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Suncor Energy Products Partnership

Liquid Petroleum Hydrocarbon Assessment
Hounsfield Heights Area
1620 – 14th Avenue NW
Calgary, Alberta

Clifton

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6/29/2021

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Executive Summary

Clifton Engineering Group Inc. was retained by Suncor Energy Products Partnership to conduct a Liquid Petroleum Hydrocarbon (LPH) Assessment in the northern portion of Hounsfield Heights, bound by 16th Street to the west, Lion's Park to the north and the laneway between 15th and 16th Street to the east. The LPH Assessment was a requirement of Ministerial Order 09/2020 to address Item 3 and Item 4 of Environmental Protection Order (EPO) – 2018/01-SSR (and amendments).

Item 3 and Item 4 of EPO 2018/01-SSR state the following:

"3. The Parties shall complete the delineation of the presence of liquid petroleum hydrocarbons in Hounsfield Heights neighborhood, as outlined in the Clifton Report and in accordance with the Remediation Plan approved by the Direction, within 18 months of the date of the Ministerial Order issued in EAB Appeals 17-069-070 and 18-013."

"4. The Director may extend the 18-month deadline specified in condition 3 if the Parties have difficulty obtaining access to private property, but the intent of the deadline, which is to complete delineation in a timely manner, should remain."

Based on the requirements set forth in EPO 2018/01- SSR and as outlined in the Revised Remediation Plan (Version 3.0), Clifton conducted a Liquid Petroleum Hydrocarbon (LPH) Assessment which involved a review of the historical LPH monitoring data, current LPH monitoring data, Dual Phase Vapour Extraction (DPVE) system operation and performance testing as well as an intrusive subsurface investigation within City of Calgary right-of-ways and parks.

As part of the LPH Assessment, four residents were contacted regarding obtaining access to their property(s) for investigative purposes. At the time of this report, access has not been granted to any of the properties.

The objectives for the LPH Assessment were to:

1. Complete DPVE performance testing to determine a zone of pneumatic and drawdown influence established through various DPVE operational configurations.
2. Complete a subsurface investigation to determine if LPH is still present in areas where it had been previously identified prior to well decommissioning.
3. Complete an assessment, based on multiple lines of evidence, of the current state of LPH within the investigated area.

In order to complete the objectives, Clifton first completed its DPVE performance testing which involved determining the integrity of the DPVE header network, the pneumatic influence achieved by the system as well as the extent of the hydraulic drawdown created by the system.

Following the performance testing, a historical LPH data review was completed to help form the basis of the subsurface investigation. The subsurface investigation was completed to assess for the presence of LPH in, and adjacent to, areas where it had been previously identified. The review of the DPVE performance testing data, the historical LPH data and the subsurface investigation data was then assessed to help determine the current presence/absence of LPH within the investigated area through multiple lines of evidence. To provide further context surrounding the results obtained during this assessment, LPH has been classified into the following three categories based on its level of saturation within the soil matrix:

- Migrating: The LPH body moves laterally based on its degree of saturation and LPH-head;
- Mobile: LPH moves vertically and horizontally, at a pore-scale level, under a gradient; and
- Residual: LPH is discontinuous and does not occupy enough pore space to flow.

Based on the findings from this investigation and multiples lines of evidence, Clifton concludes the following:

- Migrating LPH does not appear to be present within the investigated area.
- Mobile LPH does not appear to be present within the newly investigated areas nor in the areas where it had been previously identified.
- There is some evidence to suggest residual LPH is still present in select locations.
- Based on the data, the DPVE appears to have been effective in helping to reduce LPH saturation to a level at, or below, residual phase.
- The DPVE performance testing suggests that the areas beneath the residences would likely be reflective of the surrounding investigated areas based on the radius of influence achieved by the system.
- The data obtained during this assessment should be used as part of the Remedial Options Assessment to help determine how the DPVE system will be used in the future.

Use of this report and this Executive Summary is subject to the terms outlined in the Closure section of this report (Section 11.0). The reader’s attention is specifically drawn to these conditions as it is considered essential that they be followed for the proper use and interpretation of this report.

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1.0 Introduction

Clifton Engineering Group Inc. (Clifton) was retained by Suncor Energy Products Partnership (Suncor) to address Item 3 and Item 4 of Environmental Protection Order (EPO) – 2018/01-SSR (and amendments) as required by Ministerial Order 09/2020.

Item 3 and Item 4 of EPO 2018/01-SSR state the following:

“3. The Parties shall complete the delineation of the presence of liquid petroleum hydrocarbons in Hounsfield Heights neighborhood, as outlined in the Clifton Report and in accordance with the Remediation Plan approved by the Direction, within 18 months of the date of the Ministerial Order issued in EAB Appeals 17-069-070 and 18-013.”

“4. The Director may extend the 18-month deadline specified in condition 3 if the Parties have difficulty obtaining access to private property, but the intent of the deadline, which is to complete delineation in a timely manner, should remain.”

Based on the requirements set forth in EPO 2018/01- SSR and as outlined in the Revised Remediation Plan (Version 3.0), Clifton conducted a Liquid Petroleum Hydrocarbon (LPH) Assessment within the northern portion of the community of Hounsfield Heights (Study Area). The Study Area is depicted in Figure 1 of the attachments and is bound by 16th Street to the west, the laneway between 15th and 16th Street to the east and by Lion’s Park to the north. In accordance with EPO 2018/01-SSR, the LPH Assessment is to be completed by August 2021.

The LPH Assessment involved a review of the historical LPH monitoring data, current LPH monitoring data, Dual Phase Vapour Extraction (DPVE) system operation and performance testing as well as an intrusive subsurface investigation within City of Calgary right-of-ways and parks.

As part of the LPH Assessment, four residents were contacted regarding obtaining access to their property(s) for investigative purposes. At the time of this report, access has not been granted to any of the properties.

The data gathered and reviewed as part of this LPH Assessment has been used to form a weight-of-evidence based conclusion on the current presence of LPH within the Study Area.

2.0 Liquid Petroleum Hydrocarbon

The information provided within this section of the report has been referenced from the Interstate Technology Research Council (ITRC) guidance *Light Non-Aqueous Phase Liquid (LNAPL)-3: LNAPL Site Management: LCSM Evolution, Decision Process, and Remedial Technologies*.

The intent of this summary is to provide a high-level overview of what LPH is, how it enters the environment and how it behaves once in the environment. This will help to form the basis and rationale of our assessment and the conclusions which were drawn.

LPH is defined as liquid petroleum hydrocarbon and in the case of this assessment, we are referring to the raw gasoline released into the subsurface from infrastructure associated with the former service station. A more accurate term, which also describes the behaviour of the gasoline, is LNAPL. LNAPL is defined as a light non-aqueous phase liquid that has a density less than water and is immiscible with water. The terms LNAPL, LPH and “free product” are often used interchangeably and to be consistent with EPO 2018/01-SSR and the Revised Remediation Plan (Version 3.0), the term LPH will be used in place of LNAPL in this assessment.

When LPH is released into the environment it will migrate vertically through the force of gravity and by way of permeable pathways. If the release is of significant volume, the LPH can eventually reach the water table where it will expand horizontally and vertically. If the pressure head on the LPH is significant enough, a depression of the water table can occur and the LPH body can drive down into the saturated zone to an extent defined by the buoyancy of the LPH and the resistive forces of the soil column. Once the source of the LPH is eliminated, the LPH body will continue to expand for a short time-period until it has stabilized. At this point, the LPH body will typically no longer expand assuming no additional LPH is released, and no significant hydrogeological changes occur.

The process of an LPH release, to a stable LPH body, is largely defined in three categories based on the saturation of LPH within the soil. These categories include:

- Migrating LPH;
- Mobile LPH; and
- Residual LPH.

Migrating LPH refers to the lateral movement of an LPH body as a result of its saturation level and LPH-head. This movement represents a plume-scale behaviour which occurs earlier on during a release, or immediately following a release, until the LPH head-gradient dissipates and begins to mimic the groundwater.

Mobile LPH refers to the movement, vertically or horizontally, at a pore-scale level, of an LPH body under a given groundwater gradient. The degree and extent of the LPH body to be mobile is based on its saturation level and the pore-space connectedness. Observing LPH within a monitoring well is generally a good indicator that mobile LPH is present.

Lastly, residual LPH refers to the presence of LPH that is discontinuous and does not occupy enough pore space to flow. Residual saturation refers to the point where the resistive forces of the soil pore space cannot be overcome by the LPH.

3.0 Study Area Characterization

3.1 LPH History and Current State

The Kal-Tire Automotive Centre, located at 1620 – 14th Avenue NW in Calgary Alberta, was originally developed as a service station and automotive centre in 1958. The service station was located at the North Hill Shopping Centre on a property owned by Sears and operated as a Sears Service Centre from 1958 to 1984. From 1984 to 1995, the location was operated under license as a Sunoco Service Station. An addition to the automotive centre building was constructed in 1982 and a separate gas bar kiosk was added in 1989. The original USTs were replaced in 1984 and in October 1995 fuel storage and dispensing facilities at the gas bar were decommissioned. The former Sears Service Centre continues operating at the site under license to Kal-Tire Automotive Centre.

Since decommissioning of the fuel storage and dispensing facilities in 1995, several environmental site assessments (ESAs) have been conducted both on and off-site associated with the occurrence of soil and groundwater petroleum hydrocarbon (PHC) contamination. As part of these investigations, LPH was first encountered within the North Hill Mall property (1620-14th Avenue) in1998. Subsequently, two remedial excavations were completed to address these areas where LPH was observed in 2003 and 2004. In addition to these two smaller excavations, a larger remedial excavation was completed between 2006 and 2007 within the parking lot to the east of the Kal-Tire Automotive Centre to remove PHC impacted soil and any LPH that may have been present. Since the completion of the remedial excavation in 2006 and 2007, LPH has no longer been encountered in any monitoring wells in the Mall Area.

LPH was also first encountered within the community of Hounsfield Heights in 1998 in two monitoring wells (BH213 and BH214) located on 13th Avenue NW. Subsequently, between 1998 and 2012, several additional ESAs were completed throughout Lion's Park and the community of Hounsfield Heights to further define and delineate the presence of soil and groundwater PHC contamination as well as the presence of LPH. During this time, LPH was observed in 12 groundwater monitoring wells within the community of Hounsfield Heights and Lion's Park:

- BH209, BH213, BH214, BH702 and BH1703 - located on 13th Avenue near 16th Street NW;
- BH509, BH705 and BH706 – located on 16th Street NW near 13th Avenue NW;
- BH510, BH510A and BH725 – located in the laneway between 15th Street NW and 16th Street NW; and
- BH1105 (sheen only) – located in Lions Park.

All of the above monitoring wells, with the exception of BH1703, were decommissioned in 2008 prior to the installation and operation of the Dual Phase Vapour Extraction (DPVE) system. The decommissioning which was completed in 2008 was a result of these wells being within the LPH plume or adjacent to the proposed (at the time) extraction wells. As some of the wells were screened across multiple soil units there was the potential that this could result in short-circuiting of air from higher permeability soil strata to the

adjacent extraction wells. Monitoring wells BH209, BH509, BH702, BH705, and BH706 still contained LPH during their most recent monitoring event prior to the decommissioning in 2008 while the remaining wells no longer showed the presence of LPH. Monitoring well BH1703 was decommissioned in 2014 and during its previous monitoring event in 2013 also did not show the presence of LPH. The decommissioning of BH1703 in 2014 was completed as part of a well abandonment program which included over 70 wells prior to installing a more unit specific groundwater monitoring well network.

Since the decommissioning of monitoring well BH1703, LPH has only been encountered in one monitoring well (which includes all extraction wells) within Hounsfield Heights, BH1704. Monitoring well BH1704 is located along 13th Avenue NW between 16th Street and the gravel laneway to the east. LPH was first encountered in this monitoring well in 2015 and since June 2019 has no longer been observed. As a result, no LPH is currently being observed on-site. However, as mentioned above, several of the wells which historically contained LPH were decommissioned and some of these wells still contained LPH prior to their decommissioning.

Although the 1900 series monitoring wells provides a comprehensive well network, there are immediate data gaps in some of the areas where LPH was previously observed. Furthermore, there has never been any direct investigation on residential properties for the purposes of identifying and potentially delineating the presence of LPH. An interpretation has been made based on the extent of LPH surrounding residential properties, on the eastern and western boundaries, that some of these properties may potentially have LPH beneath them. Two of the objectives of this LPH Assessment are to address these data gaps as described in Section 3.5 and 4.0 of this report.

Figure 2 shows the current monitoring well network and Figure 3 shows the historical (decommissioned) and current monitoring wells where LPH has been encountered.

Finally, it should be noted that the exact date and timeframe of when the release(s) occurred from the former service station (operating from 1958 to 1995), and the amount of LPH released during that timeframe into the environment, is unknown. It is unclear whether there were multiple releases, one large release, a continuous release or a combination of all three of these.

3.2 Passive Recovery of LPH

Since the initial observations of LPH within monitoring wells BH213 and BH214 in 1998, Clifton implemented a passive bailer recovery program to capture, remove and dispose of the accumulated LPH in each monitoring well. This program was conducted until LPH was no longer observed in a specific monitoring well or until the monitoring well was decommissioned.

Between 1998 and 2013, when the final well, BH1703, containing LPH was decommissioned, a total of 478 L of LPH had been recovered through this program.

Between 2015 and 2019, an additional 4.4 L of LPH had been removed from monitoring well BH1704. Since June 2019, LPH has not been observed in any monitoring wells throughout the site.

3.3 DPVE Operation

In the original Site Management Plan (SMP) (31 May 2006), following a field level pilot study, Clifton recommended the installation and operation of a DPVE system within the community of Hounsfield Heights. The primary objective of the DPVE system, as stated in the 2006 SMP, was to remove and control LPH to the extent practicable. A secondary objective for the DPVE was to reduce the dissolved phase PHC impacts by removing groundwater from the subsurface and treating this water for discharge to the municipal sanitary sewer system. A third objective for the DPVE was to further reduce the PHC impacts by removing soil gases from the impacted soil strata, promoting desaturation of the smear zone during groundwater depression and providing oxygen for biodegradation of PHCs through forced aeration of the soil.

Based on this recommendation, Clifton initiated the installation of the DPVE system and associated infrastructure in 2008. The DPVE system skid was installed by Ground Effects Environmental Services, followed by the installation of seven extraction wells and an underground header system connecting the extraction wells to the system. The extraction wells were placed in a configuration surrounding the residential properties bound by the laneway to east, 13th Avenue to the north and 16th Street to the west. This design was intended to create a zone of influence which would capture the areas beneath the residential properties. The unit was housed within an enclosed fenced area, receiving power and internet service from the overhead utilities in the laneway to the south and connected to the City's sanitary sewer system via an underground utility connection to the east of the system.

The DPVE was officially started in October 2010 and began running full time in June 2011. For approximately the first four years of operation all seven extraction wells were employed. In 2015, based on the most recent presence of LPH being observed in monitoring wells BH1703 and BH1704, the system operation was re-configured to use extraction wells EX-4 through EX-7 which were in closest proximity to the LPH observed on-site. This involved closing the headers to extraction wells EX-1 to EX-3 and directing the vacuum to the headers connected to extraction wells EX-4 to EX-7. This continues to be the current configuration. This decision relates back to the primary objective of the DPVE which was to remove the LPH.

As part of the DPVE system, a datalogging program has been in place since system start-up to record extracted groundwater volume as well as vacuum flow rates and the temperature and concentration of the extracted soil vapour. Vacuum flow rates, temperature and concentration of the extracted vapour are then used to calculate a vapour equivalent LPH volume. As a result of issues with some of the sensors used to capture flow rate and temperature, resulting in the use of assumptions based on past data, the data logging system was successfully changed to a manual capture system in 2020, which has been done on a weekly basis since its implementation.

Since the initial operation of the DPVE in October 2010, and up to the end of May 2021, it is estimated that approximately 2,219,000 L of contaminated groundwater has been captured and treated and discharged to the City of Calgary sanitary sewer system. In addition, based on the data logging system up to 28 May 2021, it is also estimated that approximately 12,683 L of vapour equivalent LPH has been extracted from the subsurface and treated. It should be noted that the vapour equivalent represents an approximation of LPH volume based on concentrations observed within the soil vapour. To put this in context, you can estimate an extracted vapour equivalent LPH without even having LPH on site and only having dissolved phase, vapor phase and soil contamination present. Based on this, these estimates are to be viewed from the perspective of contaminant recovery (in all phases) as it relates to concentration trends in the groundwater, soil vapour, and whether or not LPH is still being detected within monitoring wells. This is further compounded by the fact that the volume of the LPH release is unknown.

The DPVE system layout is presented in Figure 4.

3.4 Natural Source Zone Depletion

The information presented below on Natural Source Zone Depletion has been referenced from the ITRC guidance document *Light Non-Aqueous Phase Liquid (LNAPL)-3: LNAPL Site Management: LCSM Evolution, Decision Process, and Remedial Technologies*.

Natural Source Zone Depletion (NSZD) is a term used to describe the natural processes through which LPH will degrade and partition into the aqueous and gaseous phases within the subsurface environment following a release. These processes will begin as soon as the LPH enters the subsurface, primarily through volatilization and dissolution once the water table is contacted. At this point, NSZD is dominated by biodegradation processes at the various interfaces of the LPH within the subsurface.

Direct-contact biodegradation occurs at the immediate interface between the LPH and soil pores and results in the production of soil gases, primarily CO_2. Biodegradation of LPH constituents also occurs throughout the entire smear zone (saturated, transition and unsaturated zones). This biodegradation can occur both aerobically and anaerobically and measuring soil vapour gases reflective of these processes can be done to provide evidence that this is occurring. Finally, LPH will also partition into the groundwater, as is observed when dissolved phase hydrocarbons are encountered adjacent to an LPH source. The biodegradation of these constituents can be assessed by looking at the presence and distribution of select geochemical parameters which act as oxidizing and reducing agents.

NSZD will occur at all sites where LPH is released into the subsurface. The rates of degradation are affected by several site-specific conditions including the temperature, soil moisture, soil gas permeability, groundwater geochemistry and microbiology. Based on the information provided in the ITRC resource, rates have been estimated to be between 2,650 to 10,600 litres/acre/year.

The NSZD processes described above are occurring within the LPH zone of our Study Area and should be factored into the discussion surrounding any potential remaining LPH.

3.5 Current Data Gaps

Based on the information presented in the previous sections, three primary data gaps have been identified by Clifton for the Study Area, they are as follows:

1. It is currently unknown if the areas where LPH was previously observed prior to well decommissioning still contain LPH.
2. It is currently unknown if the interpreted extent of LPH within areas occupied by residential properties still contain LPH.
3. If LPH is still present on site, is it at a migrating, mobile or residual saturation or a combination of two or more of these saturation levels.

The current LPH Assessment has been designed to address these data gaps. The specific objectives and scope of work are presented in the following section.

4.0 Objective and Scope and Work

The following three objectives have been identified for this LPH Assessment:

1. Complete a subsurface investigation to determine if LPH is still present in areas where it had been previously identified prior to well decommissioning.
2. Complete DPVE performance testing to determine a zone of pneumatic and drawdown influence established through various DPVE operational configurations.
3. Complete an assessment, based on multiple lines of evidence, of the current state of LPH within the Study Area.

The specific scope of work to address the first objective (subsurface investigation) was as follows:

- Obtain utility clearance through Alberta One-Call and a private utility locator;
- Obtain a license of occupation, utility line assignment, excavation permit and street use permit from the City of Calgary;
- Develop a tree protection plan for approval by the City of Calgary for boreholes advanced within Lion's Park;
- Notify residents within the immediate vicinity of the drilling locations with a proposed drilling schedule;
- Advance three boreholes completed as monitoring wells to a depth of approximately 14 m below ground surface (bgs) along 16th Street NW in, and adjacent to, areas where LPH had been previously identified;
- Advance two boreholes completed as monitoring wells to a depth of approximately 14 m bgs within Lion's Park, north of monitoring well BH1704, to further define the presence of LPH within these areas;

- Advance one borehole completed as a monitoring well to a depth of approximately 17 m bgs within the laneway between 15th and 16th Street NW in an area where LPH had been previously identified;
- Collect and submit up to three soil samples from each borehole for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), PHC fractions F1 to F4, and volatile organic compounds (VOCs);
- Obtain select samples from each borehole for shake tests;
- Collect and submit nine soil samples for analysis of Unified Soil Classification System (USCS) through Atterberg and Hydrometer testing;
- Return to the site the following week to develop the new monitoring wells;
- Following development of the monitoring wells, return to the site approximately one week later to monitor the fluid levels and obtain vapour concentration measurements followed by the collection of groundwater samples for analysis of BTEX, PHC fractions F1 to F2 and VOCs;
- Complete *in-situ* hydraulic conductivity testing on two of the newly-installed monitoring wells.
- Follow the quality assurance and quality control (QA/QC) sampling program;
- Survey the horizontal and vertical position of the six new wells; and
- Compare the soil and groundwater results to the AEP 2019 Tier 2 Guidelines as well as the Site-Specific Tier 2 Quality Guidelines.

The specific scope of work to address the second objective (DPVE performance testing) was as follows:

- Retain Sequoia Environmental Remediation Inc. (Sequoia) to complete a header integrity test and preliminary pneumatic influence testing on the DPVE system;
- Complete additional pneumatic influence testing under varying operational configurations over 24-hour periods; and
- Complete drawdown testing under varying operational configurations over a three-week period.

The specific scope of work to address the third objective (LPH presence and saturation) was as follows:

- Review historical and current LPH information from the Study Area;
- Assess subsurface investigation data with respect to the presence/absence of the LPH;
- Assess pneumatic and drawdown influence testing of the DPVE system to determine an approximate areal extent of system influence; and
- Assess all lines of evidence and develop a report documenting the information gathered and conclusions related to the presence of LPH within the Study Area.

5.0 Subsurface Investigation – Field Activities

5.1 Soil Investigation

The following sections discuss the field activities that occurred between 27-30 April 2021.

5.1.1 Safety and Utility Locates

Before ground disturbance activities began, underground utilities were located through the services of Alberta One-Call and a private utility locating company. A health and safety briefing was completed by Mr. Bryn Gelowitz and Mr. Austin Mei of Clifton which involved the contractors, prior to the commencement of the field work to identify all potential hazards and controls to mitigate the hazards. All staff on-site were current Petroleum Orientation Safety Training (POST) certification holders. The entire safety program was completed to meet the POST standards.

5.1.2 Soil Sampling Methods

Clifton personnel supervised the advancement of six boreholes completed as monitoring wells (MW6001 to MW6006). The boreholes were advanced with a direct-push GeoProbe 8040 DT drill rig supplied and operated by All Service Drilling Inc. of Airdrie, Alberta.

The location and rationale for each borehole is provided in the following table.

Well ID	Location	Rationale
MW6001	16th Street NW	Delineation of potential LPH
MW6002	16th Street NW	Immediate vicinity of previous LPH presence (BH509, BH705 and BH706)
MW6003	Corner of 13th Avenue and 16th street NW	Immediate vicinity of previous LPH presence (BH1703)
MW6004	Lion's Park	Additional refinement and delineation of LPH previously identified in BH1704
MW6005	Lion's Park	Additional refinement and delineation of LPH previously identified in BH1704
MW6006	Laneway between 15th and 16th Street NW	Immediate vicinity of previous LPH presence (BH510 and BH725)

Borehole/monitoring well locations are presented in Figure 5 of the attachments. The borehole logs of the newly-installed monitoring wells are included in Appendix A1 and the logs for the historic wells along with their groundwater monitoring records as referenced in the above table are provided in Appendix A2.

5.1.2.1 Soil Sample Collection

During completion of the boreholes, soil samples were collected by pushing a clear, polyvinyl chloride (PVC) core tube into the subsurface. The core tube was then extracted from the borehole and opened by the drilling crew. For the upper approximately 8.0 m of each borehole, the 1.5 m sample cores were split into a top and bottom interval with a sample collected from each interval. Once the boreholes were advanced past approximately 8.0 m in depth, the sampling intervals were reduced to 0.3 m as well as to specific areas where color, vapours and odors suggested the potential presence of PHCs. A discrete sample was collected from the specific intervals. The detailed sampling intervals at each location are presented in the Borehole Logs attached in Appendix A1.

In addition to the discrete sampling, Clifton also obtained one representative sample, from each 0.3 m interval where field observation indicated the potential presence of PHC contamination, for a shake test. Approximately ¼ of a 125 ml jar was filled with soil, with the remaining space filled with deionized water. The samples were then vigorously shaken, labelled and allowed to settle prior to completing observations in a laboratory setting approximately one week later. The observations involved examining the sample to see if a separate phase liquid was present on top of the water surface, assessing the sample for a sheen or odor and completing a Kolor Kut Gasoline Gauging Paste test. The Kolor Kut Gasoline Gauging Paste test involved the application of the paste to testing strip which was then placed into the sample water and then removed. If hydrocarbons are present in a free phase form, the gauging paste will change color to a bright pink.

5.1.2.2 Sample Containers and Preservation

For each sample collected, a portion of the soil sample (approximately 5 grams) was collected with a Terra Core® soil sampler and placed into two laboratory-supplied, pre-weighed, methanol-preserved 40 mL vials. The samples collected with the Terra Core® soil samplers were submitted for analyses of volatile compounds including BTEX and PHC fraction F1. Another portion of the soil sample interval was placed into one laboratory-supplied, 125 mL glass sampling container with a Teflon®-lined lid. The sample collected in the glass sampling jar was used for analyses of moisture content and PHC fractions F2 – F4. The last portion was placed into a resealable plastic bag. The laboratory sample containers were labelled, and the vial and jar samples were stored on ice to minimize volatilization and degradation. The bag sample was set aside for field screening of organic vapours.

5.1.2.3 Decontamination Procedures

Decontamination procedures between sample locations included cleaning the putty knives with a solution of deionized water and Alconox Liquinox™ soap, and then rinsed with deionized water. New PVC liners were used to collect soil samples from each borehole. A new pair of nitrile gloves was worn during the collection of each soil sample to prevent cross-contamination.

5.1.3 Field Vapour Screening

Field screening for headspace vapours was conducted on each soil sample with a Minirae 3000 photoionization detector (PID). A bump test was completed on April 29th and 30th to confirm the calibration of the Minirae 3000 PID. This included the introduction of known concentrations of isobutylene gas.

Due to the inexact volume of the headspace and varying soil conditions, detector readings should only be considered a relative indication of vapour concentrations. Soil moisture and humid atmospheric conditions have been known to produce falsely elevated organic ionizable vapour readings, due to condensation on the lamp.

Each soil bag sample was allowed to warm up outside within the direct sunlight and had their temperatures taken to ensure that the bags reached approximately 15 ºC prior to obtaining a vapour reading. The bags were then opened and the Minirae 3000 sensor placed inside the bag to secure a reading of the gasses. This was completed for each of the samples, with the results recorded into a field log. After the probe was removed from the sample bag, the Minirae 3000 was allowed to record the ambient air in the area where the sample readings were taken until the levels had dropped to 0 parts per million (ppm), prior to recording the readings of the next sample.

5.1.4 Soil Analytical Selection

Two soil samples were selected from each borehole (MW6001 to MW6006) for analysis based on the presence of odours, discolouration, elevated vapours or grain size from a known depth interval of PHC contamination based on past drilling. A third soil sample was selected from the six boreholes from a depth below the interpreted zone of impacts to help determine the vertical extent of potential contamination. Eighteen soil samples, excluding duplicates, were analyzed for the contaminants of concern which included BTEX, PHC fractions F1-F4, and VOCs.

Nine soil samples were obtained from boreholes BH6001, BH6003, BH6005 and BH6006 for USCS at a depth corresponding with the geological unit defined as Unit 3 (Revised Remediation Plan (Version 3.0), March 2021).

5.1.5 Laboratory and Chain of Custody

The soil samples were submitted to AGAT Laboratories of Calgary, Alberta for analyses under Chain of Custody (COC) control within ice filled coolers. Samples were submitted within the required holding time for the analytes selected and temperatures were checked and recorded on the COC upon arriving at the laboratory. The completed COC documentation included the name of the sampler, date/time relinquished, date sampled, and temperature of the samples. Copies of the COCs have been attached along with the Certificates of Analysis in Appendix B.

5.2 Groundwater Investigation

As part of the investigation, all six boreholes (MW6001 to MW6006) were completed as monitoring wells. See Figure 5 for the monitoring well locations.

5.2.1 Groundwater Monitor Well Construction Methods

The monitoring wells were constructed using 50 mm inner diameter (ID) Schedule 40 PVC. The well screen is 0.25 mm (0.010") slotted screen, capped at the base. Solid PVC risers of corresponding diameter were attached to the screens up to the ground surface. The riser was capped with a watertight J-Plug well cap.

The screened interval was carefully selected to ensure it would intersect the observed contaminated zone and allow, if present, LPH into the well screen. This process was based on viewing the water level in nearby monitoring wells that were screened in the same geological unit. Upon choosing the depth of the screened interval, the borehole was backfilled with hydrated bentonite chips to approximately 0.3 m below the bottom of the well placement. The annulus, 0.3 m below to 0.3 m above the screen, was then backfilled with 10/20 filter sand, followed by approximately 0.15 m of bentonite chips. The remainder of the annulus was backfilled with a grout slurry to just below the ground surface. All wells were finished with a metal road box concreted in place at the surface.

The following is a summary of screen interval depths and the corresponding unit they were completed in.

Well ID	Screen Depth (m)	Soil Unit[1]
MW6001	9.75 – 12.80	Unit 3
MW6002	10.67 – 13.72	Unit 3
MW6003	9.75 – 12.80	Unit 3
MW6004	9.14 – 12.19	Unit 3
MW6005	9.14 – 12.19	Unit 3
MW6006	12.19 - 15.24	Unit 3

1 – Soil unit description based on geological unit characterization presented in Revised Remediation Plan (Version 3.0), March 2021

5.2.2 Groundwater Monitoring and Sampling Methods

As part of the groundwater investigation program the six new monitoring wells were all developed the week following the drilling on 03 May 2021. The groundwater monitoring, sampling and *in-situ* hydraulic conductivity testing all took place the following week between the 12th and 13th May 2021.

5.2.2.1 Monitoring Well Development Methods

On 03 May 2021, all six newly-installed monitoring wells were developed. The well development was completed using Waterra tubing with a foot valve.

Development was completed by extracting up to three well volumes of groundwater or until the well went dry and was no longer able to recover. The monitoring wells were developed by surging the tubing up and down within the screened interval of the well standpipe to dislodge clay and silt particles that may have collected either within the well itself, or in the sand pack that was placed around the well screen. It should be noted that all six wells went dry prior to removing three well volumes.

5.2.2.2 Standpipe Vapour Screening

The ambient headspace vapour concentrations in all the monitoring well standpipes were measured using a Minirae 3000. The J-plug on the monitoring well was quickly removed and the probe of the Minirae 3000 was placed in the pipe which was then sealed by the technician's hand. The Minirae 3000 PID sensor was removed from the monitoring well after highest concentration was recorded. Refer to Section 5.1.3 for details on operation and calibration of the Minirae 3000. A bump test was performed on the Minirae 3000 on 12 May 2021.

5.2.2.3 Fluid Level Measurements

Fluid levels, including groundwater and any potential LPH, and total well depth were measured using a Heron oil/water interface meter. During the fluid level measurements, Clifton also performed a Kolor Kut Gasoline Gauging Paste test as well as a clear disposal bailer test to assess for the presence of LPH. The Kolor Kut Gasoline Gauging Paste test involved applying the paste to the interface meter tape directly above the probe. Following obtaining a surface water level, the probe was lowered into the well column slowly to ensure the paste passed through the water surface. Upon retrieval of the water tape, the colour of the paste was assessed to determine if it indicated the presence of a free phase hydrocarbon by turning to a bright pink color. The clear disposable bailer test involved slowly lowering the bailer into the water column, without completely submersing it, and allowing the bailer to fill prior to removal. Once the bailer was removed and brought to the surface it was visually examined for indicators of LPH.

5.2.2.4 Groundwater Sample Collection

After the fluid levels were monitored, the groundwater in all wells was sampled using a dedicated disposable bailer. All groundwater samples were placed into laboratory-supplied sampling containers and placed into ice-filled coolers.

5.2.2.5 Decontamination Procedures

The oil/water interface meter was cleaned between monitoring wells using a solution of deionized water and Alconox Liquinox™ soap, and then rinsed with deionized water. New foot valves and Waterra tubing were used to develop each well. A new pair of nitrile gloves was worn for each sample during collection to prevent cross-contamination. A new weighted disposable bailer was used at each monitoring well location for sampling and a separate clear disposable bailer (also new) was used at each well for the LPH-bailer check test.

5.2.2.6 Groundwater Analytical Selection

Groundwater samples were collected from the six monitoring wells and analyzed for potential contaminants of concern (BTEX, PHC fractions F1-F2 and VOCs).

5.2.3 Laboratory and Chain of Custody

The groundwater samples were submitted to AGAT Laboratories of Calgary, Alberta for analyses under COC control within ice-filled coolers. Samples were submitted within the required holding time for the analytes selected and temperatures were checked and recorded on the COC upon arriving at the laboratory. The completed COC documentation included the name of the sampler, date/time relinquished, date sampled, and temperature of the samples. Copies of the COCs have been attached along with the Certificates of Analysis in Appendix C.

5.2.4 Hydraulic Conductivity Testing

On 13 May 2021, Clifton performed a rising and falling head slug test on monitoring wells BH6005 and BH6006 to determine the *in-situ* hydraulic conductivity of geological Unit 3 (Revised Remediation Plan (Version 3.0), March 2021).

The falling head slug test is performed by adding a PVC slug to the monitoring well. The slug displaces a volume of water, and the water level rises to a level higher than the static water level. The water level then decreases over time back to the approximate static water level. Following the falling head slug test, a rising head slug test was performed by removing the PVC slug. The removal of the slug causes the water level to fall to a level lower than the static water level. The water level then increases over time back to the approximate static water level. The change in water levels was measured by a Solinst Levelogger data logging pressure transducer.

The data recorded by the Solinst Levelogger was downloaded and input into Waterloo Hydrogeologic's AquiferTest software. Hydraulic conductivity values were calculated using the Hvorslev method.

The results from the hydraulic conductivity testing are presented in Appendix D.

5.3 Quality Assurance and Quality Control Program

As part of the QA/QC program for this investigation, Clifton included the following: collection of two soil field duplicate samples, collection of one groundwater field duplicate sample, submission of five trip blanks, and a laboratory data review.

5.3.1 Field Duplicate Samples

Field duplicate samples are separate samples collected as close together in space and time as possible. Variability introduced through sampling procedures, analytical procedures, or the heterogeneity of the sampled matrix may influence the resulting concentration. Duplicate samples help to quantify the confidence of the analytical result.

Two field duplicate soil samples were collected: soil sample MW6003-98 (duplicate of MW6003-18) and MW6005-92 (duplicate of MW6005-22) were submitted for analyses of BTEX, PHC fraction F1-F4 and VOCs.

One field duplicate groundwater sample was collected: groundwater sample MW6009 (duplicate of MW6005) was submitted for analyses of BTEX, PHC fractions F1-F2 and VOCs.

5.3.2 Trip Blanks

Trip blank samples help assess any volatile contamination introduced during shipping and field handling. Four soil trip blanks, consisting of two 40 mL vials containing methanol, were supplied by AGAT Laboratories and kept in the cooler each day of drilling that samples were collected, transported, and submitted to the laboratory. The soil trip blank samples were submitted for analysis of BTEX and PHC fraction F1.

A groundwater trip blank, consisting of two 40 mL vials containing deionized, organic-free water supplied by AGAT Laboratories was kept in the cooler the entire time samples were collected, transported, and submitted to the laboratory for the one day of groundwater sampling. One water trip blank sample was submitted for laboratory analyses of VOCs.

5.3.3 Laboratory Review

AGAT Laboratories conducted their own internal QA/QC program including but not limited to laboratory blanks, matrix spike, laboratory duplicates and a sample integrity checklist. Clifton reviewed the laboratory reports to ensure the COCs were complete and signed, the temperature was recorded at the laboratory, the samples were analyzed within the hold times where applicable, volatiles were analyzed within 48 hours, the certificate of analyses were signed, the samples matched the analyzed samples, the detection limits were below the applicable guidelines, and to verify the AGAT Laboratories QA/QC results.

6.0 Subsurface Investigation – Results

6.1 Soil

6.1.1 Stratigraphy

The general soil stratigraphy in all the boreholes was consistent with previous investigations throughout the Study Area and was as documented in the Revised Remediation Plan (Version 3.0). The upper unit, Unit 1, was encountered in each of the boreholes and predominantly consisted of a silty sand from below the surface materials (asphalt, gravel, or organics) to approximately 4.0 m bgs, with the exception of MW6006, where Unit 1 extended to approximately 6.0 m bgs. In MW6004, there was also an area of fill encountered within Unit 1 from a depth of 1.5 m to 3.0 m bgs. The next unit encountered, Unit 2, defined as a clayey silt, consisted of alternating clay and silt layers to a depth of approximately 9.5 m bgs, with the exception of

MW6004 and MW6006. In MW6004, Unit 2, appears to extend to 10.5 m bgs where a silt unit is encountered with some sand and in MW6006, Unit 3, defined as a sandy silt was encountered at approximately 13.0 m bgs.

Unit 3 was observed to have an immediate change in grain size from Unit 2, where a medium to fine grained silty sand was encountered at the top of this Unit in all boreholes, with the exception of MW6004. Silt was encountered beneath the silty sand encountered in Unit 3 until the maximum depth of exploration. It should be noted that the exceptions observed in borehole MW6006 related to the depth of geological units is likely attributable to the fact that this borehole was located at a higher elevation than the others.

In addition to the visual soil classifications performed by Clifton in the field, Clifton's Materials Laboratory also performed Hydrometer and Atterberg Limit testing to define the soil under the USCS. Select samples from Unit 3 were obtained from boreholes MW6001, MW6003, MW6005 and MW6006 for Hydrometer and Atterberg Limit testing. Based on the results of the testing, the sand encountered in Unit 3 is predominantly defined under the USCS as a silty sand (SM) and the silt encountered in Unit 3 has been defined under the USCS as a silt (ML).

Borehole logs and the symbols and terms reference guide are provided in Appendix A1. Atterberg Limits and Hydrometer testing results are provided in Appendix E.

6.1.2 Field Screening Results

Field measurements of soil vapour concentrations were performed using a Minirae 3000. The PID vapour readings from the collected soil samples ranged from 0 ppm to 2926 ppm. The maximum reading (2926 ppm) was measured from a soil sample collected from borehole MW6005 at a depth of 9.60 m bgs. Soil vapour PID readings are presented on the borehole logs in Appendix A1.

6.1.3 Soil Analytical Results

Under the AEP 2019 Tier 1 Guidelines the Study Area is classified as Residential/Parkland land use. Based on grain size analysis completed in previous investigations as well as those completed during this investigation, the Site is primarily classified as having fine-grained soils. There are, however, some samples obtained from the upper portion of Unit 3 that were classified as coarse-grained and therefore those soil samples have been compared to the coarse-grained guidelines.

For purposes of this assessment, all receptor pathways considered under the AEP 2019 Tier 1 Guidelines are applicable to the Study Area, except for the Freshwater Aquatic Life (FAL) pathway for PHCs and some VOCs. Under the AEP 2019 Tier 2 Guidelines, the FAL pathway can be excluded for PHCs and some VOCs if the contamination related to the site is greater than 300 m upgradient of a surface water body and a minimum of 100 m downgradient from a surface water body. This pathway is still applicable for the primary VOC 1,2 – dichloroethane which has been detected on site in the past. As a result, Clifton has defaulted to the AEP 2019 Tier 1 Guidelines for VOCs.

The soil laboratory Certificates of Analysis have been attached in Appendix B. Analytical results for soil samples are presented in Tables 1 and 2 of the attachments.

6.1.3.1 BTEX and PHC fractions F1-F4

Eighteen soil samples, excluding duplicates, were submitted for analyses of BTEX and PHC fractions F1-F4 and compared to the AEP 2019 Tier 2 Guidelines.

Soil samples from every borehole exceeded the AEP 2019 Tier 2 Guidelines for at least one of the BTEX and PHC fractions F1 to F4 parameters. The deepest sample submitted from each borehole met the applicable guidelines except for samples from boreholes MW6002 and MW6005. Seven of the 18 samples submitted for analysis of BTEX and PHC fractions F1 to F4 met the applicable AEP 2019 Tier 2 Guidelines.

The laboratory results for BTEX and PHC fractions F1 to F4 from this investigation are presented in Table 1.

6.1.3.2 VOCs

Eighteen soil samples, excluding duplicates, were submitted for analyses of VOCs and compared to the AEP 2019 Tier 1 Guidelines.

All soil samples submitted for analysis of VOCs were below the laboratory detection limit for each parameter and therefore met the AEP 2019 Tier 1 Guidelines.

The laboratory results for VOCs from this investigation are presented in Table 2.

6.1.3.3 Shake Test

A shake test was performed on 41 soil samples obtained from the suspected contaminated zone encountered in each borehole. One soil sample indicated the presence of a sheen (MW6006-25 at 13.41 m bgs), and a second sample (MW6005-15 at 9.91 m bgs) indicated the presence of LPH through a positive Kolor Kut Gauging Paste test and the visual presence of a separate phase liquid on top of the water surface. The results from the shake test are presented in Appendix F.

6.2 Groundwater

6.2.1 Groundwater Well Monitoring Results

A summary of groundwater field measurements, including depth to groundwater, total well depths, standpipe PID vapour readings, LPH thickness, Kolor Kut Gauging Paste test and an LPH-bailer check test are provided in Table 3.

6.2.1.1 Hydrogeology

The groundwater elevations calculated for the newly-advanced monitoring wells ranged from 1077.83 m asl (MW6006) to 1079.29 m asl (MW6005). These elevations are consistent with other monitoring wells within

the area. All monitoring wells were screened in Unit 3 and will be used in the semi-annual groundwater monitoring and sampling program to produce a potentiometric surface diagram.

6.2.1.2 LPH Measurements

No LPH was measured in any of the newly-installed groundwater wells during the monitoring event using an oil/water interface meter, Kolor Kut Gauging Paste and an LPH-bailer check. A summary of the LPH measurements is presented in Table 3.

6.2.1.3 Standpipe Vapour Screening Measurements

Field measurements of the standpipe vapour concentrations were collected with the Minirae 3000 PID sensor. The vapour concentrations ranged from 1 to 1003 ppm (MW6005) during the groundwater monitoring and sampling event. A summary of the vapour concentrations is presented in Table 3.

6.2.2 Groundwater Analytical Results

For the purposes of assessing the groundwater, the guidelines have been adopted from the report titled *Human Health and Ecological Risk Assessment for the Hounsfield Heights and North Hill Mall Areas, Calgary, Alberta* (Intrinsik Corp, April 2017; revised April 2019). This includes the AEP 2019 Tier 2 Guidelines with the FAL pathway removed (for PHCs only) for site closure as well as the Site-Specific Tier 2 Groundwater Guidelines for Protection of Vapour Inhalation – Zone N1 (Site-Specific Tier 2 Guidelines). It should be noted that for the parameters of concern the AEP 2019 Tier 2 Guidelines with the FAL pathway removed are the same as the default AEP 2019 Tier 1 Guidelines.

The groundwater laboratory analytical report and associated Certificates of Analysis are attached in Appendix C. Analytical results from this investigation are presented in Tables 4 and 5 of the attachments.

6.2.2.1 BTEX and PHC fractions F1-F2

Six groundwater samples, excluding duplicates, were collected and submitted for laboratory analysis of BTEX and PHC fractions F1-F2. The results were compared to the AEP 2019 Tier 2 Guidelines and the Site-Specific Tier 2 Guidelines.

All samples from each monitoring well exceeded the applicable AEP 2019 Tier 2 Guidelines for one or more of the BTEX and PHC fractions F1 to F2 parameters. None of the samples exceeded the Site-Specific Tier 2 Guidelines.

The laboratory results for BTEX and PHC fractions F1-F2 from this investigation are presented in Table 4.

6.2.2.2 VOCs

Six groundwater samples were collected and submitted for laboratory analysis of VOCs. The results were compared to the AEP 2019 Tier 1 Guidelines and the Site-Specific Tier 2 Guidelines.

All samples from each monitoring well were below the Site-Specific Tier 2 Guidelines for all parameters. However, monitoring wells MW6004 and MW6005 exceeded the applicable AEP Tier 1 Guideline for 1,2-dichloroethane.

The laboratory results for VOCs from this investigation are presented in Table 5.

6.3 Quality Assurance and Quality Control Results

The results of the QA/QC program including the analytical results are discussed below.

6.3.1.1 Field Duplicate Samples

Comparing the sample results to duplicate results is done by calculating the relative percent difference (RPD) between the two results. RPD is calculated using the following formula:

$$\text{RPD}\ (\%) = \ \text{ABS}\left(\frac{C_1 - C_2}{\frac{C_1 + C_2}{2}}\right) * 100$$

C_1 – original sample, C_2 – duplicate sample.

Two field duplicate soil samples were collected, sample MW6003-98 (duplicate of MW6003-18) and MW6005-92 (duplicate of MW6005-22), and were submitted for analyses of BTEX, PHC fraction F1-F4 and VOCs.

One field duplicate groundwater sample was collected, sample MW6009 (duplicate of MW6005), and was submitted for analyses of BTEX, PHC fractions F1-F2 and VOCs.

For both soil and groundwater, some of the RPDs could not be calculated for some constituents as the analytical results were less than five times the reportable detection limit (RDL). The remaining RPDs that could be calculated for both the soil and groundwater duplicates were within the acceptable range with the exception of toluene and xylene(s) from soil sample MW6003-98 which had a RPD from its duplicate, MW6008-18, of 84% and 107%, respectively. The other parameters within this soil sample were within five times the RDL and therefore the RPD was not calculated. Since all other parameters in the other soil duplicate and groundwater sample where the RPD could be calculated were within the acceptable limits, we believe this likely represents heterogeneity of the constituents within the sample analyzed and is not reflective of the quality of the laboratory data.

The soil field duplicate sample results are presented in Table 6 and the groundwater field duplicate sample results are presented in Table 7.

6.3.1.2 Trip Blank Samples

The results from the five trip blank samples were all below the laboratory detection limits, which are considered acceptable. The soil trip blank results are presented in Table 8 and the groundwater trip blank results are presented in Table 9.

6.3.1.3 Laboratory QA/QC

Based on a detailed review of the laboratory quality control program, there were no issues identified within their blanks, matrix spikes, laboratory duplicates or sample integrity checklist. We have also attached our Laboratory Data Quality Control and Quality Assurance Review checklist in Appendix B and C along with the lab Certificates of Analysis.

6.4 Hydraulic Conductivity Testing

The results from the rising and falling head slug tests for monitoring wells MW6005 and MW6006 are presented below.

Monitoring Well	Screen Interval (m)	Test	Hvorslev Method (m/s)
MW6005	9.14 – 12.19	FH	1.20×10^{-7}
MW6005	9.14 – 12.19	RH	7.20×10^{-8}
MW6006	12.19 - 15.24	FH	4.00×10^{-7}
MW6006	12.19 - 15.24	RH	2.40×10^{-7}

The Hvorslev method which was chosen to be most applicable to the select wells based on the following assumptions:

- The compressibility and storativity of the aquifer are negligible;
- A fully penetrating well is present;
- The aquifer has an infinite areal extent;
- The aquifer is homogeneous and has uniform thickness;
- The slug is added or removed instantaneously; and
- Groundwater flow is steady state.

The hydraulic conductivity testing results are attached in Appendix D.

6.5 Survey

On 11 May 2021, Tronnes Geomatics Inc. surveyed the location and elevations of the monitoring wells. The coordinates of the monitoring wells can be found on the borehole logs in Appendix A1 as well as the groundwater monitoring table (Table 3).

7.0 DPVE Performance Testing – Field Activities

7.1 DPVE System Header Line and Extraction Wells Network Operation

To provide further understanding into the header integrity, pneumatic influence and drawdown testing, information presented in the following sections gives an overview of how the DPVE system functions.

The DPVE system skid, which is housed in an enclosed fence within Lion's Park, operates on two blower motors, which creates a vacuum for multiphase extraction. This vacuum is directed to the extraction wells, which are installed on 16th Street, 13th Avenue and the laneway between 15th and 16th Street NW, through an underground header system. The headers were bored into place horizontally between the system and the extraction wells. There are four header lines and seven extraction wells. One of the headers is connected to EX-1, another connected to EX-2 and EX-3, a third header is connected to EX-4 and EX-5 and the fourth and final header is connected to EX-6 and EX-7. The locations of the extraction wells and the headers are presented in Figure 4.

The DPVE system has the ability to operate the headers either individually or simultaneously. The DPVE system is also able to operate the headers on a time-based cycle. For example, operating a single or group of headers for a 12-hour time-period and then automatically switching to another header or group of headers for an additional 12 hours and repeating this cycle.

Currently, the system is continuously operating on the two headers connected to extraction wells EX-4 through EX-7.

7.2 Header Integrity Test and Preliminary Pneumatic Influence Testing

In February and March 2020, Clifton retained Sequoia to complete a header integrity test as well as pneumatic influence testing on select extraction wells. The integrity testing was completed to help determine the operational condition of the header system, whether any leaks, breaks or damage was present, where optimization could be achieved and how the system is operating under its current state.

The header integrity testing involved:

- Isolating each individual header and then isolating the extraction wells from the header;
- Placing a vacuum gauge on the capped header at the location of the furthest extraction well (for headers with two extraction wells);
- Initiating the system on a single blower motor;
- Achieving peak vacuum flow followed by isolating the tested header from the vacuum source and then deactivating the vacuum; and
- Recording the time from the moment of isolation until the header vacuum reached zero or returned to atmospheric pressure.

This process was then repeated on each header line. On headers with two extraction wells, the process was repeated a second time with capping the header at the nearest extraction well. This allowed for the determination of the header integrity up to the first extraction well and then beyond the first extraction well to the second extraction well.

For additional details related to the header integrity test completed by Sequoia please see their report included in Appendix G. The results of the header integrity testing completed by Sequoia is summarized in Section 8.1.

Following the completion of the header integrity testing, Sequoia also performed pneumatic influence testing on extraction well EX-3, EX-4 and EX-7 which are all on separate headers.

The purpose of the pneumatic influence testing was to help determine the zone of influence, or distance of influence for each extraction well tested, that the system can achieve. This is particularly important when determining the influence that the system has had beneath residential properties where no extraction wells have been installed.

The pneumatic influence testing involved:

- Isolating all headers and extraction wells that were not being tested from the vacuum source;
- Turning the system off for 12 hours;
- Returning to the site to measure the depth to groundwater and headspace vapours of the monitoring wells surrounding the extraction well being tested that were going to be used as vacuum influence “observation wells”;
- Following the field measurements, placing a cap consisting of a vacuum measurement port on each of the observation point monitoring wells;
- Turning on the system and measuring the vacuum levels in the extraction well being tested as well as the observation wells; and

- If a vacuum of > 1 mm of H2O was present in an observation well, expanding the measurement network to include additional observation points further away from the extraction well being tested. This process was repeated until all tested wells showed a vacuum reading of < 1 mm of H2O.

This process was repeated for each of the three extraction wells included as part of Sequoias pneumatic influence testing. The tests on each well were run for 2-5 hours or until a steady state vacuum was achieved. The system was deactivated between trials for a minimum of 12-hours.

For additional details related to the pneumatic influence testing completed by Sequoia please see their report included in Appendix G. The results of the pneumatic influence testing completed by Sequoia is summarized in Section 8.1.

7.3 Additional Pneumatic Influence Testing

In December and January of 2020/2021, Clifton performed additional pneumatic influence testing to provide a greater understanding into the area of influence achieved by the system under varying DPVE operational configurations.

Clifton performed three pneumatic influence tests. The first test operated on the header lines connected to EX4 through EX-7, the second test operated on the header line connected to EX-2 and EX-3 and the third test operated on the two header lines connected to EX-1 through EX-3.

Each of the pneumatic influence testing trials described above involved:

- Deactivating the DPVE system for a minimum of 24-hours prior to initiating the pneumatic influence testing;
- Upon arriving to complete the test, obtaining initial vacuum measurements from the extraction wells being tested as well as the observation wells being used in the trial;
- Activating the DPVE system to induce a vacuum in the header(s) and associated extraction well(s) being tested; and
- Obtaining vacuum measurements from the extraction well(s) being tested as well as the observation wells at approximately 0.5 hr, 12 hours and 24 hours after activating the vacuum source.

This process was repeated for each of the three pneumatic influence testing trials. The system was deactivated for a minimum of 24 hours between trials. The results of the pneumatic influence testing completed by Clifton is presented in Section 8.2.

7.4 Drawdown Testing

In February and March 2021, Clifton completed drawdown testing to help determine the hydraulic zone of influence created by the system under two operational configurations for the header lines which are currently in use. The hydraulic zone of influence, for purposes of this assessment, is defined as the distance from an extraction well where there is an observable depression in groundwater elevation. When

operating an extraction well, the local groundwater elevation is depressed, thus creating a hydraulic gradient towards the extraction well for purposes of contaminated groundwater containment and removal.

Clifton performed two drawdown tests on the header lines currently in operation which are connected to extraction wells EX-4 to EX-7. The first test looked at the hydraulic zone of influence achieved by cycling the two header lines for 12 hours and during the second test, the headers were operated simultaneously.

The drawdown testing protocol described above involved:

- Deactivating the DPVE system for a minimum of one week prior to initiating the drawdown influence testing;
- Returning to the site approximately one week later to hang Solinst Leveloggers in select extraction wells and observation wells;
- Activating the system on a 12-hour header cycle for approximately one week;
- Returning to the site approximately one week later and switching the operational configuration so that both headers operated simultaneously for approximately one week;
- Returning to the site approximately one week later to deactivate the system and retrieve the Solinst Leveloggers; and
- Downloading and interpreting the data from the Solinst Leveloggers to determine the observed hydraulic influence under the two operational configurations.

The results of the drawdown testing completed by Clifton is presented in Section 8.3.

8.0 DPVE Performance Testing – Results

8.1 Header Integrity Test and Preliminary Pneumatic Influence Testing

Based on the header integrity testing protocol summarized in Section 7.2, Sequoia determined the following:

- All headers tested are likely compromised (minor leaks/cracks) meaning a completely sealed system is not present;
- Despite the headers likely being compromised, the header lines connected to extraction wells EX-4 to EX-7 are still able to operate effectively;
- The header line connected to EX-1 also provided adequate communication for operational purposes; and
- The header line connected to EX-2 and EX-3 showed some communication with extraction well EX-3 and zero communication with extraction well EX-2 suggesting a blockage or break in the pipe between these two wells.

Based on the pneumatic influence testing protocol summarized in Section 7.2, Sequoia determined the following information:

Extraction Well Operated	Maximum Distance of Observed Vacuum (> 1 mm of H_2O)
EX-3	70 m[1]
EX-4	34 m
EX-7	42 m

1 – Distance based on limited reading, as a result, vapour reading remained high, conservative estimate of 60 m provided in report conclusions.

It should be noted that the observed vacuum influence was not equivalent in all directions from the tested extraction wells. This may be a result of the heterogeneity of the subsurface between an extraction point and the observation well and/or a result of differing screened interval depths between the extraction well and the observation point. In addition to this, the pneumatic testing observation wells are limited to existing monitoring well locations and in some cases the maximum extent of influence was not able to be measured as no additional monitoring wells within a reasonable distance were available. For the full details and results of the header integrity and pneumatic influence testing completed by Sequoia please see their report attached in Appendix G.

8.2 Additional Pneumatic Influence Testing

The following table presents the results of the pneumatic influence testing protocol completed by Clifton and described in Section 7.3 of this report.

Extraction Wells Operated	Maximum Distance of Observed Vacuum (> 1 mm of H_2O)[1]		
	0.5 HR	12 HR	24 HR
EX-4, EX-5, EX-6 and EX-7	69 m (EX-1)	52 m (BH1906)	17 m (BH1921)
EX-2 and EX-3	64 m (EX-6)	70 m (BH1907)	64 m (EX-6)
EX-1, EX-2 and EX-3	63 m (EX-6)	NT[2]	69 m (BH1921)

1 – Measurement made from closest operational extraction well to observation well.
2 – Not Tested.

It should be noted that during the trial involving extraction wells EX-1, EX-2 and EX-3, extraction well EX-6 had a greater recorded vacuum than the operating extraction wells. Based on this evidence, it is possible that the valve to the header line that operates extractions well EX-6 and EX-7 may not have been able to achieve a complete seal, therefore, influencing the vacuum that was observed in EX-6 and EX-7 during this trial.

Based on the pneumatic influence testing completed by Clifton there was not a consistent timeframe when the observed pneumatic influence appeared to peak among the three trials. It was also observed throughout the trials that the vacuum level at the system blowers appeared to drop over time which would result in less vacuum being induced at the extraction wells. Furthermore, the observed response appeared to be consistently higher in certain observation wells which were sometimes further away than other points which had lower vacuum readings. This could likely be the result of these observation points and the extractions well(s) having a more homogenous geological connection between their screened intervals. Additionally, the screened intervals of the monitoring wells used as observations points were not always consistent with the screened intervals of the extraction wells activated. Lastly, because several extraction wells were operated in each trial, with the exception of Trial 2, where the header integrity testing showed no connection between the system and EX-2, it was difficult to determine which extraction well was resulting in the influence observed.

Clifton has attached contour plots showing the observed pneumatic influence for the three trials and each timeframe tested in Appendix H. In addition, the vacuum readings in tabulated form are also presented in Appendix H.

8.3 Drawdown Testing

Based on the drawdown testing protocol presented in Section 7.4, Clifton has prepared graphs of the level logger data to depict the influence on the groundwater elevation from the operation of the DPVE system. The data has been compensated for barometric pressure and normalized to reflect groundwater elevation (m above sea level).

The observation points used during the trial included monitoring wells BH1910, BH1921, BH1923, EX-2 and EX-3. These monitoring wells are located 34 m, 19 m, 18 m, 47 m and 34 m, respectively, from the closest operational extraction well used during the trials.

For each observation point, a graph has been prepared showing the water elevations under operating extraction wells EX-4 through EX-7 simultaneously and operating EX-4 through EX-7 on a 12-hour cycle.

To determine if a drawdown influence was observed, Clifton compared the data from the observation wells to the barometric pressure curve to see if there were any significant deviations in groundwater elevation that did not reflect changes in atmospheric pressure.

Identifying deviations during the simultaneous operation trial of the system was more challenging than when the headers were cycled. When the extraction wells are operated simultaneously and following achieving maximum drawdown in an observation well, any subsequent changes in groundwater elevation will reflect barometric changes. As a result of this, it was not obvious whether the gathered elevation data reflected an influence from the DPVE system or barometric pressure changes.

When assessing the data for the cycling header trial, observation well BH1921, showed an obvious correlation of change in water elevation because of the header closest to it being “on” vs “off”. On a 12-hour cycle, the water elevation in this monitoring well fluctuated between 0.04 m and 0.15 m, depressing when the header closest to it was on and elevating when the header closest to it was off. This well is located approximately 19 m away from extraction well EX-7 and was the only observation well where the observed fluctuation was obvious. It is possible that changes in groundwater elevation as a result of the DPVE system may be masked by changes in elevation due to barometric pressure.

The graphs depicting the drawdown testing trials are presented in Appendix I.

9.0 Discussion

As presented in Section 4.0 of this report, the objectives of this LPH Assessment are:

1. Complete a subsurface investigation to determine if LPH is still present in areas where it had been previously identified prior to well decommissioning.
2. Complete DPVE performance testing to determine a zone of pneumatic and drawdown influence established through various DPVE operational configurations.
3. Complete an assessment, based on multiple lines of evidence, of the current state of LPH within the Study Area.

Each of the objectives presented above will be discussed in terms of the results presented in Section 8.0 of this report.

9.1 Objective 1 – LPH Presence

The first objective of this assessment was to determine if LPH was still present in areas where it had been previously identified in monitoring wells which were decommissioned prior to the installation of the DPVE system.

9.1.1 Soil

To address this objective, Clifton completed a subsurface investigation which involved the advancement of boreholes, completed as monitoring wells, in areas where LPH was previously identified. The placement of boreholes MW6002, MW6003 and MW6006 was based on the location of decommissioned monitoring

wells which contained LPH. Borehole MW6002 was advanced in a location adjacent to decommissioned monitoring wells BH509, BH705 and BH706. Borehole MW6003 was advanced in a location adjacent to decommissioned monitoring well BH1703 and borehole MW6006 was advanced in a location adjacent to BH510 and BH725. The location of borehole MW6001 was selected to provide delineation to the west if LPH was identified in MW6002. Boreholes MW6004 and MW6005 were advanced in locations to provide delineation of previous LPH identified in monitoring well BH1704 along with additional characterization within Lion's Park.

In order to assess for the presence of LPH during the drilling program, Clifton performed a detailed field logging and sampling analysis program including the completion of shake tests. This data was then screened against the following potential LPH indicators (US EPA, 2013).

Type	Potential Indicator	Measures and Screening Values
Direct	Current or historic presence of LPH in soil	Shake tests or significant soil staining and sheen
Indirect	Individual PHC compound concentrations approaching (>0.2 times) effective soil saturation concentrations	Benzene >10 mg/kg
Indirect	Organic Vapour Analyzer	>500 ppm

Boreholes MW6002, MW6003 and MW6006 were all advanced in areas which had a historic presence of LPH. Boreholes MW6001, MW6004 and MW6005 were all advanced in areas which were not previously investigated. As seen in the borehole logs, staining indicated by a greyish colored soil was present in each borehole, with the exception of MW6005. The staining was generally encountered at the top of Unit 3 and varied in thickness from location to location. This staining was also characterized with a hydrocarbon odor. No obvious sheen was present within the saturated soils associated with the staining.

Clifton performed shake tests on 41 soil samples obtained from the suspected PHC contaminated zone. Of the 41 shake tests, a sheen was observed in one sample (MW6006-25 at 13.41 m bgs) and a second sample (MW6005-15 at 9.91 m bgs) indicated the presence of a free phase liquid (LPH) and had a positive Kolor Kut Gauging Paste test.

Based on the soil analytical results and using a benzene concentration of >10 mg/kg as a screening tool, the results from a sample obtained from MW6005 at a depth of 9.91 m bgs had a concentration of 13.2 mg/kg. This sample depth corresponds with the positive Kolor Kut Gauging Paste test and provides support

to using this benzene concentration as a potential LPH screening tool. The second highest benzene concentration observed in the soil samples was 1.45 mg/kg which was obtained in the same borehole at a depth of 9.60 m bgs.

Based on the soil vapour readings obtained in the field and using a concentration of > 500 ppm as a screening tool, six soil samples exceeded this potential LPH indicator. Four of the soil samples were obtained from MW6005 at a depth range of approximately 9.2 to 10.2 m bgs. The highest vapour reading was 2926 ppm. One soil sample from MW6004 at a depth of approximately 10.8 m bgs had a concentration of 558 ppm and one soil sample from MW6006 at a depth of approximately 13.6 m bgs had a concentration of 997 ppm.

Below is a summary of the potential LPH indicators based on the drilling program:

- All boreholes had soil staining, with the exception of MW6005, and hydrocarbon odors;
- No sheen was observed in the saturated soils during the drilling;
- Shake tests indicated one positive LPH test (MW6005) and one sample had a sheen (MW6006);
- Benzene results exceeded the screening concentration in one soil sample (MW6005-15); and
- Soil vapour exceeded the screening concentration in six soil samples (MW6004, MW6005 and MW6006).

Based on the drilling program data, boreholes MW6001, MW6002 and MW6003 located along 16th Street NW presented one potential LPH indicator. Staining and odors was present in these boreholes.

Borehole MW6004, located in Lion's Park, presented two potential LPH indicators. These indicators included soil staining and odors and one soil sample which exceeded the soil vapor concentration screening limit of 500 ppm.

Borehole MW6005, located in Lion's Park, directly north of BH1704, presented four potential LPH indicators, including soil odors, a positive LPH presence shake test and exceedance of the benzene and soil vapour concentration screening limits.

Borehole MW6006, located in the laneway between 15th and 16th Street NW, presented three potential LPH indicators, including soil staining and odors, a sheen in the shake test and an exceedance of the soil vapour concentration screening limits.

This analysis will be used in conjunction with the groundwater summary below and the DPVE performance summary in Section 9.2 to provide conclusions on the presence of LPH in Section 9.3 of this report.

9.1.2 Groundwater

The groundwater program completed as part of the subsurface investigation involved completing each of the boreholes described in the previous section as monitoring wells and then conducting a monitoring and sampling program.

The monitoring program involved checking for the presence of LPH and/or a sheen and obtaining well standpipe vapour concentrations. The analytical program involved obtaining samples and submitting them for analysis of BTEX and PHC fractions F1 to F2 and VOCs. The results from the groundwater monitoring and sampling program was then compared to the potential LPH indicators presented in the table below.

Type	Potential Indicator	Measures and Screening Values
Direct	Current or historic presence of LPH in soil	LPH observed in well and presence of sheens
Indirect	Individual PHC compound concentrations approaching (>0.2 times) effective solubilities	Benzene >5 mg/L
Indirect	Organic Vapour Analyzer	>500 ppm

Monitoring wells MW6002, MW6003 and MW6006 were all advanced in areas which had a historic presence of LPH. Monitoring wells MW6001, MW6004 and MW6005 were all advanced in areas which were not previously investigated. Based on the groundwater monitoring program, no LPH was indicated based on the oil/water interface meter testing, the Kolor Kut Gauging Paste testing and the LPH bailer-check testing.

Based on the laboratory analytical results, none of the samples exceeded the benzene screening limit concentration of > 5 mg/L. The highest benzene concentration observed was 1.03 mg/L from monitoring well MW6005.

Based on the groundwater monitoring well standpipe vapours and using a screening concentration of >500 ppm, two monitoring wells, MW6004 and MW6005, exceeded this limit. Monitoring well MW6004 had a standpipe vapour concentration of 569 ppm and monitoring well MW6005 had a standpipe vapour concentration of 1,003 ppm.

Below is a summary of the potential LPH indicators based on the groundwater program:

- Two monitoring wells exceeded the standpipe vapour concentration screening limit of 500 ppm (MW6004 and MW6005).

Monitoring wells MW6001, MW6002, MW6003 and MW6006 did not present any potential LPH indicators during the groundwater program.

Monitoring wells MW6004 and MW6005 each presented one potential LPH indicator by exceeding the standpipe vapour concentration screening limit.

This analysis will be used in conjunction with the soil summary in the previous section and the DPVE performance summary in the following section, to provide conclusions on the presence of LPH in Section 9.3 of this report.

9.2 Objective 2 – DPVE Performance Assessment

The second objective of this assessment was to complete DPVE performance testing which involved assessing the header integrity and determining the pneumatic and drawdown influence through various operational configurations.

9.2.1 Header Integrity Testing

Sequoia assessed the integrity of the header system through a vacuum test to determine the communication between the vacuum generated at the system and the extraction wells used for remedial purposes. The vacuum test essentially helps to determine whether the header lines are maintaining the induced vacuum or if leaks/breaks are present that affect its ability to do so.

Based on the header integrity testing completed by Sequoia, the header lines used under the current operational configuration (EX-4 to EX-7), allow for adequate vacuum induction into the subsurface for purposes of multi-phase extraction.

For the header lines currently not in use, the integrity testing of the header line connected to EX-1 is also in sufficient condition to operate this extraction well. The header line connected to EX-2 and EX-3 shows the most damage and suggests that there is likely a break or rupture in the line between EX-2 and EX-3. Despite this rupture, when operating this header line, EX-3 was still able to produce a significant pneumatic influence as discussed in section 9.2.1.

The results of the integrity testing suggest all lines are partially compromised and the line between EX-2 and EX-3 would require repair in order to activate EX-2. Currently we are planning to repair this line in 2021 unless the Remedial Options Analysis (ROA) suggests there are more appropriate remedial approaches.

9.2.2 Pneumatic Influence Testing

The pneumatic influence testing completed by Sequoia and Clifton was done to help determine the area of influence the system can achieve through operating the extraction wells. Of particular importance was providing evidence that the influence achieved would capture the areas beneath the residential properties situated between 16th Street and the laneway between 15th and 16th Street NW.

The design radius of influence for the extraction wells was 50 m and based on the pneumatic influence testing completed by Sequoia and Clifton, an influence was observed at a range of 34 to 70 m. Under the

current operational configuration, using extraction wells EX-4 through EX-7, the influence appeared to vary over time, achieving its maximum influence at 0.5 hr after initiating the system where influence was observed up to 69 m away in EX-1.

The pneumatic influence testing did show a variation in the zone of influence depending on the extraction well(s) used in the test and the surrounding observation wells. This is likely a result of heterogeneity in the subsurface within the treatment zone as well as differing screened intervals between the extraction wells and observation wells.

Based on the pneumatic influence testing, the system does appear to achieve a zone of influence which would capture the areas beneath the residential properties adjacent to where LPH had been previously detected.

9.2.3 Drawdown Testing

The drawdown testing completed by Clifton was done to help determine the hydraulic area of influence achieved by the system through either cycling the currently used headers or operating them simultaneously.

Based on the data, the pneumatic influence extends beyond the hydraulic influence which was only clearly observed in one observation well approximately 19 m away from the closest extraction well. This is to be expected as the drop tubes used for extraction purposes are not solely designed to pump groundwater which would create a larger zone of hydraulic influence. In the current DPVE configuration, the drop tubes are adjusted to maximize the vapour extracted at the surface of the groundwater column (confirmed through vapour concentration measurement), and not necessarily to maximize the volume of groundwater extracted. Although groundwater is extracted in this configuration, the primary purpose is to extract vapour and LPH if present.

9.3 Objective 3 – LPH Saturation

Based on a review of the historical and new data gathered as part of the LPH Assessment, the evidence suggests that the Study Area does not show signs of migrating or mobile LPH and select locations indicate the potential for residual state LPH. This analysis is based on having multiple potential LPH indicators within the soil and only standpipe vapour exceedances of the LPH indicator screening level in the groundwater.

Based on the results of the DPVE performance testing, the results provide evidence that the zone of influence achieved by the system would capture the areas beneath the residential properties bound by 16th Street to the west, 13th Avenue to the north and the laneway between 15th and 16th Street to the east. Based on this data, and the data from the surrounding boreholes and monitoring wells, if LPH is present beneath the residential properties within the Study Area, it is likely to be in a residual state, if present at all.

10.0 Conclusions

This LPH Assessment was completed as a requirement under the Ministerial Order 09/2020 as per Items 3 and 4 of EPO 2018/01-SSR.

The purpose of the LPH Assessment was to delineate and further characterize the extent of LPH on-site which had been previously identified in select monitoring wells throughout the Study Area. As part of the assessment, Clifton completed a subsurface investigation in and around areas where LPH was previously identified, in addition to a DPVE Performance Assessment. Clifton also provided a brief overview of NSZD and the likely effects it has had on the LPH which was previously identified within monitoring wells.

At the onset of this report, Clifton made the distinction between three primary forms of LPH which can occur after a release. These include migrating, mobile and residual LPH.

Migrating LPH typically occurs early on during a release, or immediately following a release, until the LPH head-gradient dissipates and begins to mimic the groundwater. Based on the last underground storage tanks being removed from the former Sunoco and Sears Service Station in 1995 and the available evidence, it is Clifton's opinion that migrating LPH is no longer an issue within the Study Area.

Mobile LPH represents a pore-scale movement of an LPH body under a gradient and observing LPH within a monitoring well is generally a good indicator that mobile LPH is present. A mobile LPH represents the potential for an expanding groundwater plume. Based on the recent subsurface investigation and a review of the historical data, mobile LPH was last observed within the Study Area in June 2019. Based on the current and historical data, mobile LPH is not present within the areas where it was previously identified nor in the new areas investigated as part of this assessment.

Residual LPH refers to the presence of LPH that is discontinuous and does not occupy enough pore space to flow. It is a stable source that will continue to decrease in volume based on the principles of NSZD and remedial interventions. Based on the evidence obtained during this assessment, it is Clifton's opinion that if there is any remaining LPH within the Study Area that it would likely be in a residual phase.

Lastly, based on the summary provided above, the DPVE system appears to have been effective in reducing the LPH saturation to level at, or below, residual phase which aligns with the original primary objective of the system which was to remove the LPH to the extent practicable. The term "extent practicable" references the fact that LPH recovery tends to asymptotic in that rates continue decreasing over time but never fully reach zero. This is often represented by a residual phase saturation (ITRC, 2021). Based on this, the data gathered during this LPH Assessment will be used to further refine the Remedial Options Assessment which may include a revision of how the system is currently operated; including which extraction wells are used in the future.

11.0 Closure

This report was prepared by Clifton Engineering Group on behalf of Suncor Energy Products Partnership. It is intended for the sole use and exclusive use of and Suncor Energy Products Partnership, their affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively known as Suncor). The material in it reflects Clifton Engineering Group best judgment available to it at the time of preparation. Any use that a third party makes of this report, or any reliance on or decisions to be made based on it, other than by Suncor, are the responsibility of such third parties. Clifton Engineering Group and Suncor accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report has been prepared in accordance with generally accepted engineering practice common to the local area. No other warranty expressed or implied is made.

No conclusions should be made based on this report regarding any concentrations of substances in other areas of the Site. Other Contaminants of Concern may be present at the Site in areas that were not investigated. Clifton Engineering Group accepts no responsibility for any deficiencies or inaccuracies in the information provided in this report that are the direct result of intentional or unintentional misrepresentations, errors or omissions of the information reviewed.

No environmental site investigation or remediation can wholly eliminate uncertainty regarding environmental conditions in connection with a property. This investigation is intended to reduce, but not eliminate the uncertainty regarding environmental conditions. Conclusions regarding the condition of the Site do not represent a warranty that all areas within the site and beneath structures are of the same quality as those sampled. Further, contamination could also exist in forms not indicated by the investigation.

The work was based in part upon the environmental quality guidelines and regulations in effect when the work was begun. Future regulatory changes may require reassessment of the findings of this investigation.

Copying or distributing this report or use of or reliance on the information presented within it, in whole or part, other than by Suncor, is not permitted without written consent from Clifton Engineering Group.

12.0 References

Alberta Environment and Parks. (2019). *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*

Alberta Environment and Parks. (2019). *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*

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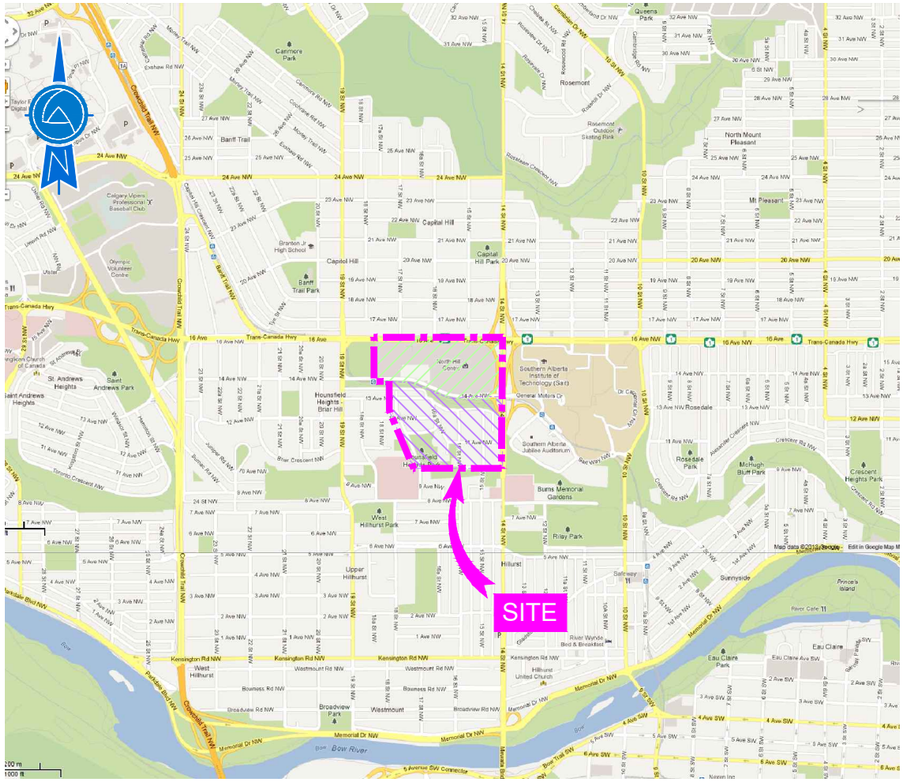
Figures

Clifton



GENERAL SITE LOCATION

SCALE 1:30,000

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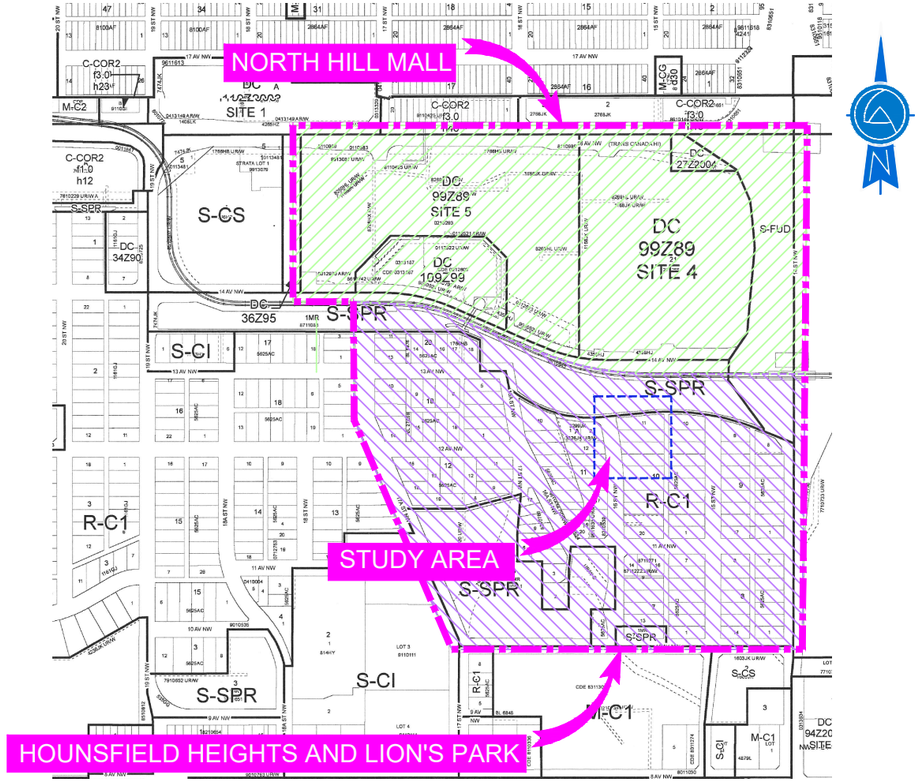

SURROUNDING LAND USE

SCALE 1:7,500

0 100 200 300 m

LEGEND:

- SITE BOUNDARY
- MALL AREA
- HOUNSFIELD HEIGHTS AREA
- CITY OF CALGARY BY-LAW ZONING
- STUDY AREA

LAND USE DISTRICTS:

RESIDENTIAL - CONTEXTUAL ONE DWELLING DISTRICT	R-C1
MULTI-RESIDENTIAL - CONTEXTUAL LOW-PROFILE DISTRICT	MC-1
MULTI-RESIDENTIAL - CONTEXTUAL GRADE-ORIENTED DISTRICT	MC-G
COMMERCIAL - CORRIDOR 2 DISTRICT	C-COR2
SPECIAL PURPOSE - SCHOOL, PARK, AND COMMUNITY RESERVE DISTRICT	S-SPR
SPECIAL PURPOSE - COMMUNITY INSTITUTION DISTRICT	S-CI
SPECIAL PURPOSE - COMMUNITY SERVICE DISTRICT	S-CS
SPECIAL PURPOSE - FUTURE URBAN DEVELOPMENT DISTRICT	S-FUD
DIRECT CONTROL DISTRICT	DC

NOTES:

1. CITY OF CALGARY ROAD MAP PROVIDED BY CANADIAN CARTOGRAPHICS CORPORATION, 2012.
2. LAND USE MAP PROVIDED BY THE CITY OF CALGARY.

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Clifton

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SUNCOR ENERGY PRODUCTS PARTNERSHIP

PROJECT

LIQUID PETROLEUM HYDROCARBON ASSESSMENT
HOUNSFIELD HEIGHTS AND LION'S PARK
1620-14th AVE NW CALGARY, ALBERTA

TITLE

SITE LOCATION AND SURROUNDING LAND USE

DESIGNED	SCALE: AS SHOWN	DATE: 2021-06-08
DRAWN: CC	PROJECT NO.: CG3418 E10	FIG.: 1
CHECKED: SDA	FILE NO.: CG3418-E10.01	

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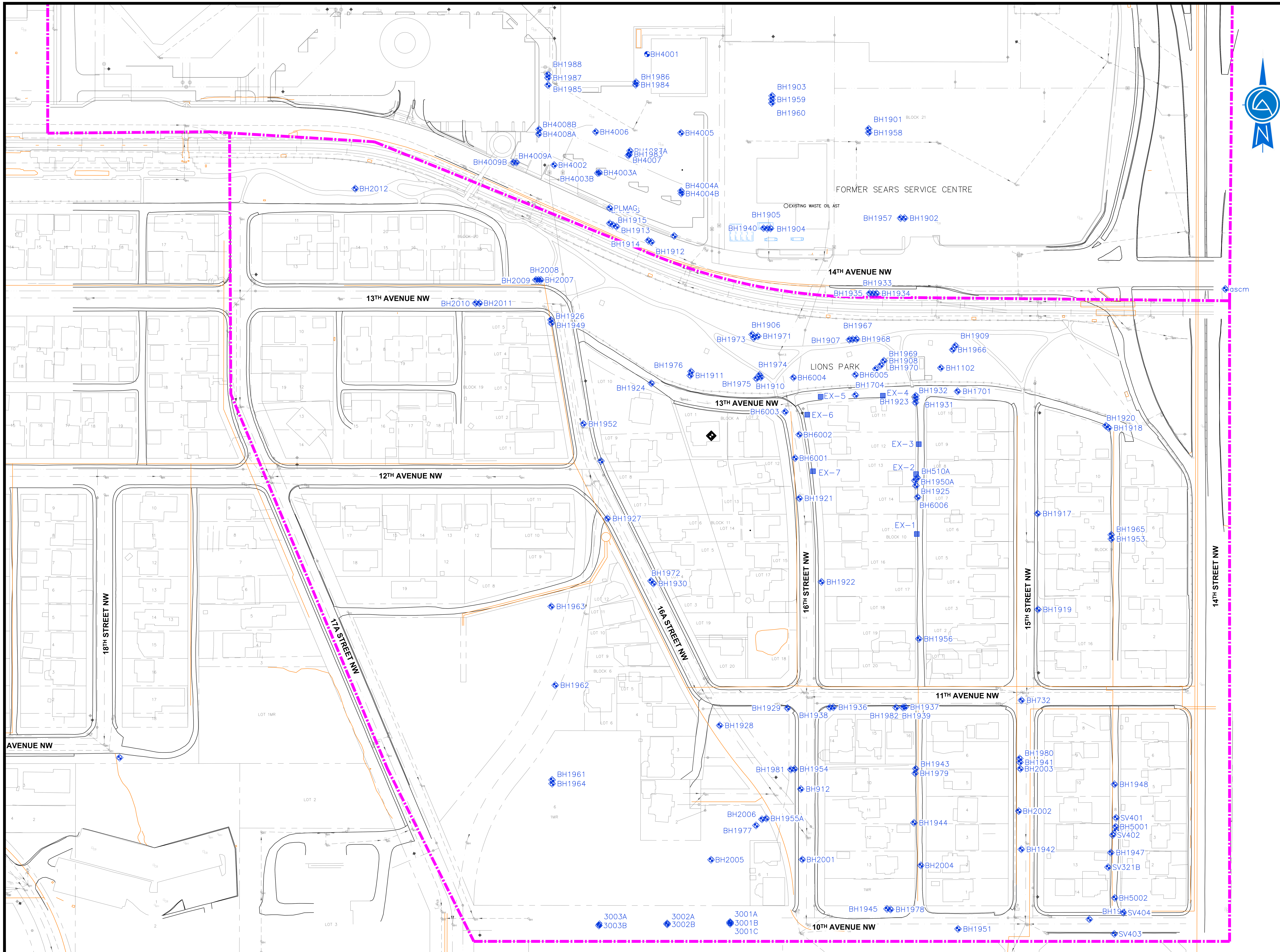

LEGEND

- SITE BOUNDARY
- EXTRACTION WELL
- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- GROUNDWATER MONITORING WELL
- BOREHOLE
- ABANDONED / DAMAGED MONITORING WELL

UTILITY LINES & SYMBOLS

- NATURAL GAS LINE
- SANITARY SEWER
- STORM SEWER
- WATER
- CATCH BASIN
- FIRE HYDRANT
- LIGHT STANDARD
- MANHOLE
- UTILITY POLE

NOTES:

1 DRAWING COMPILED FROM PLANIMETRIC FILES SUPPLIED BY THE CITY OF CALGARY (INCLUDING U/G UTILITIES) & FROM SITE ASSESSMENT INFORMATION. ADDITIONAL REFERENCES FROM SEACOR ENVIRONMENTAL ENGINEERING INC., DRAWINGS 149-5A11.DWG, 149-5A6.DWG.

0 10 20 30 40 50 m

PLOT SIZE 22x34

ENGINEER

Clifton

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SUNCOR ENERGY PRODUCTS PARTNERSHIP

PROJECT

LIQUID PETROLEUM HYDROCARBON ASSESSMENT
HOUNSFIELD HEIGHTS AND LION'S PARK
1620-14th AVE NW CALGARY, ALBERTA

TITLE

MONITORING WELL LOCATION PLAN

DESIGNED	SCALE 1:1000	DATE 2021-06-08
DRAWN CC	PROJECT NO. CG3418 E10	FIG. 2
CHECKED SDA	FILE NO. CG3418-E10.02	

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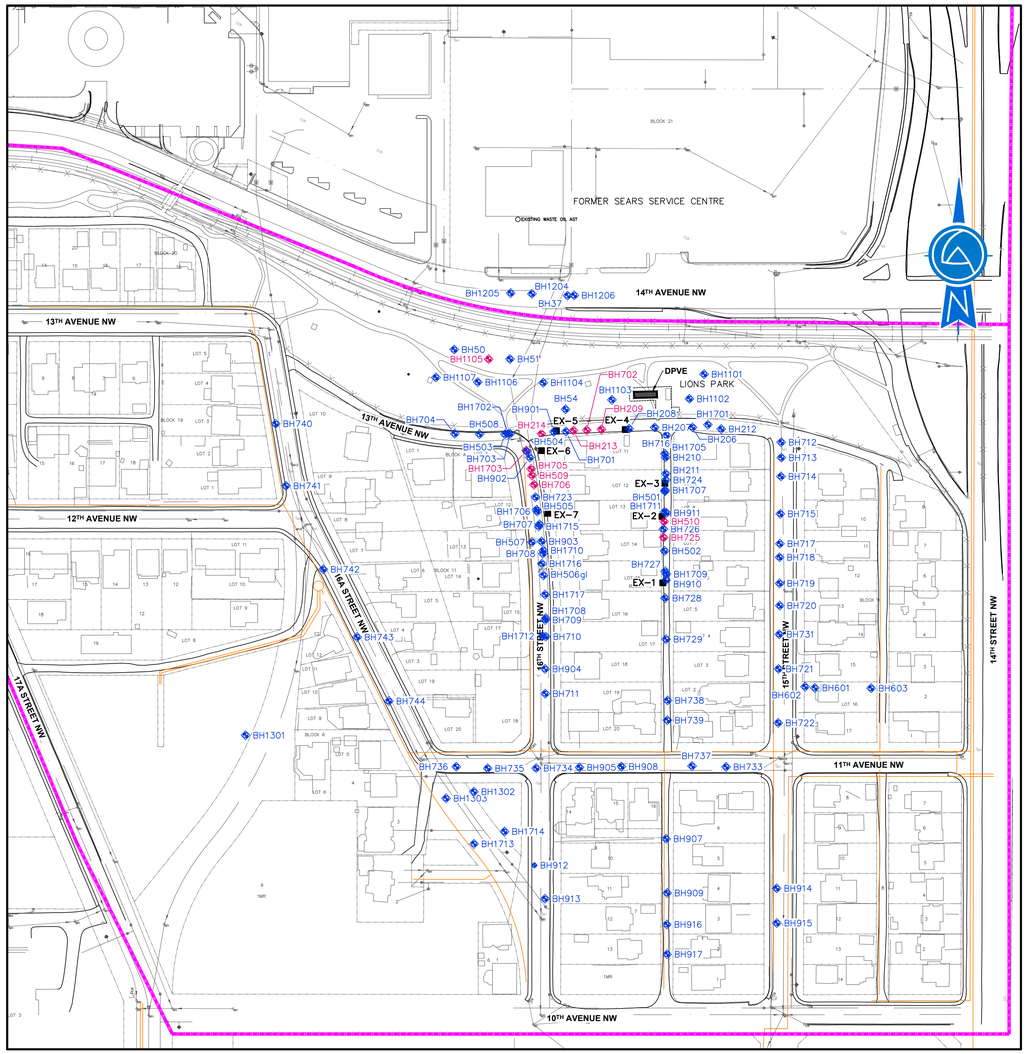
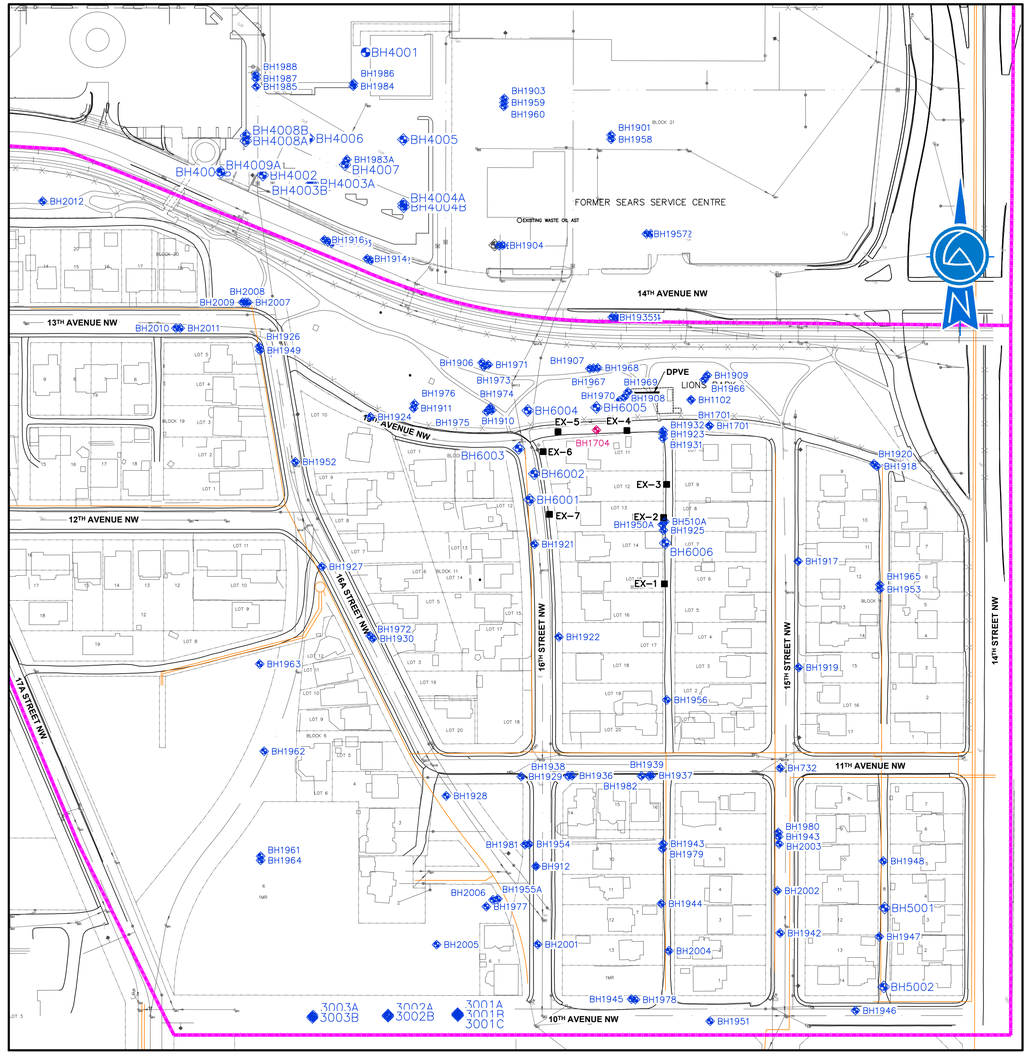


HISTORIC LPH DISTRIBUTION
(ABANDONED MONITORING WELL NETWORK)



RECENT LPH DISTRIBUTION
(CURRENT MONITORING WELL NETWORK)

LEGEND

- SITE BOUNDARY
- EXTRACTION WELL
- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL CONTAINING LPH

UTILITY LINES & SYMBOLS

- NATURAL GAS LINE
- SANITARY SEWER
- STORM SEWER
- WATER
- CATCH BASIN
- FIRE HYDRANT
- LIGHT STANDARD
- MANHOLE
- UTILITY POLE

NOTES:

1 DRAWING COMPILED FROM PLANIMETRIC FILES SUPPLIED BY THE CITY OF CALGARY (INCLUDING U/G UTILITIES) & FROM SITE ASSESSMENT INFORMATION. ADDITIONAL REFERENCES FROM SEACOR ENVIRONMENTAL ENGINEERING INC., DRAWINGS 149-5A11.DWG, 149-5A6.DWG.

0 10 20 30 40 50 100 m

ENGINEER

Clifton

CLIENT

SUNCOR ENERGY PRODUCTS PARTNERSHIP

PROJECT

LIQUID PETROLEUM HYDROCARBON ASSESSMENT
HOUNSFIELD HEIGHTS AND LION'S PARK
1620-14th AVE NW CALGARY, ALBERTA

TITLE

LIQUID PETROLEUM HYDROCARBONS (LPH)

DESIGNED	SCALE	DATE
	1:1500	2021-06-08
DRAWN: CC	PROJECT NO.: CG3418 E10	FIG.: 3
CHECKED: SDA	FILE NO.: CG3418-E10.03	

LEGEND

- SITE BOUNDARY
- EXTRACTION WELL
- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- EXTRACTION NETWORK

UTILITY LINES & SYMBOLS

- NATURAL GAS LINE
- SANITARY SEWER
- STORM SEWER
- WATER
- CATCH BASIN
- FIRE HYDRANT
- LIGHT STANDARD
- MANHOLE
- UTILITY POLE

NOTES:

1 DRAWING COMPILED FROM PLANIMETRIC FILES SUPPLIED BY THE CITY OF CALGARY (INCLUDING U/G UTILITIES) & FROM SITE ASSESSMENT INFORMATION. ADDITIONAL REFERENCES FROM SEACOR ENVIRONMENTAL ENGINEERING INC., DRAWINGS 149-5A11.DWG, 149-5A6.DWG.

0 5 10 15 m

ENGINEER

Clifton

CLIENT

SUNCOR ENERGY PRODUCTS PARTNERSHIP

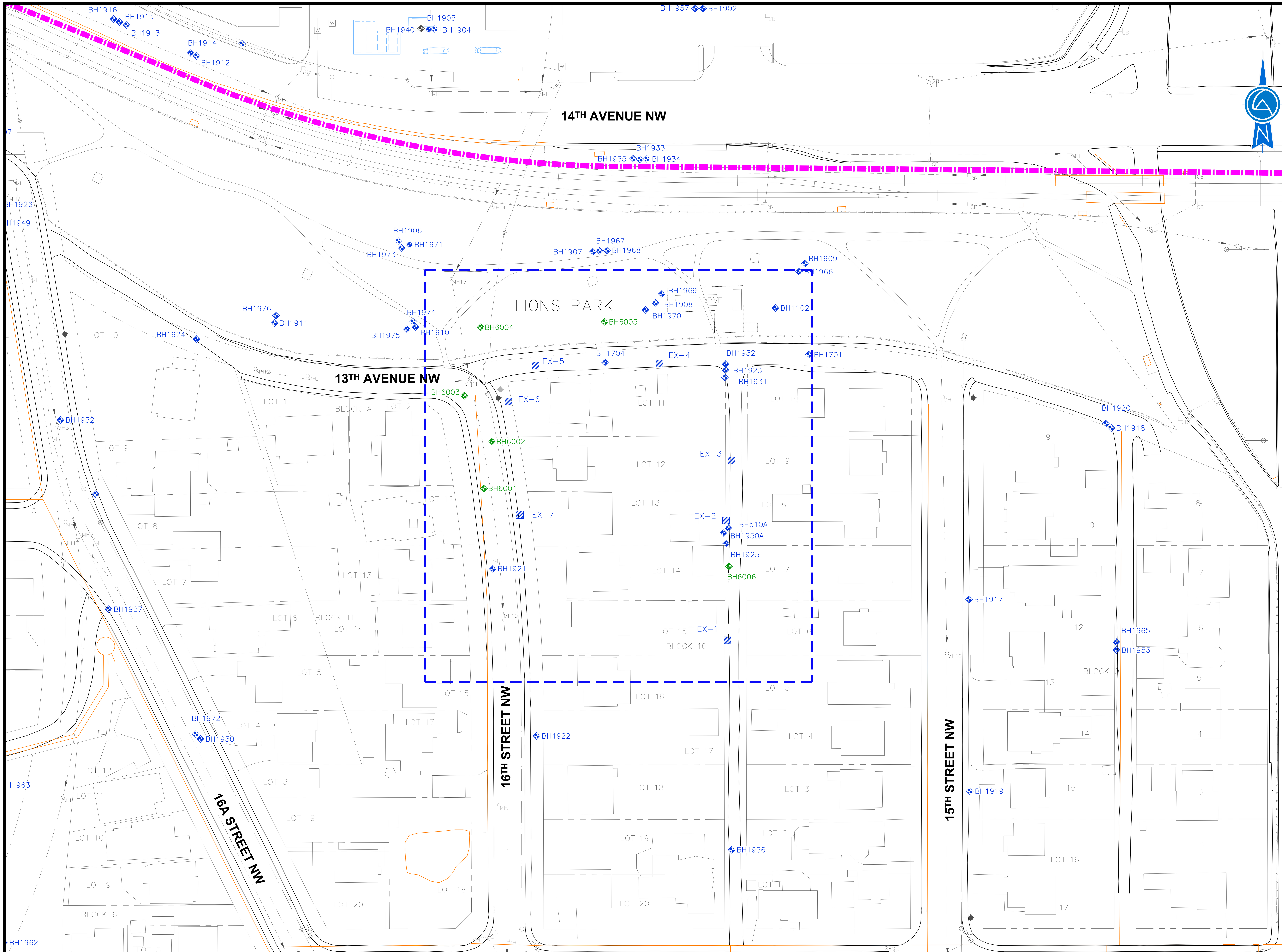
PROJECT

LIQUID PETROLEUM HYDROCARBON ASSESSMENT
HOUNSFIELD HEIGHTS AND LION'S PARK
1620-14th AVE NW CALGARY, ALBERTA

TITLE

DPVE SYSTEM LAYOUT

DESIGNED	SCALE	DATE
	1:200	2021-06-08
DRAWN: CC	PROJECT NO.: CG3418 E10	FIG.: 4
CHECKED: SDA	FILE NO.: CG3418-E10.04	



LEGEND

- SITE BOUNDARY
- EXTRACTION WELL
- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- GROUNDWATER MONITORING WELL
- NEWLY ADVANCED MONITORING WELL
- BOREHOLE
- ABANDONED / DAMAGED MONITORING WELL
- SITE BOUNDARY

UTILITY LINES & SYMBOLS

- NATURAL GAS LINE
- SANITARY SEWER
- STORM SEWER
- WATER
- CATCH BASIN
- FIRE HYDRANT
- LIGHT STANDARD
- MANHOLE
- UTILITY POLE

NOTES:

1 DRAWING COMPILED FROM PLANIMETRIC FILES SUPPLIED BY THE CITY OF CALGARY (INCLUDING U/G UTILITIES) & FROM SITE ASSESSMENT INFORMATION. ADDITIONAL REFERENCES FROM SEACOR ENVIRONMENTAL ENGINEERING INC., DRAWINGS 149-5A11.DWG, 149-5A6.DWG.

ENGINEER: Clifton

CLIENT: SUNCOR ENERGY PRODUCTS PARTNERSHIP

PROJECT: LIQUID PETROLEUM HYDROCARBON ASSESSMENT
HOUNSFIELD HEIGHTS AND LION'S PARK
1620-14th AVE NW CALGARY, ALBERTA

TITLE: STUDY AREA MONITORING WELL LOCATION PLAN

DESIGNED	SCALE	DATE
	1:500	2021-06-15
DRAWN: CC	PROJECT NO.: CG3418 E10	FIG. 5
CHECKED: SDA	FILE NO.: CG3418-E10.05	

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Tables

Clifton

Table 1: Soil - BTEX and PHC fraction F1 to F4

	BTEX F1-F4							
	Benzene	Toluene	Ethylbenzene	Xylene Total	PHC fraction F1 (minus BTEX)	PHC fraction F2	PHC fraction F3	PHC fraction F4
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
AB Tier 2 Subsoil - Residential/Parkland (Coarse Soil)[1]	0.078	0.12	0.14	1.9	30	160	600	3600
AB Tier 2 Subsoil - Residential/Parkland (Fine Soil)[2]	0.046	0.52	0.073	0.99	420	300	2,600	10,000
Location Code	**Date**	**Field ID**	**Depth (m bgs)[2]**								
MW6001	**4/30/2021**	**6001-17**	**10.52**	0.031	0.06	0.52	3.05	10	<10	10	<10
		6001-18	**10.82**	0.067	0.13	0.64	5.89	20	<10	<10	<10
		6001-24	**13.41**	0.016	0.01	0.01	0.03	<10	<10	10	<10
MW6002	**4/28/2021**	**6002-18**	**10.82**	<0.005	0.02	0.01	0.07	<10	35	63	<10
		6002-20	**11.43**	0.017	0.10	0.24	2.45	<10	<10	<10	<10
		6002-24	**13.41**	0.055	0.03	0.03	0.05	<10	<10	<10	<10
MW6003	**4/28/2021**	**6003-18**	**10.61**	0.012	0.37	0.03	3.28	20	<10	<10	<10
		6003-19	**10.82**	0.016	0.15	0.05	4.27	30	224	19	<10
		6003-25	**12.95**	0.019	0.02	<0.01	0.06	<10	<10	<10	<10
MW6004	**4/29/2021**	**6004-9**	**6.25**	0.407	0.07	1.77	0.90	20	<10	<10	<10
		6004-18	**10.82**	0.011	0.03	0.01	0.03	<10	<10	<10	<10
		6004-23	**12.34**	<0.005	0.02	<0.01	0.04	<10	<10	<10	<10
MW6005	**4/29/2021**	**6005-14**	**9.6**	1.45	36.2	8.57	52.5	800	56	<10	<10
		6005-15	**9.91**	13.2	535	148	939	12100	829	44	<10
		6005-22	**12.65**	0.158	0.10	0.24	0.55	<10	<10	<10	<10
MW6006	**4/27/2021**	**6006-25**	**13.56**	0.022	0.12	3.08	21.5	1140	240	18	<10
		6006-26	**14.02**	0.011	0.06	0.01	0.07	10	<10	<10	<10
		6006-29	**15.09**	0.034	0.03	<0.01	0.02	<10	<10	10	<10

Notes

1 Alberta Environment, January 10, 2019, AB Tier 2 Soil - Residential/Parkland (Fine Soil) for sub-soil (>3.0m) . Freshwater Aquatic Life Pathway Eliminated.

2 Alberta Environment, January 10, 2019, AB Tier 2 Soil - Residential/Parkland (Coarse Soil) for sub-soil (>3.0m) . Freshwater Aquatic Life Pathway Eliminated.

3 Meters below ground surface.

exceeds applicable sub soil guideline value (fine grained).

exceeds applicable sub soil guideline value (coarse grained).

Table 2: Soil - Volatile Organic Compounds

			Location Code	MW6001			MW6002			MW6003			MW6004			MW6005			MW6006		
			Date	4/30/2021			4/28/2021			4/28/2021			4/29/2021			4/29/2021			4/27/2021		
			Field ID	6001-17	6001-18	6001-24	6002-18	6002-20	6002-24	6003-18	6003-19	6003-25	6004-9	6004-18	6004-23	6005-14	6005-15	6005-22	6006-25	6006-26	6006-29
			Depth (m bgs)[2]	10.52	10.82	13.41	10.82	11.43	13.41	10.61	10.82	12.95	6.25	10.82	12.34	9.6	9.91	12.65	13.56	14.02	15.09
	Unit	AB Tier 1 Soil - Residential/Parkland (Fine Soil)[1]	AB Tier 1 Soil - Residential/Parkland (Coarse Soil)[2]																		
VOCs																					
1,1,1-trichloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-tetrachloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-trichloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,1,2-tetrachloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-dichloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-dichloroethene	mg/kg	0.15	0.021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-trichlorobenzene	mg/kg	0.78	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-dibromoethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-dichlorobenzene	mg/kg	0.097	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-dichloroethane	mg/kg	0.025	0.0027	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,2-dichloropropane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3-dichlorobenzene	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,4-dichlorobenzene	mg/kg	0.051	0.098	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Ethyl Ketone	mg/kg	NG	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-hexanone (MBK)	mg/kg	NG	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
4-Methyl-2-pentanone	mg/kg	NG	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Acetone	mg/kg	NG	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromoform	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bromomethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bromodichloromethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Carbon tetrachloride	mg/kg	0.013	0.00057	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chlorodibromomethane	mg/kg	0.91	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	mg/kg	0.39	0.018	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroform	mg/kg	0.16	0.011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloromethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,3-dichloropropene	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,2-dichloroethene	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dichloromethane	mg/kg	0.1	0.095	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	mg/kg	0.044	0.046	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Styrene	mg/kg	0.68	0.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichloroethene	mg/kg	0.054	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tetrachloroethene	mg/kg	0.26	0.018	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-dichloropropene	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,2-dichloroethene	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichlorofluoromethane	mg/kg	NG	NG	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vinyl chloride	mg/kg	0.0083	0.00034	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes

1 Alberta Environment, January 10, 2019, AB Tier 1 Soil - Residential/Parkland (Fine Soil).

1 Alberta Environment, January 10, 2019, AB Tier 1 Soil - Residential/Parkland (Coarse Soil).

2 Meters below ground surface.

NG No Guideline Value.

exceeds applicable uideline value (fine grained).

exceeds applicable guideline value (coarse grained).

Table 3: Groundwater - Summary of Well Monitoring

Monitor Well	Monitor Date	Northing [1]	Easting [1]	Top of Pipe Elevation[1]	Ground Surface Elevation[1]	Total Depth	Depth to Water	Depth to Water	Water Elevation	LPH[5] Thickness	Vapours[6]	Kolor Kut Guaging Paste	LPH Bailer Check	Comments
	(dd-mmm-yy)	(UTM)	(UTM)	(m asl[2])	(m asl[2])	(m btop[3])	(m btop[3])	(m bgs[4])	(m asl[2])	(mm)	(ppm)			
MW6001	3-May-21	5660891.08	703337.90	1089.37	1089.47	12.76	11.08	11.18	1078.29	0.0	1	Negative	No LPH	
MW6002	3-May-21	5660904.12	703339.62	1089.56	1089.67	13.66	10.85	10.96	1078.71	0.0	1	Negative	No LPH	
MW6003	3-May-21	5660916.55	703331.29	1089.77	1089.84	12.70	10.79	10.86	1078.98	0.0	229	Negative	No LPH	
MW6004	3-May-21	5660935.83	703335.13	1089.67	1089.78	12.09	10.44	10.55	1079.23	0.0	569	Negative	No LPH	
MW6005	3-May-21	5660938.73	703369.59	1089.08	1089.31	12.17	9.79	10.02	1079.29	0.0	1,003	Negative	No LPH	
MW6006	3-May-21	5660872.01	703406.89	1091.38	1091.50	15.19	13.56	13.67	1077.83	0.0	74	Negative	No LPH	

Notes:

1 Elevations based on survey completed by Tronnes Geomatics Inc (2021).
2 Meters above sea level.
3 Below top of pipe.
4 Below ground surface.
5 Liquid Petroleum Hydrocarbon
6 Vapour concentrations measured in monitoring well standpipes using Eagle 2 gas monitor with a photo ionization detector.
- No Information

Table 4: Groundwater - BTEX and PHC Fraction F1 to F2

		BTEX F1-F4					
		Benzene	Toluene	Ethylbenzene	Xylene Total	PHC fraction F1 (minus BTEX)	PHC fraction F2
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
AB Tier 2 GW - Residential/Parkland (Fine Soil)[1]		0.005	0.024	0.0016	0.02	2.2	1.1
AB Tier 2 GW - Residential/Parkland (Coarse Soil)[2]		0.005	0.021	0.0016	0.02	0.81	1.1
Site Specific Tier 2 Guidelines (N1)[3]		4.6	NG	NG	134	32	NG
Date	**Field ID**						
5/12/2021	**MW6001**	0.0042	0.0018	0.0065	0.0292	<0.1	<0.1
	MW6002	0.0294	0.125	0.258	1.3	0.3	0.4
	MW6003	0.0052	0.147	0.0244	4.07	2.3	2.7
	MW6004	0.0019	0.0008	0.0056	0.0134	0.4	0.4
	MW6005	1.03	11.9	0.509	6.37	3.6	0.9
	MW6006	0.0008	0.0004	0.0005	0.0297	1.4	0.8

Notes

1 Alberta Environment, January 10, 2019, AB Tier 2 GW - Residential/Parkland (Fine Soil). FAL eliminated.

2 Alberta Environment, January 10, 2019, AB Tier 2 GW - Residential/Parkland (Coarse Soil). FAL eliminated.

3 Site Specific Tier 2 Groundwater Quality Guideline - Zone N1.

Exceeds AB Tier 2 guideline value (fine soil and coarse grained)

Exceeds Site Specific Tier 2 guideline value.

Table 5: Groundwater - Volatile Organic Compounds				Date Sampled	5/12/2021					
	Unit	AB Tier 1 GW - Residential/Parkland (Fine Soil)[1]	AB Tier 1 GW - Residential/Parkland (Coarse Soil)[2]	Site Specific Tier 2 Guidelines (N1)[3]	MW6001	MW6002	MW6003	MW6004	MW6005	MW6006
VOCs										
1,1,1-trichloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,1-dichloroethene	µg/L	14	14	NG	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	15	15	NG	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	0.7	0.7	NG	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	µg/L	5	5	290	<1	<1	4	12	15	<1
1,2-dichloropropane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	NG	NG	NG	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	µg/L	1	1	NG	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Ethyl Ketone	µg/L	NG	NG	NG	<10	<10	<10	<10	<10	<10
2-hexanone (MBK)	µg/L	NG	NG	NG	<20	<20	<20	<20	<20	<20
4-Methyl-2-pentanone	µg/L	NG	NG	NG	<10	<10	<10	<10	<10	<10
Acetone	µg/L	NG	NG	NG	<10	<10	<10	<10	<10	<10
Bromoform	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	2	0.57	NG	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	µg/L	190	190	NG	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	1.3	1.3	NG	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	18	NG	<1	<1	<1	<1	<1	<1
Chloromethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Chloroethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Dichloromethane	µg/L	50	50	NG	<1	<1	<1	<1	<1	<1
MTBE	µg/L	15	15	NG	<1	<1	<1	<1	<1	<1
Styrene	µg/L	72	72	NG	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	5	NG	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	10	10	NG	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
trans-1,2-dichloroethene	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	NG	NG	NG	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	2	1.1	NG	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Notes

1 Alberta Environment, January 10, 2019, AB Tier 1 GW - Residential/Parkland (Fine Soil).
2 Alberta Environment, January 10, 2019, AB Tier 1 GW - Residential/Parkland (Coarse Soil).
3 Site Specific Tier 2 Groundwater Quality Guideline - Zone N1.
Exceeds AB Tier 1 guideline value.
Exceeds Site Specific Tier 2 guideline value.
NG No Guideline Value.

Table 6: Soil - Field Duplicates

	Location	MW6003					MW6005				
	Date	4/27/2021					4/28/2021				
	Sample	6003-98					6005-92				
	Depth	10.61					12.65				
	Parent Sample	2414063					2414055				
	Unit	6003-98	6003-18	RDL	RPD (%)	Acceptable Range	6005-92	6005-22	RDL	RPD (%)	Acceptable Range
BTEX F1-F4											
Benzene	mg/kg	0.044	0.012	<0.005	NC	60	0.117	0.158	<0.005	30	60
Toluene	mg/kg	0.91	0.37	<0.05	84	60	0.06	0.10	<0.05	50	60
Ethylbenzene	mg/kg	0.11	0.03	<0.01	NC	60	0.17	0.24	<0.01	34	60
Xylene Total	mg/kg	10.8	3.28	<0.05	107	60	0.42	0.55	<0.05	27	60
PHC fraction F1	mg/kg	40	20	<10	NC	60	<10	<10	<10	NC	60
PHC fraction F2	mg/kg	<10	<10	<10	NC	60	<10	<10	<10	NC	60
PHC fraction F3	mg/kg	<10	<10	<10	NC	60	<10	<10	<10	NC	60
PHC fraction F4	mg/kg	<10	<10	<10	NC	60	<10	<10	<10	NC	60
VOCs											
1,1,1-trichloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,1,2,2-tetrachloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,1,2-trichloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,1,1,2-tetrachloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,1-dichloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,1-dichloroethene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,2,4-trichlorobenzene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,2-dibromoethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,2-dichlorobenzene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,2-dichloroethane	mg/kg	<0.002	<0.002	<0.002	NC	60	<0.002	<0.002	<0.002	NC	60
1,2-dichloropropane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,3-dichlorobenzene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
1,4-dichlorobenzene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Methyl Ethyl Ketone	mg/kg	<0.2	<0.2	<0.2	NC	60	<0.2	<0.2	<0.2	NC	60
2-hexanone (MBK)	mg/kg	<0.2	<0.2	<0.2	NC	60	<0.2	<0.2	<0.2	NC	60
4-Methyl-2-pentanone	mg/kg	<0.2	<0.2	<0.2	NC	60	<0.2	<0.2	<0.2	NC	60
Acetone	mg/kg	<0.2	<0.2	<0.2	NC	60	<0.2	<0.2	<0.2	NC	60
Bromoform	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Bromomethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Bromodichloromethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Carbon tetrachloride	mg/kg	<0.0005	<0.0005	<0.0005	NC	60	<0.0005	<0.0005	<0.0005	NC	60
Chlorodibromomethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Chlorobenzene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Chloroform	mg/kg	<0.001	<0.001	<0.001	NC	60	<0.001	<0.001	<0.001	NC	60
Chloromethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Chloroethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
cis-1,3-dichloropropene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
cis-1,2-dichloroethene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Dichloromethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
MTBE	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Styrene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Trichloroethene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Tetrachloroethene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
trans-1,3-dichloropropene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
trans-1,2-dichloroethene	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Trichlorofluoromethane	mg/kg	<0.01	<0.01	<0.01	NC	60	<0.01	<0.01	<0.01	NC	60
Vinyl chloride	mg/kg	<0.0002	<0.0002	<0.0002	NC	60	<0.0002	<0.0002	<0.0002	NC	60

Notes

Exceeds acceptable RPD

Meets acceptable RPD

RDL Reportable detection limit as published in the laboratory report.

RPD Relative Percent Difference = ((X1-X2) / ((X1 + X2) / 2)) x 100, where X1 - original sample, X2 - duplicate sample.

NC Not calculated, the results were less than 5 x the RDL.

Table 7: Groundwater - Field Duplicates	Date	5/12/2021				
	Field ID	MW6009				
	Parent Sample	MW6005				
	Unit	6009	6005	RDL	RPD	Acceptable Range
BTEX F1-F4						
Benzene	µg/L	1,090	1,030	<0.5	6	60
Toluene	µg/L	11,100	11,900	<0.3	7	60
Ethylbenzene	µg/L	350	509	<0.5	37	60
Xylene Total	µg/L	6,410	6,370	<0.5	1	60
PHC fraction F1	µg/L	24,000	23,800	<100	1	60
PHC fraction F2	µg/L	900	900	<100	0	60
VOCs						
1,1,1-trichloroethane	µg/L	<1	<1	<1	NC	60
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	NC	60
1,1,2-trichloroethane	µg/L	<1	<1	<1	NC	60
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	NC	60
1,1-dichloroethane	µg/L	<1	<1	<1	NC	60
1,1-dichloroethene	µg/L	<1	<1	<1	NC	60
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	NC	60
1,2-dibromoethane	µg/L	<1	<1	<1	NC	60
1,2-dichlorobenzene	µg/L	<0.5	<0.5	<0.5	NC	60
1,2-dichloroethane	µg/L	16	15	<1	6	60
1,2-dichloropropane	µg/L	<1	<1	<1	NC	60
1,3-dichlorobenzene	µg/L	<0.5	<0.5	<0.5	NC	60
1,4-dichlorobenzene	µg/L	<0.5	<0.5	<0.5	NC	60
Methyl Ethyl Ketone	µg/L	<10	<10	<10	NC	60
2-hexanone (MBK)	µg/L	<20	<20	<20	NC	60
4-Methyl-2-pentanone	µg/L	<10	<10	<10	NC	60
Acetone	µg/L	<10	<10	<10	NC	60
Bromoform	µg/L	<1	<1	<1	NC	60
Bromomethane	µg/L	<1	<1	<1	NC	60
Bromodichloromethane	µg/L	<1	<1	<1	NC	60
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	NC	60
Chlorodibromomethane	µg/L	<1	<1	<1	NC	60
Chlorobenzene	µg/L	<1	<1	<1	NC	60
Chloroform	µg/L	<1	<1	<1	NC	60
Chloromethane	µg/L	<1	<1	<1	NC	60
Chloroethane	µg/L	<1	<1	<1	NC	60
cis-1,3-dichloropropene	µg/L	<1	<1	<1	NC	60
cis-1,2-dichloroethene	µg/L	<1	<1	<1	NC	60
Dichloromethane	µg/L	<1	<1	<1	NC	60
MTBE	µg/L	<1	<1	<1	NC	60
Styrene	µg/L	<1	<1	<1	NC	60
Trichloroethene	µg/L	<1	<1	<1	NC	60
Tetrachloroethene	µg/L	<1	<1	<1	NC	60
trans-1,3-dichloropropene	µg/L	<1	<1	<1	NC	60
trans-1,2-dichloroethene	µg/L	<1	<1	<1	NC	60
Trichlorofluoromethane	µg/L	<1	<1	<1	NC	60
Vinyl chloride	µg/L	<0.8	<0.8	<0.8	NC	60

Notes

Exceeds acceptable RPD

Meets acceptable RPD

RDL Reportable detection limit as published in the laboratory report.

RPD Relative Percent Difference = ((X1-X2) / ((X1 + X2) / 2)) x 100, where X1 - original sample, X2 - duplicate sample.

NC Not calculated, the results were less than 5 x the RDL.

Table 8: Soil - Trip Blanks

		BTEX F1-F4				
		Benzene	Toluene	Ethylbenzene	Xylene Total	PHC fraction F1
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date	Field ID					
4/26/2021	Trip Blank #1	<0.005	<0.05	<0.01	<0.05	<10
4/27/2021	Trip Blank #2	<0.005	<0.05	<0.01	<0.05	<10
4/28/2021	Trip Blank #3	<0.005	<0.05	<0.01	<0.05	<10
4/29/2021	Trip Blank #4	<0.005	<0.05	<0.01	<0.05	<10

Table 9: Groundwater - Trip Blank	Date	5/11/2021
	Field ID	Trip Blank
	Unit	
BTEX F1-F4		
Benzene	µg/L	<0.5
Toluene	µg/L	<0.3
Ethylbenzene	µg/L	<0.5
Xylene Total	µg/L	<0.5
VOCs		
1,1,1-trichloroethane	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
1,1-dichloroethane	µg/L	<1
1,1-dichloroethene	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
1,2-dibromoethane	µg/L	<1
1,2-dichlorobenzene	µg/L	<0.5
1,2-dichloroethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
1,3-dichlorobenzene	µg/L	<0.5
1,4-dichlorobenzene	µg/L	<0.5
Methyl Ethyl Ketone	µg/L	<10
2-hexanone (MBK)	µg/L	<20
4-Methyl-2-pentanone	µg/L	<10
Acetone	µg/L	<10
Bromoform	µg/L	<1
Bromomethane	µg/L	<1
Bromodichloromethane	µg/L	<1
Carbon tetrachloride	µg/L	<0.5
Chlorodibromomethane	µg/L	<1
Chlorobenzene	µg/L	<1
Chloroform	µg/L	<1
Chloromethane	µg/L	<1
Chloroethane	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
cis-1,2-dichloroethene	µg/L	<1
Dichloromethane	µg/L	<1
MTBE	µg/L	<1
Styrene	µg/L	<1
Trichloroethene	µg/L	<1
Tetrachloroethene	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
trans-1,2-dichloroethene	µg/L	<1
Trichlorofluoromethane	µg/L	<1
Vinyl chloride	µg/L	<0.8

Appendix A1

Clifton

Clifton

Symbols and Terms

Soil Descriptive Terms
A soil description for geotechnical applications includes a description of the following properties:

- texture
- color, oxidation
- consistency and condition
- primary and secondary structure

Texture

The soil texture refers to the size, size distribution and shape of the individual soil particles which comprise the soil. The Unified Soil Classification System (ASTM D2487-00) is a quantitative method of describing the soil texture. The basis of this system is presented on the following page. The following terms are commonly used to describe the soil texture.

Particle Size (ASTM D2487-00)	
Boulder	300 mm plus
Cobble	75 mm – 300 mm
Gravel:	4.75 mm – 75 mm
- Coarse	19 mm – 75 mm
- Fine	4.75 mm – 19 mm
Sand:	0.075 mm – 4.75 mm
- Coarse	2 mm – 4.75 mm
- Medium	0.425 mm – 2 mm
- Fine	0.075 mm – 0.425 mm
Silt and Clay	Smaller than 0.075 mm

Relative Proportions (CFEM, 4th Ed., 2006)	
Trace	1% – 10%
Some	10% – 20%
Gravelly, sandy, silty, clayey, etc.	20% – 35%
And	>35%
Gravel, Sand, Silt, Clay, etc.	35% and main fraction

Gradation	
Well Graded	Having a wide range of grain sizes and substantial amount of all intermediate sizes
Uniform or Poorly Graded	Possessing particles of predominantly one size
Gap Graded	Possessing particles of two distinct sizes

Particle Shape	
Angular	Sharp edges and relatively plane sides with unpolished face
Subangular	Similar to ‘angular’ but have rounded edges
Subrounded	Well-rounded corners and edges, nearly plane sides
Rounded	No edges, has smoothly curved sides
Also may be flat, elongated, or both	

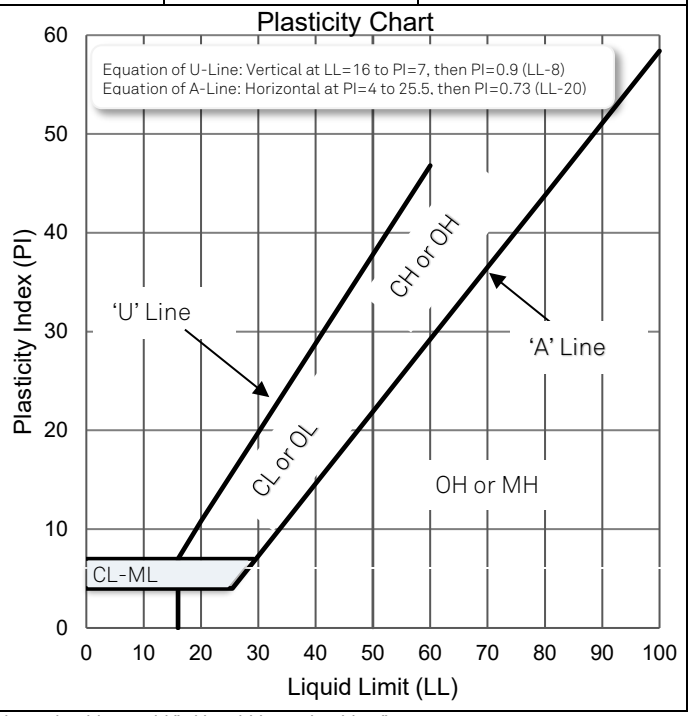
The term “TILL” may be used as a textural term to describe a soil which has been deposited by glaciers and contains an unsorted, wide range of particle sizes.

Colour and Oxidation

The soil color at its natural moisture content is described by common colors and, quantitatively, in terms of the Munsell color notation; (eg. 5Y 3/1). The notation combines three variables, hue, value and chroma to describe the soil color. The hue indicates its relation to red, yellow, green, blue and purple. The value indicates its lightness. The chroma indicates its strength of departure from a neutral of the same lightness. Departure of the soil color from a neutral color indicates the soil has been oxidized. Oxidation of a soil occurs in an oxygen rich environment where most commonly metallic iron, oxidizes and turns a neutral colored soil 'rusty' or reddish brown. Oxidized manganese gives a purplish tinge to the soil. Oxidation may occur throughout the entire soil mass or on fracture/joint/fissure surfaces.

Classification of Soils for Engineering Purposes

ASTM Designation D 2487-00 (Unified Soil Classification System)

Major divisions			Group Symbol	Typical Names	Classification Criteria			
Coarse-grained soils More than 50% retained on No. 200 sieve* (>0.075 mm)	Gravels More than 50% of coarse fraction retained on No. 4 sieve (4.75 mm)	Clean gravels <5% fines	GW	Well-graded gravel	If 15% sand add "with sand" to group name	Classification on basis of percentage of fines: Less than 5% pass No. 200 sieve - GW, GP, SW, SP More than12% pass No. 200 sieve - GM, GC, SM, SC If 5% to 12% pass No. 200 sieve - Borderline classifications, use of dual symbols	$C_u = \frac{D_{60}}{D_{10}} \geq 4$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravel			Not meeting either Cu or Cc criteria for GW	
		Gravels with >12% fines	GM	Silty gravel			Atterberg limits below "A" line or PI less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols If fines are organic add "with organic fines" to group name
			GC	Clayey gravel			Atterberg limits on or above "A" line and PI >7	
	Sands 50% or more of coarse fraction passes No. 4 sieve (<4.75 mm)	Clean sands <5% fines	SW	Well-graded sand	If 15% gravel add "with gravel" to group name		$C_u = \frac{D_{60}}{D_{10}} \geq 6$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sand			Not meeting either Cu or C criteria for SW	
		Sands with >12% fines	SM	Silty sand			Atterberg limits below "A" line or PI less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols If fines are organic add "with organic fines" to group name
			SC	Clayey sand			Atterberg limits on or above "A" line and PI >7	
Fine-grained soils 50% or more passes No. 200 sieve* (<0.075 mm)	Silts and Clays Liquid Limit <50%	Inorganic	ML	Silt	If 15% to 29% coarse-grained, add "with sand" or "with gravel" as appropriate. If > 30% coarse-grained, add "sandy" or "gravelly" as appropriate. Class as organic when oven dried liquid limit is < 75% of undried liquid limit.			
			CL	Lean Clay -low plasticity				
		Organic	OL	Organic clay or silt (Clay plots above 'A' Line)				
	Silts and Clays Liquid Limit >50%	Inorganic	MH	Elastic silt				
			CH	Fat Clay -high plasticity				
		Organic	OH	Organic clay or silt (Clay plots above 'A' Line)				
	Highly Organic Soils		PT	Peat, muck and other highly organic soils				

*Based on the material passing the 3 in. (75 mm) sieve, if field samples contain cobbles or boulders, add "with cobbles or boulders" to group name

Consistency and Condition

The consistency of a cohesive soil is a qualitative description of its resistance to deformation and can be correlated with the undrained shear strength of the soil. The condition of a coarse-grained soil qualitatively describes the soil compactness and can be correlated with the standard penetration resistance (ASTM D1586-99).

Consistency of Cohesive Soil
(CFEM, 4th Edit., 2006)

Consistency	Undrained Shear Strength (kPa)	Field Identification (ASTM D2488-00)
Very Soft	<12	Thumb will penetrate soil more than 25 mm
Soft	12 – 25	Thumb will penetrate soil about 25 mm
Firm	25 – 50	Thumb will indent soil about 6 mm
Stiff	50 – 100	Thumb will indent but penetrate only with great effort (CFEM)
Very Stiff	100 – 200	Readily indented by thumbnail (CFEM)
Hard	>200	Thumb will not indent soil but readily indented with thumbnail
Very Hard	N/A	Thumbnail will not indent soil

Consistency of Coarse-Grained Soil
(CFEM, 4th Edit., 2006)

Compactness Condition	SPT N – Index (Blows/300 mm)
Very Loose	0 – 4
Loose	4 – 10
Compact	10 – 30
Dense	30 – 50
Very Dense	Over 50

Moisture Conditions
(ASTM D2488-00)

Description	Criteria
Dry	Absence of moisture, dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible, free water, usually soil is below water table

Structure

The soil structure is the manner in which the individual soil particles are assembled to form the soil mass. The primary soil structure is the arrangement of soil particles as originally deposited. The secondary soil structure refers to any rearrangement of the soil such as deformation and cracking which has taken place since deposition.

Primary Soil Structure (Depositional)

Geometry	
Stratum	• A single sedimentary 'layer', greater than 10 mm in thickness, visibly separable from other strat by a discrete change in lithology and/or sharp physical break
Homogeneous	• Same colour and appearance throughout
Stratified	• Consisting of a sequence of layers which are generally of contrasting texture or colour
Laminated	• Stratified with layer thickness between 2 – 10 mm
Thinly Laminated	• Stratified with layer thickness less than 2 mm
Bedded	• Stratified with layer thickness greater than 10 mm
Very Thinly-bedded (Flaggy)	• Stratified with layer thickness between 10 – 50 mm
Thinly-beddy (Slabby)	• Stratified with layer thickness between 50 – 600 mm
Thickly-beddy (Blocky)	• Stratified with layer thickness between 600 – 1200 mm
Thick-bedded (Massive)	• Stratified with layer thickness greater than 1,200 mm
Lensed	• Inclusions of small pockets of different soil, such as small lenses of sand material throughout a mass of clay
Bedding Structures	
Cross-bedding	• Internal 'bedding' inclined to the general bedding plane
Ripple-bedding	• Internal 'wavy bedding'
Graded-bedding	• Internal gradation of grain size from coarse at base to finer at top of bed
Horizontal-bedded	• Internal bedding is parallel and flat lying

Secondary Soil Structure (Post-Depositional)

Accretionary Structures	
Includes nodules, concretions, crystal aggregates, veinlets, color banding, and:	
Cementation	• Chemically precipitated material, commonly calcite ($CaCO_3$), binds the grains of soil, usually sandstone. Described as weak, moderate, or strong (ASTM D2488-00)
Salt Crystals	• Groundwater flowing though the soil/rock often precipitates visible amounts of salts. Calcite ($CaCO_3$), glauber salts ($Na_2Ca(SO_4)_2$), and gypsum ($CaSO_4*2H_2O$) are common
Fracture Structures	
Fracture	• A break or discontinuity in the soil or rock mass caused by stress exceeding the materials strength
Joint	• A fracture along which no displacement has occurred
Fissure	• A gapped fracture, which may open and close seasonally. Usually an extensive network of closely spaced fractures, giving the soil a 'nuggetty' structure
Slickensides	• Fractures in clay that are slick and glossy in appearance, caused by shear movements
Brecciated	• Contains randomly orientated angular fragments of a finer mass, usually associated with shear displacement in soils
Fault	• A fracture or fracture zone along with displacement has occurred
Blocky	• A cohesive soil that can be broken down into small angular lumps which resist further break down

Symbols Used on Borehole Logs

Lithology Type


Clay


Silt


Sand


Gravel


Cobbles


Till – oxidized


Till – unoxidized


Peat


Fill (undifferentiated)


Coal


Topsoil or Organic Soil


Concrete


Asphalt


Clay Shale


Sandstone


Mudstone


Bedrock (undifferentiated)

Borehole Completion and Backfill Materials


Bentonite


Concrete


Cover


Cuttings


Grout


Sand


Slough


Solid Pipe


Slotted Pipe

Soil Sample Type


Thin Walled Tube


Driven Spoon


Disturbed


Core (any type)


No Recovery

Groundwater Symbols


Piezometric elevation as determined by a piezometer installation.


Water levels measured in borings at time and under the conditions noted.

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BOREHOLE LOG

Borehole: MW6001
Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660891.08	Date:	30 Apr 2021
Project:	LPH Assessment	Easting:	703337.82	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.47	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.37	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0 / 1089		ASPHALT: solid stem auger							Flush mount road box
		GRAVEL: Fill, solid stem auger, not sampled							
1 / 1088		SAND: fine to medium, brown, compact, moist		MW01-2				33.3	
2 / 1087				MW01-3				29.2	
				MW01-4				28.5	
3 / 1086		@2.98m, large cobble							Bentonite grout
		SILT: dark brown, loose, wet @3.72m 3cm clay lens		MW01-5				32.1	
4 / 1085		SAND: dark brown, wet		MW01-6				29.3	
		CLAY: trace silt, brown, high plastic, moist							
		SILT: trace clay, dark brown, compact to soft, wet		MW01-7				28.9	Schedule 40 PVC pipe, 50 mm ID
5 / 1084		@4.91m, 5cm clay, high plastic, moist, firm							
		CLAY: brown, firm, high plastic, moist		MW01-8				27.0	
6 / 1083		CLAY: some silt, trace gravel, brown, firm, high plastic, moist							
		@6.8m, ~8cm silt lens, wet, soft		MW01-9				27.6	
7 / 1082				MW01-10				26.3	
		SILT: brown, soft, wet		MW01-11				25.5	
8 / 1081		CLAY: brown, firm, high plastic, moist, trace coal							Bentonite grout
				MW01-12				26.2	
9									

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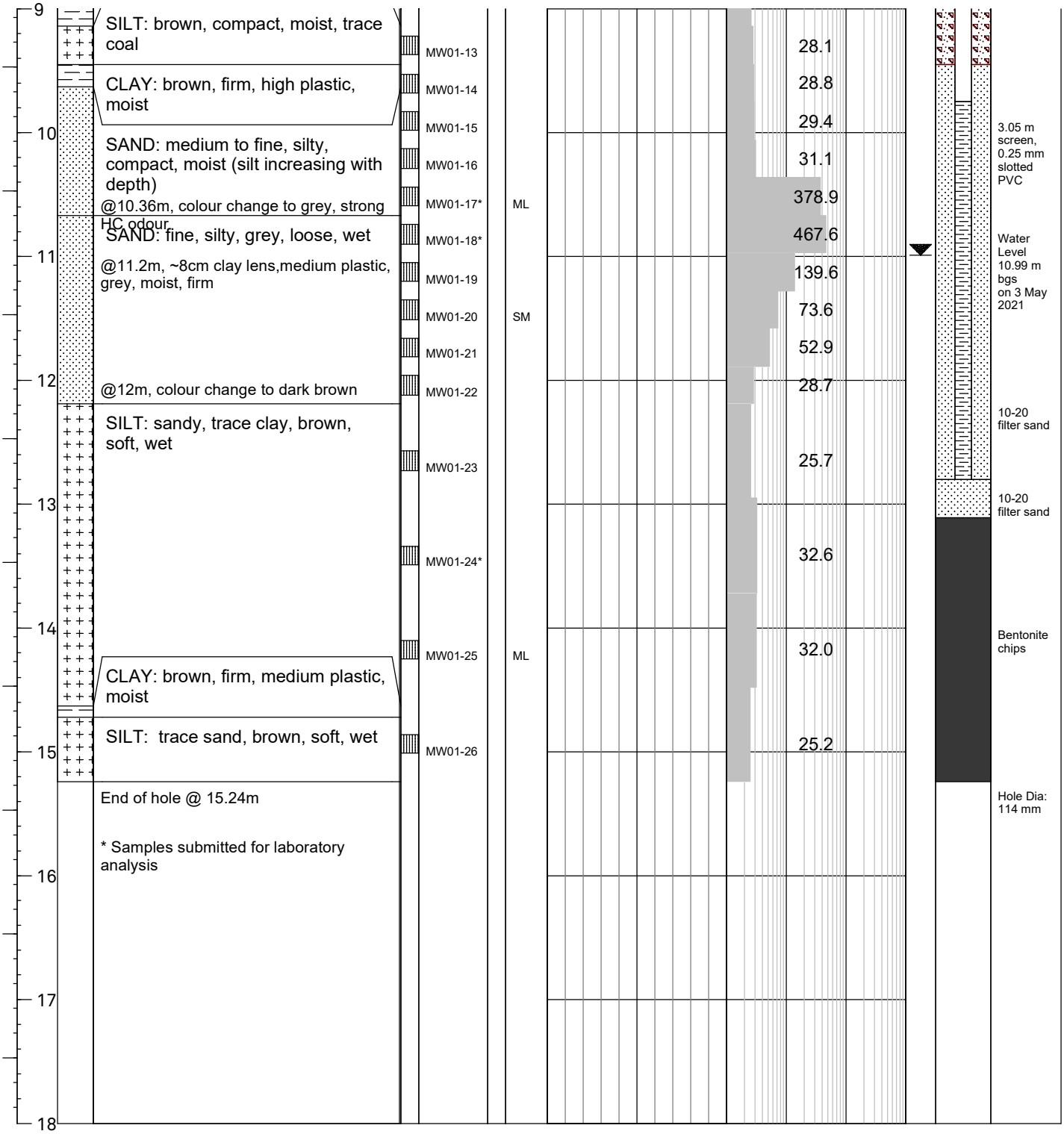
BOREHOLE LOG

Borehole: MW6001
Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660891.08	Date:	30 Apr 2021
Project:	LPH Assessment	Easting:	703337.82	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.47	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.37	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1080 / 9		SILT: brown, compact, moist, trace coal		MW01-13				28.1	
		CLAY: brown, firm, high plastic, moist		MW01-14				28.8	
1079 / 10		SAND: medium to fine, silty, compact, moist (silt increasing with depth)		MW01-15				29.4	
		@10.36m, colour change to grey, strong HC odour		MW01-16				31.1	
1078 / 11		SAND: fine, silty, grey, loose, wet		MW01-17*		ML		378.9	
		@11.2m, ~8cm clay lens,medium plastic, grey, moist, firm		MW01-18*				467.6	
				MW01-19				139.6	
1077 / 12		@12m, colour change to dark brown		MW01-20		SM		73.6	
		SILT: sandy, trace clay, brown, soft, wet		MW01-21				52.9	
1076 / 13				MW01-22				28.7	
				MW01-23				25.7	
1075 / 14				MW01-24*				32.6	
		CLAY: brown, firm, medium plastic, moist		MW01-25		ML		32.0	
1074 / 15		SILT: trace sand, brown, soft, wet		MW01-26				25.2	
		End of hole @ 15.24m							
1073 / 16		* Samples submitted for laboratory analysis							
1072 / 17									
18									



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BOREHOLE LOG

Borehole: MW6002

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660904.19	Date:	28 Apr 2021
Project:	LPH Assessment	Easting:	703339.67	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.67	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.56	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1089 / 0		ASPHALT: Fill. Gravel, solid stem auger, not sampled							Flush mount road box
1089 / 1		SAND: fine, silty, brown, soft							
		SILT: some sand, brown, soft, wet		MW02-2				38.9	
1088 / 2		SAND: fine to medium, brown, moist, homogeneous @1.82m, ~3cm clay layer		MW02-3				43.1	
1087 / 3		@2.5m, ~3cm clay layer		MW02-4				42.2	Bentonite grout
1086 / 4		SILT: brown, soft, wet		MW02-5				41.5	
		CLAY: brown, firm, high plastic, moist		MW02-6				37.7	
1085 / 5		SILT: brown, loose, wet CLAY: silty, brown, firm, high plastic, moist							
		SILT: trace clay, brown, soft, wet		MW02-7				39.8	Schedule 40 PVC pipe, 50 mm ID
1084 / 6		CLAY: brown, firm, high plastic, moist, homogeneous @5.94m, ~5cm clay layer		MW02-8				42.5	
				MW02-9				37.4	
1083 / 7		SILT: brown, loose, wet CLAY: silty, firm, medium plastic, moist @6.95m, ~5cm silt layer, saturated		MW02-10				39.7	
		SILT: brown, soft, wet							
1082 / 8		CLAY: trace gravel, brown, firm, high plastic, moist. @7.6m large cobble		MW02-11				36.4	
		SILT: some clay, brown, soft, wet		MW02-12				38.5	Bentonite grout
1081 / 9		CLAY: firm, high plastic, moist, trace oxidation		MW02-13				35.2	

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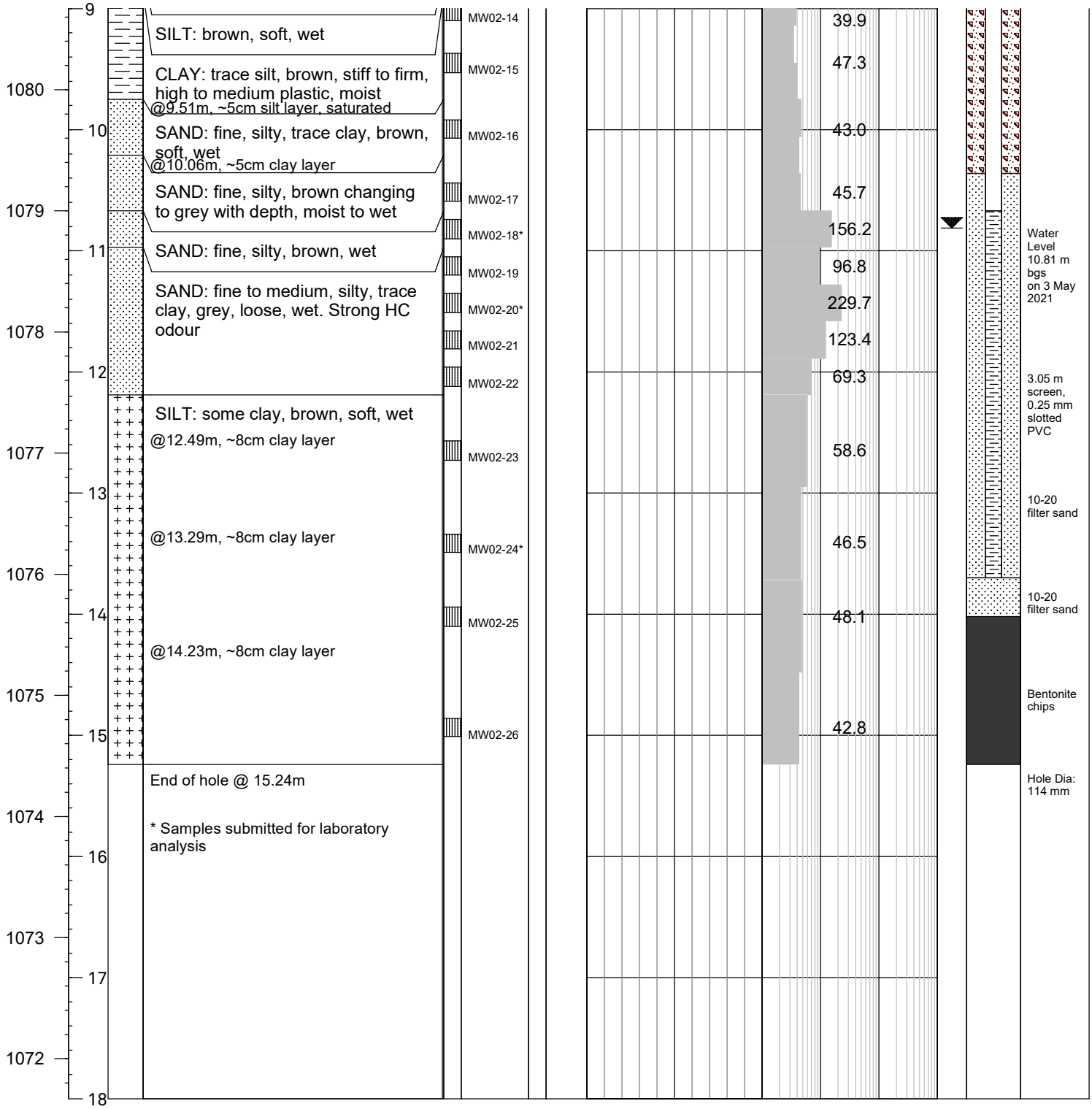
BOREHOLE LOG

Borehole: MW6002
Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660904.19	Date:	28 Apr 2021
Project:	LPH Assessment	Easting:	703339.67	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.67	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.56	Logged by:	AM



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BOREHOLE LOG

Borehole: MW6003

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660916.55	Date:	28 Apr 2021
Project:	LPH Assessment	Easting:	703331.29	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.88	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.77	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1089 / 0		ASPHALT: Fill. Gravel, solid stem auger, not sampled							Flush mount road box
1089 / 1		SILT: gravelly, light brown, moist, compact							
		ORGANIC SOIL: dark grey, loamy, moist, roots		MW03-2				36.4	
1088 / 2		SAND: fine to medium, silty, light brown, compact, moist		MW03-3				38.9	
		decreasing silt with depth		MW03-4				33.7	
1087 / 3		SAND: fine to medium, light brown, compact, wet							Bentonite grout
		CLAY: light brown, firm, high plastic, moist		MW03-5				32.4	
1086 / 4		SAND: fine, silty, light brown, wet @4.08m, ~8cm saturated sand		MW03-6				31.7	
		CLAY: medium plastic, some silt, firm, moist							
1085 / 5		SAND: fine to medium, compact, moist, homogeneous		MW03-7				32.9	Schedule 40 PVC pipe, 50 mm ID
		CLAY: trace silt, trace gravel, light brown, firm, high plastic, moist		MW03-8				34.2	
1084 / 6		SILT: brown, loose, wet							
		CLAY: silty, firm, medium plastic, moist							
		SILT: some clay, light brown, soft, wet		MW03-9				40.2	
1083 / 7		CLAY: medium plastic, silty, light brown, firm, moist		MW03-10				39.3	
		SILT: light brown, soft, wet		MW03-11				38.9	
1082 / 8		CLAY: silty, brown, firm, low plastic							
		SILT: clayey, soft, brown, wet		MW03-12				41.9	Bentonite grout
		CLAY: brown, firm, high plastic, moist							
1081 / 9				MW03-13				36.7	

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BOREHOLE LOG

Borehole: MW6003

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660916.55	Date:	28 Apr 2021
Project:	LPH Assessment	Easting:	703331.29	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1089.88	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.77	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm	Monitor Well Construction Detail
1089 / 9		SILT: clayey, brown, wet		MW03-14				34.8	
		CLAY: some silt, firm, high to medium plastic, moist		MW03-15				34.3	
1080 / 10		SAND: fine, silty, brown to light grey, loose, wet, HC odour. Slighty coarser in upper unit, finer with depth.		MW03-16				39.5	10-20 filter sand
				MW03-17				102.8	
		strong HC odour @ 10.7m		MW03-18*				402.6	
1079 / 11				MW03-19*		SM		494.5	Water Level 10.78 m bgs on 3 May 2021
		@11.3m ~3cm clay layer		MW03-20				363.4	
				MW03-21				193.6	
1078 / 12				MW03-22				84.6	
		SILT: trace clay, trace sand, brown, soft, wet		MW03-23				55.5	3.05 m screen, 0.25 mm slotted PVC
				MW03-24		ML		52.6	
1077 / 13		CLAY: trace clay, brown, soft, wet		MW03-25*				51.4	10-20 filter sand
		SILT: trace clay, brown, soft, wet		MW03-26				48.9	Bentonite chips
1076 / 14		End of hole @ 15.24m							Hole Dia: 114 mm
		* Samples submitted for laboratory analysis							
1075 / 15									
1074 / 16									
1073 / 17									
1072 / 18									

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BOREHOLE LOG

Borehole: MW6004

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660935.83	Date:	29 Apr 2021
Project:	LPH Assessment	Easting:	703335.21	Driller:	All-Service
Location:	Houndsfield Heights Area	Ground Elev.:	1089.78	Method:	Geoprobe 8040 DP
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.67	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit / Natural Moisture / Liquid Limit (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1089 / 0		TOPSOIL							Flush mount road box
		SILT: sandy, brown, moist, solid auger, not sampled							
1089 / 1		SAND: fine to medium, silty, brown, compact, moist		MW04-2				33.1	
		SILT: some gravel, dark brown, moist							
1088 / 2		FILL: silty, dark brown, moist, some roots, pieces of glass		MW04-3				33.5	
				MW04-4 NR					
1087 / 3		SAND: fine to medium, brown, wet							Bentonite grout
		SILT: brown, wet		MW04-5				35.1	
1086 / 4		@3.66m, ~4cm clay layer CLAY: medium plastic, brown, firm, moist						30.0	
		SILT: brown, soft, wet, homogeneous		MW04-6					
1085 / 5		SILT: dark brown, soft, wet		MW04-7				33.6	Schedule 40 PVC pipe, 50 mm ID
		SILT: brown, firm, high plastic, moist		MW04-8				157.2	
1084 / 6		SILT: some clay, grey, soft, wet, HC odour		MW04-9*					
		@6.55m, ~5cm clay layer		MW04-10				381.5	
1083 / 7		CLAY: silty, brown, medium plastic @6.89m, ~8cm silt layer		MW04-11					
		SILT: dark brown, loose, wet		MW04-12				156.6	
		CLAY: trace silt, firm, medium to high plastic, moist, trace coal		MW04-13				147.7	
1082 / 8		SILT: brown, loose, wet		MW04-14				88.9	
		CLAY: trace gravel, brown, firm to stiff, high plastic, moist							Bentonite grout
1081 / 9		@8.75m, ~5cm silt layer		MW04-15				35.1	

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BOREHOLE LOG

Borehole: MW6004

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660935.83	Date:	29 Apr 2021
Project:	LPH Assessment	Easting:	703335.21	Driller:	All-Service
Location:	Houndsfield Heights Area	Ground Elev.:	1089.78	Method:	Geoprobe 8040 DP
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.67	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit / Natural Moisture / Liquid Limit (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1089 / 0									
1088 / 1									
1087 / 2									
1086 / 3									
1085 / 4									
1084 / 5									
1083 / 6									
1082 / 7									
1081 / 8									
1080 / 9		@9.45m, ~8cm silt layer		MW04-16				33.5	
1079 / 10								33.3	
				MW04-17				32.9	
		SILT: brown, loose, wet						50.0	
		@10.63m, ~5cm fine sand layer		MW04-18*				557.7	
1078 / 11		@10.7m, dark brown, HC odour		MW04-19				112.2	
				MW04-20				36.4	
								32.4	
		CLAY: silty, brown, firm, low plastic, moist		MW04-21				33.8	
1077 / 12		@12.04m, ~8cm silt layer		MW04-22				31.1	
		SILT: brown, soft, loose, wet		MW04-23*				34.4	
		@12.65m, ~5cm clay layer							
		CLAY: some silt, brown, firm, medium plastic, moist							
1076 / 13		SILT: some clay, brown, compact, moist		MW04-24					
1075 / 14		End of hole @ 13.72m							
		* Samples submitted for laboratory analysis							
1074 / 15									
1073 / 16									
1072 / 17									
1071 / 18									

3.05 m screen, 0.25 mm slotted PVC

Water Level 10.46 m bgs on 3 May 2021

10-20 filter sand

10-20 filter sand

Bentonite chips

Hole Dia: 114 mm

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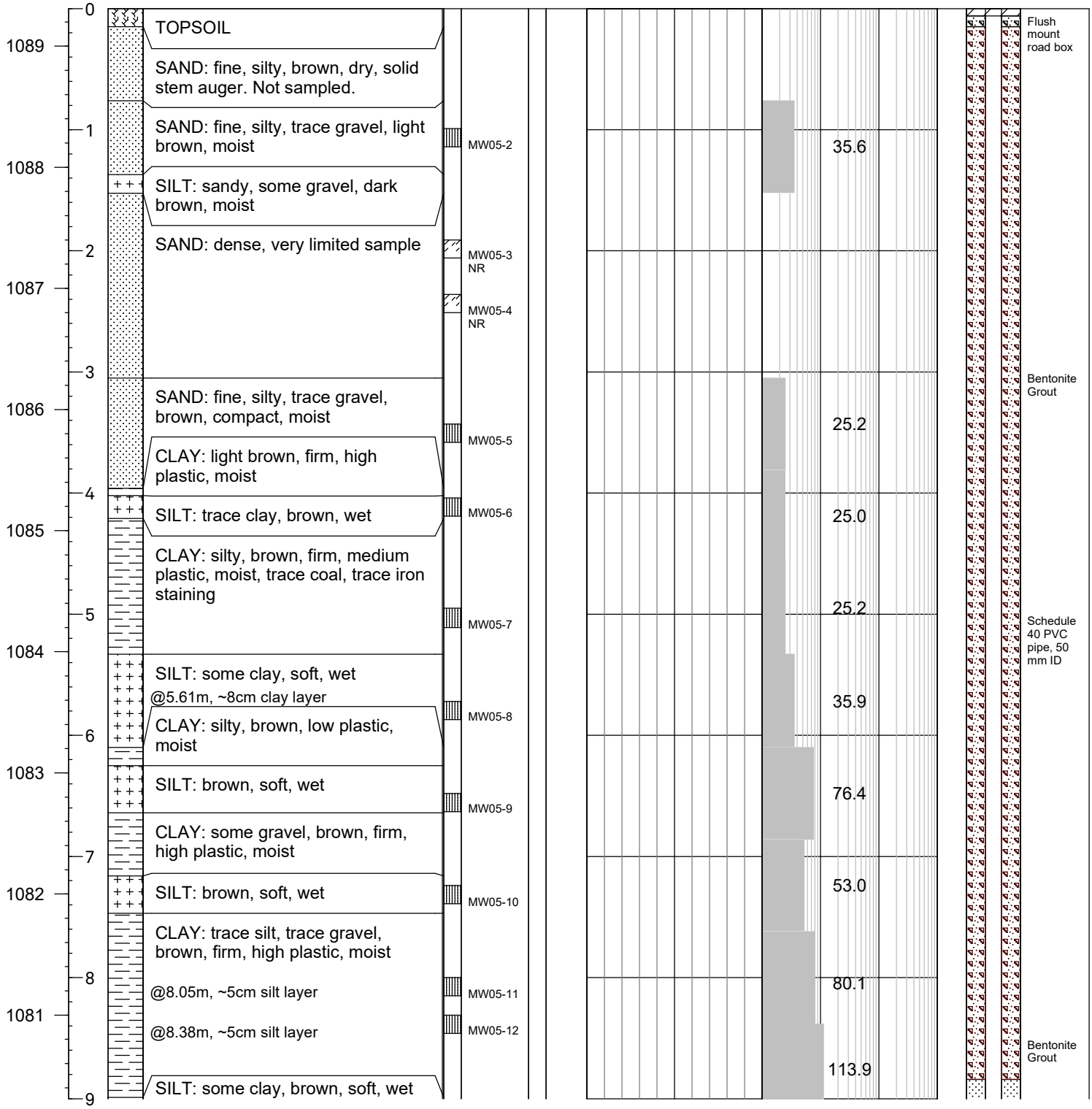
BOREHOLE LOG

Borehole: MW6005

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660938.73	Date:	29 Apr 2021
Project:	LPH Assessment	Easting:	703369.60	Driller:	All-Service
Location:	Houndsfield Heights Area	Ground Elev.:	1089.31	Method:	Geoprobe 8040 DP
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.08	Logged by:	AM



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BOREHOLE LOG

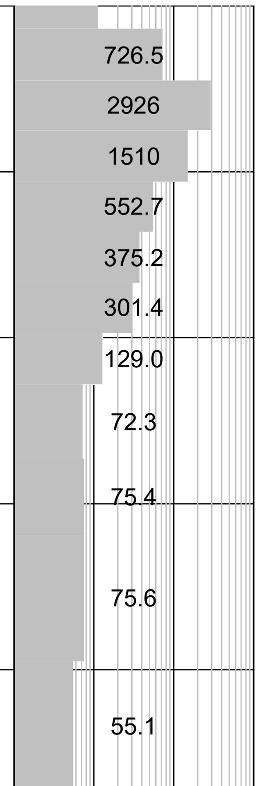
Borehole: **MW6005**

Client:	Suncor Energy Product Partnership	Northing:	5660938.73	Date:	29 Apr 2021
Project:	LPH Assessment	Easting:	703369.60	Driller:	All-Service
Location:	Houndsfield Heights Area	Ground Elev.:	1089.31	Method:	Geoprobe 8040 DP
Project No.:	CG3418 / 010	Top Casing Elev.:	1089.08	Logged by:	AM

Elev (m)	Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲, Natural Moisture ●, Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1080	9 – 10.5		SAND: fine, silty, trace clay, brown, wet, HC odour		MW05-13				726.5	10 - 20 filter sand
					MW05-14*				2926	Water Level 9.82 m bgs on 3 May 2021
	10				MW05-15*		SM		1510	
1079			@10.27m, ~5cm clay layer		MW05-16				552.7	
					MW05-17				375.2	
	10.5 – 13.72		SILT: brown, compact to soft, wet, homogeneous		MW05-18				301.4	
	11				MW05-19		ML		129.0	3.05 m screen, 0.25 mm slotted PVC
1078					MW05-20				72.3	
			@11.73m, ~3cm clay layer							
	12				MW05-21				75.4	
1077					MW05-22*				75.6	sand
	13		@13.13m, ~5cm clay layer							bentonite chips
1076					MW05-23				55.1	
	13.72		End of hole @ 13.72m							Hole Dia: 114 mm

* Samples submitted for laboratory analysis

Depth scale: 9 – 18 m; Elevation scale: 1080 – 1072 m



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BOREHOLE LOG

Borehole: MW6006

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660872.01	Date:	27 Apr 2021
Project:	LPH Assessment	Easting:	703406.89	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1091.50	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1091.38	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1091 / 0		GRAVEL: solid stem auger, not sampled		MW06-1				25.1	Flush mount road box
		TOPSOIL: sandy, brown, moist, some roots							
1090 / 1		SAND: fine, silty, light brown, compact, moist, homogeneous		MW06-2				27.1	
		@1.43m, increasing silt							
1089 / 2				MW06-3				34.5	
		@2.44m, ~ 10cm silt layer							
				MW06-4				24.9	
1088 / 3		SAND: fine, silty, light brown, loose, wet, homogeneous		MW06-5				28.7	Bentonite grout
		@3.84m, ~ 8cm saturated sand							
1087 / 4				MW06-6				25.9	
		SAND: fine, silty, compact, moist, homogeneous							
1086 / 5		@4.8m, ~ 1cm clay layer		MW06-7				42.2	Schedule 40 PVC pipe, 50 mm ID
		SAND: fine to medium, silty, compact, moist, trace coal		MW06-8				43.1	
1085 / 6		SAND: fine, silty, brown, wet							
		CLAY: silty, brown, soft to firm, high plastic, moist		MW06-9				27.6	
1084 / 7		SILT: brown, loose, wet		MW06-10				24.5	
		CLAY: trace silt, brown, firm, high plastic, moist							
		@7.86m, ~ 8cm silt layer		MW06-11				27.7	
1083 / 8		@8.38m, ~ 5cm silt layer		MW06-12				43.0	
		SILT: some clay, brown, firm, wet		MW06-13				41.3	
/ 9									

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BOREHOLE LOG

Borehole: MW6006

Page: 1 of 2

Client:	Suncor Energy Product Partnership	Northing:	5660872.01	Date:	27 Apr 2021
Project:	LPH Assessment	Easting:	703406.89	Driller:	Geoprobe 8040
Location:	Houndsfield Heights Area	Ground Elev.:	1091.50	Method:	Direct Push
Project No.:	CG3418 / 010	Top Casing Elev.:	1091.38	Logged by:	AM

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
1082 / 9		CLAY: some silt, brown, firm, mediium to high plastic, moist		MW06-14				40.2	Bentonite grout
		@9.29m, ~ 5cm silt layer							
		SILT: some clay, brown, loose, wet		MW06-15				49.4	
10		CLAY: brown, high plastic, moist		MW06-16				41.8	
1081		SILT: some clay, brown, loose, wet		MW06-17				42.0	
		@10.52m, ~ 8cm clay layer		MW06-18				42.7	
11		CLAY: dark brown, firm, high plastic, moist		MW06-19				43.8	
		SILT: dark brown, loose, wet		MW06-20				43.0	
1080		CLAY: trace silt, dark brown to brown, stiff, high to medium plastic, moist, trace coal							
12		@12.16m, large red cobble		MW06-21				39.2	10-20 filter sand
		SILT: some sand, brown, compact, wet		MW06-22				43.2	
1079				MW06-23				44.9	
		SAND: fine to medium, silty, dark brown, compact, moist		MW06-24				40.2	
13		SILT: fine sandy, grey, compact, wet, homogeneous, HC odour		MW06-25*		ML		996.9	Water Level 13.59 m bgs on 3 May 2021
1078		SAND: fine to medium, silty, trace gravel, grey to brown, wet, slight HC odour		MW06-26*				281.4	
				MW06-27				47.0	
14		SILT: some clay, brown, soft to compact, wet		MW06-28		ML		63.2	3.05 m screen, 0.25 mm slotted PVC
1077				MW06-29*				36.6	
		@15.11m, ~ 1cm clay layer							
15		@15.39m, ~ 3cm clay layer							10-20 filter sand
1076				MW06-30				37.5	
									Bentonite chips
16		@16.27m, ~ 5cm clay layer		MW06-31				37.6	
1075		@16.70m, ~ 5cm clay layer		MW06-32				36.4	
		End of hole @ 16.77m							Hole Dia: 114 mm
17		* Samples submitted for laboratory analysis							
1074									
18									

Appendix A2

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Env BH m elev CAL v03.tdf

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BORE HOLE LOG

Bore Hole: BH209
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5 658 621.1 m	Date Drilled:	19 October 1998
Project:	Environmental Site Assessment	Easting:	-6830.5 m	Drill:	B-61
Location:	North Hill Mall, Calgary	Ground Elev.:	1088.86 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1088.80 m	Logged by:	CLG

Elev (m) / Depth (m)	Symbol	Soil Description	Sample: Type	Sample: No.	Sample: SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		GRAVEL		1				43	Protective casing
-1		SAND: fine to medium grained, some silt to silty, light olive brown, loose.		2				16	
-2		@ 1.83m: trace silt, trace gravel.		3				20	Sil 9 Sand
-3		@ 3.05m: clay lenses.		4				28	50 mm solid schedule 40 PVC
-4		CLAY: trace gravel, light olive brown, fractured, fine grained sand infilling fractures, light olive brown, trace Fe oxidation specks, moist.		5				16	
-5				6				18	Bentonite seal
-6		@ 4.27m: mottled light olive brown and grey, wet.		7				18	
-7		@ 6.10m: trace rootlets.		8				10	
-8		@ 7.32m to 7.62m: sand lense, fine to medium grained, trace silt, light greyish brown, hydrocarbon odour.		9				86	
-9		SAND: fine to medium grained, trace silt, trace clay (as lenses), light greyish brown, hydrocarbon		10				200	50 mm horizontally slotted schedule 40 PVC
-10				11				180	Sil 9 Sand
				12				>10 000	
				13					Water Level 10.056 m on

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BORE HOLE LOG

Bore Hole: BH209
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5 658 621.1 m	Date Drilled:	19 October 1998
Project:	Environmental Site Assessment	Easting:	-6830.5 m	Drill:	B-61
Location:	North Hill Mall, Calgary	Ground Elev.:	1088.86 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1088.80 m	Logged by:	CLG

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content percent: Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		odour.						>10 000	29/10/98
-11				14				4200	
								48	
-12		@ 11.74m, 12.80m & 13.26m: clay lenses 150mm to 200mm thick, mottled light olive brown and grey, trace Fe oxidation specks, faint hydrocarbon odour.		15					
				16				>10 000	
-13				17				10	
				18				80	
-14									
-15		NOTES: End of hole at 14.7m. Standpipe installed to 13.5m.							
-16									
-17									
-18									
-19									
-20									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH213
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5 658 620.5 m	Date Drilled:	21 October 1998
Project:	Environmental Site Assessment	Easting:	-6844.5 m	Drill:	B-61 Beck
Location:	North Hill Mall, Calgary	Ground Elev.:	1089.08 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1088.95 m	Logged by:	CLG

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		SAND: fine to medium grained, some silt, clay lenses, light brown, moist.		1				14	Protective casing
-1				2				28	
-2				3				24	50 mm solid schedule 40 PVC
-3				4				22	
-4				5				20	Bentonite seal
-5		CLAY: some silt, mottled light olive brown and grey, fractured, trace fine grained sand infilling fractures, wet.		6				10	
-6				7				10	
-7		@ 6.55m to 6.71m: fine to medium grained sand lense.		8				38	
		@ 7.01m to 9.76m: hydrocarbon odour, sheen on soil.		9				>10,000	Sil 9 Sand
-8				10				2,000	
-9				11				7,000	
				12				580	Water Level 9.624 m on 29/10/98
-10		SAND: fine to medium grained,		13					

Env L... ..elev CAL V03.tdf

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BORE HOLE LOG

Bore Hole: BH213
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5 658 620.5 m	Date Drilled:	21 October 1998
Project:	Environmental Site Assessment	Easting:	-6844.5 m	Drill:	B-61 Beck
Location:	North Hill Mall, Calgary	Ground Elev.:	1089.08 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1088.95 m	Logged by:	CLG

Elev (m) / Depth (m)	Symbol	Soil Description	Sample: Type	Sample: No.	Sample: SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		some clay as lenses up to 150mm.		14				>10,000	Bentonite seal
-11								100	50 mm solid schedule 40 PVC
-12				15				20	Slough
-13		NOTES: End of hole at 12.2m. Standpipe installed to 12.2m.							
-14									
-15									
-16									
-17									
-18									
-19									
-20									

Env BH m elev CAL v03.tdf

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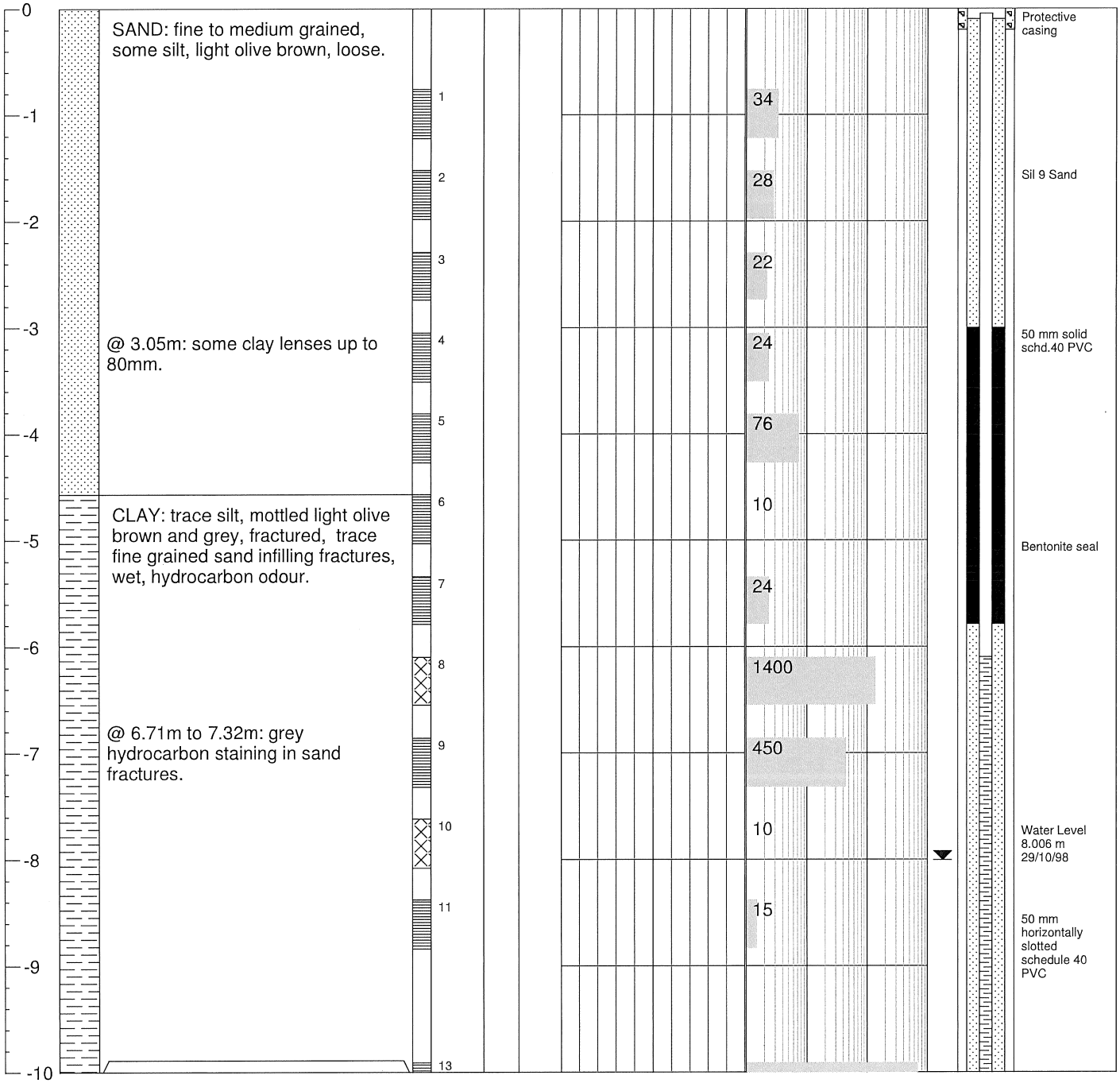
BORE HOLE LOG

Bore Hole: BH214
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5 658 619.9 m	Date Drilled:	22 October 1998
Project:	Environmental Site Assessment	Easting:	-6854.2 m	Drill:	B-61 Beck
Location:	North Hill Mall, Calgary	Ground Elev.:	1089.23 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.10 m	Logged by:	CLG



Env ... elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH214
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5 658 619.9 m	Date Drilled:	22 October 1998
Project:	Environmental Site Assessment	Easting:	-6854.2 m	Drill:	B-61 Beck
Location:	North Hill Mall, Calgary	Ground Elev.:	1089.23 m	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.10 m	Logged by:	CLG

Elev (m) / Depth (m)	Symbol	Soil Description	Sample: Type	Sample: No.	Sample: SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		SAND: fine to medium grained, some clay as lenses, no hydrocarbon odour.						7000	Sil 9 Sand
-11		NOTES: End of hole at 10.7m. Standpipe installed to 10.7m.		14				300	
-12									
-13									
-14									
-15									
-16									
-17									
-18									
-19									
-20									

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BOREHOLE LOG

Borehole: BH509

Page: 1 of 1

Client:	Sears	Northing:	5658598	Date Drilled:	14 November 2002
Project:	Phase II ESA Off-Site	Easting:	-6865.40	Drill:	B-57
Location:	13 Ave & 16 St NW, Calgary, AB	Ground Elev.:	1089.651 m	Drilling Method:	Solid Stem Auger
Project No:	CG909	Top Casing Elev.:	1089.588 m	Logged by:	CB/MH

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent): Plastic Limit (+), Natural Moisture (○), Liquid Limit (◇)	Headspace Vapour ppm	Monitor Well Construction Detail
0		ASPHALT		1				no sample	Cover Concrete
		GRAVEL							Sil 9 Sand
1		SAND: brown, moist, loose.		2				40	
				3				64	
2				4				34	
3		@3.05 m: trace black substance.		5				46	Bentonite
		@3.66 m: trace clay, trace silt.							
4		@4.72 m: 0.15 m of clay lense, trace silt, trace sand, brown, moist, firm.		6				62	50 mm solid schedule 40 PVC
5		@4.88 m: increase silt to "and".		7				38	
				8				40	
6		CLAY: trace sand, trace gravel, trace silt, brown, oxidation, moist, firm, trace coal.		9				48	
				10				28	
7		@6.10 m: 0.31 m of sand seam and silt, trace clay, brown, wet, soft.		11				76	
8				12				48	
9				13				80	
				14				220	50 mm 0.010 slotted schedule 40 PVC
10		SAND: trace silt, brown, moist, loose, hydrocarbon odour.		15				420	Sil 9 Sand
11		@10.97 m: increase mositure to "wet", hydrocarbon staining.		16 (lab)				1600	Water level measured on 05 Dec 02
		@11.28 m: 0.15 m of clay seam, brown.		17				760	
12									
13		SILT: some sand, trace clay, brown, moist, soft, slight hydrocarbon odour and staining.		18				220	
				19 (lab)				400	
14		NOTES: End of hole @ 13.72 m. Monitoring well installed to 13.72 m, completed at grade and enclosed in a protective steel road box.							
15									
16									
17									
18									

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BOREHOLE LOG

Borehole: BH510

Page: 1 of 1

Client:	Sears	Northing:	5658575	Date Drilled:	14 November 2002
Project:	Phase II ESA Off-Site	Easting:	-6798.95	Drill:	B-57
Location:	13 Ave & 16 St NW, Calgary, AB	Ground Elev.:	1091.148 m	Drilling Method:	Solid Stem Auger
Project No:	CG909	Top Casing Elev.:	1091.037 m	Logged by:	CB/MH

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent): Plastic Limit + / Natural Moisture ○ / Liquid Limit ◇ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0									Cover Concrete
1		SAND: trace gravel, brown, moist, loose.		1				20	Sil 9 Sand
2				2				20	
		@2.13 m: 0.15 m of clay seam, trace silt, trace sand, brown, moist, soft.		3				18	
3				4				26	Bentonite
4		@3.66 m: 0.15 m of clay seam, some silt, trace sand, brown, moist, soft.		5				24	
				6				28	50 mm solid schedule 40 PVC
5		@5.18 m: trace black substance.		7				130	
6		@6.10 m: some clay, some silt.		8				42	
7		@6.71 m to 7.32 m: increase moisture to wet.		9				30	
8		CLAY: trace silt, trace sand, trace gravel, brown, oxidation, moist, soft, trace coal.		10				68	
				11				12	
9				12				22	
10				13				16	50 mm 0.010 slotted schedule 40 PVC
				14				1,200	Sil 9 Sand
11				15				28	
12				16				120	
13		SAND: some clay, trace silt, brown, moist, soft, hydrocarbon odour.		17 (lab)				>10,000	
				18 (lab)				>10,000	Water level measured on 05 Dec 02
14				19				1,000	
15				20 (lab)				620	
16		NOTES: End of hole @ 15.24 m. Monitoring well installed to 15.24 m, completed at grade and enclosed in a protective steel road box.							
17									
18									

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BORE HOLE LOG

Bore Hole: BH702
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5658620.783	Date Drilled:	08-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6837.868	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.318	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.187	Logged by:	CRC

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		SAND: fine grained, and silt, brown, moist, loose, organics (roots), occasional clay lens (0.05 m).		702-1				24	. Road box. . Concrete. Sil-9 Sand. 50 mm solid schd. 40 PVC.
-1				702-2				16	
-2				702-3				28	Bentonite.
-3		@ 3.0 m, clay lens (0.6 m, some silt, trace sand, occasional pebble, moist, soft, laminated lens.)		702-4				12	
-4				702-5				32	
				702-6				26	50 mm, 0.010" horizontally slotted schd. 40 PVC.
-5		CLAY: some silt, trace sand, occasional pebble, moist soft, oxidized, light to dark brown mottling.		702-7				42	
-6				702-8				50	
				702-9				48	
-7		@ 6.9 m, hydrocarbon-like staining and odour.		702-10(lab)				3,900	
-8		@ 8.2 m, increasing hardness to firm.		702-11				680	Sil-9 Sand.
-9				702-12				2,200	
		@ 9.4 m, decreasing hardness to soft.		702-13(lab)				4,000	50 mm, 0.010" horizontally
-10									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH702
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5658620.783	Date Drilled:	08-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6837.868	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.318	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.187	Logged by:	CRC

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		SILT: silt, trace sand, trace clay, interbedded with fine grained poorly graded silty sand, trace clay, trace gravel, grey, wet, compact.		702-13(lab)				4,000	slotted schd. 40 PVC.
				702-14(lab)				3,200	Water level measured on 07 Oct 2003.
-11		@ 10.4 m, clay lens (0.2 m, trace silt, trace sand, brown, moist, soft.)		702-15				1,600	
-12				702-16				400	
		@ 12.2 m, increase moisture to wet.							Slough.
				702-17				110	
-13		@ 13.0 m, clay lens (0.2 m, trace silt, trace sand, brown, moist, firm).							
				702-18				600	
-14									
		@ 14.5 m, no hydrocarbon-like odour.		702-19				560	
		CLAY: mottling light to dark brown, silty, trace sand, moist, firm.		702-20(lab)				1,100	
-15		NOTES: End of hole @ 15.2 m. Sloughing to 9.6 m. Monitoring well installed to 15.2 m, completed at grade and enclosed in a protective steel road box.							
-16									
-17									
-18									
-19									
-20									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH705
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5658601.247	Date Drilled:	09-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6865.872	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.730	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.614	Logged by:	CRC

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		ASPHALT							Road Box. Concrete. Sil-9 Sand.
		COBBLES		705-01				26	50 mm solid schd. 40 PVC.
-1		SAND: fine grained, uniformly graded, trace to some silt, brown, oxidized, moist, loose to compact, bedded with occasional silt laminations.		705-02				29	
-2		@ 2.4 m, increase in silt content (to 3.2 m).		705-03				31	
-3		@ 3.0 m, clay lens (0.9 m, mottled light to dark brown, and silt, some sand, brown, moist, soft.)		705-04				13	
				705-05				44	
-4				705-06				28	
-5				705-07				32	Bentonite.
-6		CLAY: silty, occasional gravel, trace sand, mottled brown/light brown, occasional silt lamination with Fe staining, oxidized.		705-08				28	
-7		@ 6.6 m, silty sand lens (0.15 m to 0.3 m, brown, oxidized, moist to wet, loose, bedded).		705-09				18	
		@ 7.6 m, mottled brown/olive brown.		705-10				37	
-8		@ 8.8 m, clayey silt lens.		705-11				41	
-9		SILT: silt, trace sand, trace clay, interbedded with fine grained poorly graded silty sand, trace clay, trace clay, occasional pebble, olive brown, oxidized, moist to wet, compact, laminated.		705-12		CL		50	
		@ 9.8 m, hydrocarbon-like odour and staining.		705-13 (lab)				440	
-10									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH705
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5658601.247	Date Drilled:	09-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6865.872	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.730	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.614	Logged by:	CRC

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		SILT: silt, trace sand, trace clay, interbedded with silty sand, trace clay, occasional pebble, olive brown, oxidized, moist to wet, compact, laminated.		705-14				180	50 mm solid schd. 40 PVC.
-11		@ 10.7 m, dark olive grey, unoxidized sand becomes wet at 11.3 m.		705-15 (lab)				320	50 mm, 0.010" horizontally slotted schd. 40 PVC.
-12				705-16				320	Sil-9 Sand.
-13		@ 12.8 m, colour change to brown.		705-17 (lab)				340	Water level measured on 06 Oct 2003.
-14				705-18				120	Slough.
-15				705-19				160	
-16		NOTES: End of hole @ 15.24 m. Sloughing to 11.6 m. Monitoring well installed to 14.9 m, completed at grade and enclosed in a protective steel road box.		705-20				80	
-17									
-18									
-19									
-20									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH706
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5658593.346	Date Drilled:	09-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6864.360	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.626	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.518	Logged by:	CRC/CB

Elev (m) / Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent): Plastic Limit ▲ / Natural Moisture ● / Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		ASPHALT							Road Box. Concrete. Sil-9 Sand.
		COBBLES		706-01				16	50 mm solid schd. 40 PVC.
-1		SAND: fine grained, uniformly graded, trace to some silt, brown, oxidized, moist, loose to compact, bedded with occasional silt laminations.		706-02				22	
-2				706-03				22	Bentonite.
-3				706-04				6	
		@ 3.7 m, clay lens (0.5 m, mottling light to dark brown, and silt, some sand, moist, soft).		706-05 (lab)				63	
-4				706-06				38	
-5				706-07				88	50 mm, 0.010" horizontally slotted schd. 40 PVC.
		CLAY: silty, occasional gravel, trace sand, mottled brown/light brown, occasional silt lamination with Fe staining, oxidized.		706-08				31	
-6		@ 6.7 m, coal specks, firm.		706-09				33	
-7				706-10				51	Sil-9 Sand.
		@ 7.6 m, soft.							
-8				706-11				29	
-9		SILT: silt, trace sand, trace clay, interbedded with fine grained poorly graded silty sand, trace clay, occasional pebble, olive brown, oxidized, moist to wet, compact, laminated.		706-12				34	
		@ 9.8 m, hydrocarbon-like odour and staining.		706-13				380	
-10									

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH706
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5658593.346	Date Drilled:	09-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6864.360	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1089.626	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.518	Logged by:	CRC/CB

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		SILT: silt, trace sand, trace clay, interbedded with fine grained poorly graded silty sand, trace clay, occasional pebble, olive brown, oxidized, moist to wet, compact, laminated.		706-14 (lab)				1,700	Sil-9 Sand. 50 mm, 0.010" horizontally slotted schd. 40 PVC.
-11				706-15 (lab)				1,000	Water level measured on 06 Oct 2003.
-12		@ 10.4 m, hydrocarbon-like odour.		706-16				380	
		@ 11.0 m, wet, hydrocarbon-like staining.		706-17				56	Slough.
-13		@ 11.1 m, moist to very moist.							
		@ 12.2 m, no hydrocarbon-like staining or odour.		706-18 (lab)				240	
-14		@ 12.8 m, coal specks.							
		@ 14.3 m, wet.		706-19				210	
-15				706-20				180	
-16		NOTES: End of hole @ 15.24 m. Sloughing to 11.6 m. Monitoring well installed to 14.9 m, completed at grade and enclosed in a protective steel road box.							
-17									
-18									
-19									
-20									

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BORE HOLE LOG

Bore Hole: BH1105
Page: 1 of 2

Client:	Sears Canada Inc.	Northing:	5658656.498	Date Drilled:	01 March 2004
Project:	Environmental Site Investigation	Easting:	-6887.179	Drill:	B-57
Location:	Hounsfield Heights, Calgary, AB	Ground Elev.:	1091.134	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1091.038	Logged by:	CB

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		TOPSOIL		1105-1				56	Road Box. Concrete.
1		SAND: fine grained, some silt to silty, light to dark brown, moist, loose, laminated, Fe and Mn staining, salts.		1105-2				60	
2		TOPSOIL: thickly bedded organic soil, dark brown, moist, loose, soft.		1105-3				80	
3		SAND: fine grained, some silt to silty, light to dark brown, moist, loose, laminated, Fe and Mn staining, salts. @ 3.0 m, reddish brown (0.5 m).		1105-4				62	
				1105-5				50	Bentonite.
4									50 mm solid schd. 40 PVC.
		@ 4.6 m, trace salts.		1105-6				52	
5				1105-7				40	
		@ 5.3 m, occasional clay lens (<0.1 m), trace Fe staining.		1105-8				22	
6		@ 6.1 m, hydrocarbon-like odour.		1105-9 (lab)				940	
7		CLAY: some silt to silty, trace fine grained sand, light to dark brown, moist, firm, occasional pebble, Fe staining.		1105-10				180	
				1105-11				200	
8		@ 8.2 m, occasional coal specks.		1105-12				90	4-8 mesh sand.
9				1105-13				80	50 mm, 0.010" horizontally slotted schd. 40 PVC.
		@ 9.5 m, 0.3 m silt and sand lens, trace gravel.		1105-14				80	
10									

Env BH m CAL v03.ldf

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BORE HOLE LOG

Bore Hole: BH1105
Page: 2 of 2

Client:	Sears Canada Inc.	Northing:	5658656.498	Date Drilled:	01 March 2004
Project:	Environmental Site Investigation	Easting:	-6887.179	Drill:	B-57
Location:	Hounsfield Heights, Calgary, AB	Ground Elev.:	1091.134	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1091.038	Logged by:	CB

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
10		CLAY: some silt to silty, trace fine grained sand, light to dark brown, moist, firm, occasional pebble, Fe staining.		1105-15				44	
		@ 10.1 m, grey and brown.							
11		SILT: and fine grained sand, trace clay, brown, oxidized, moist, soft to firm, laminated, Fe staining, occasional clay lens.		1105-16				180	
12				1105-17				200	
13				1105-18				160	
				1105-19 (lab)				340	
		@ 13.7 m, wet, clay lens (0.2 m), light to dark brown.		1105-20				180	
14				1105-21				50	
15				1105-22				200	
16				1105-23				160	
17		@ 17.1 m, grey.		1105-24				260	
18		NOTES: End of hole at 16.8 m. Monitor well installed to 15.2 m, completed at grade and enclosed in a protective steel road box.		1105-25				80	
19									

Water level measured on 08 Mar 2004.

50 mm, 0.010" horizontally slotted schd. 40 PVC.

4-8 mesh sand.

Env BH m elev CAL v03.idf

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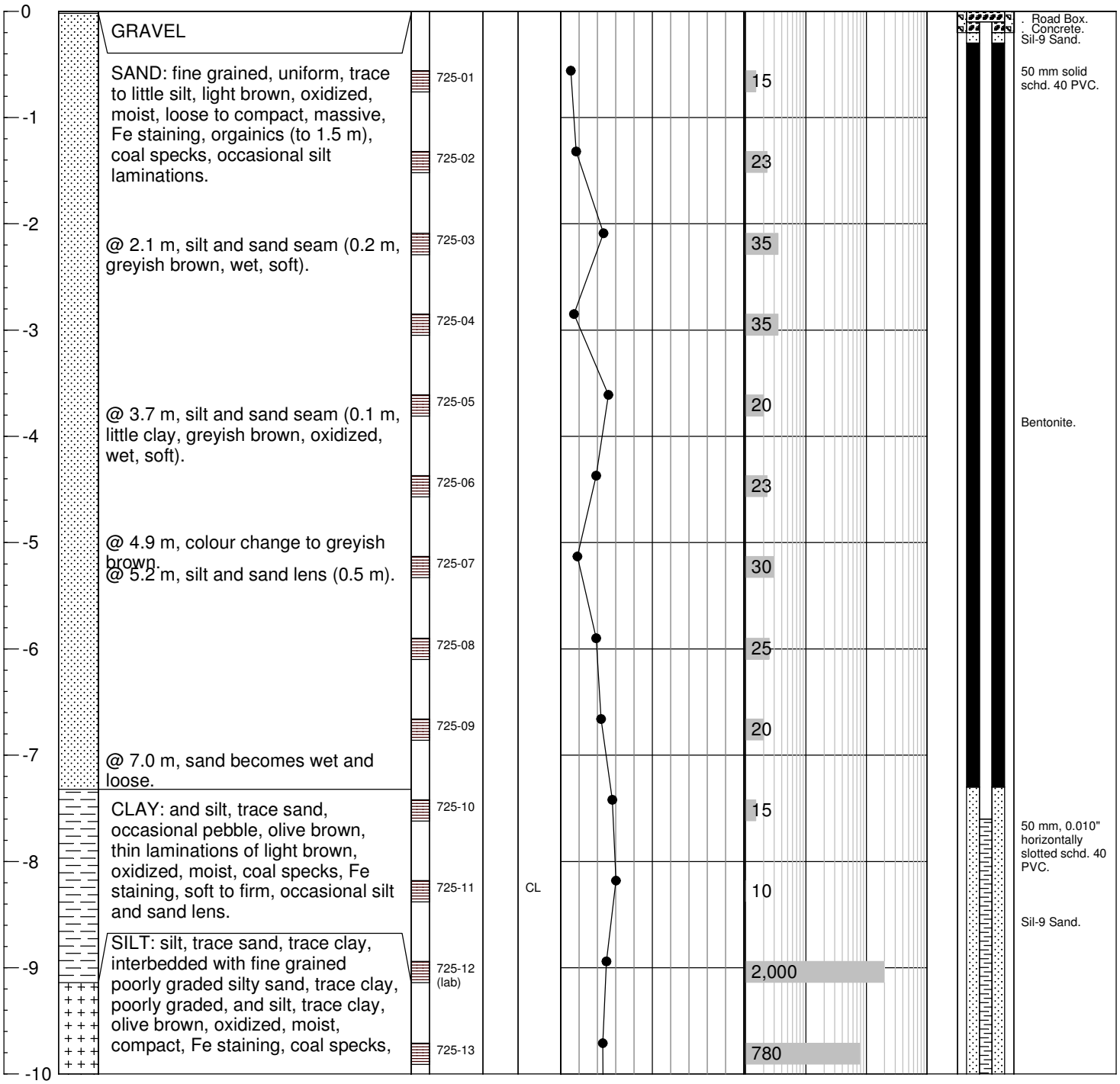
BORE HOLE LOG

Bore Hole: BH725
Page: 1 of 3

Client:	Sears Canada Inc.	Northing:	5658566.797	Date Drilled:	16-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6799.155	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1091.410	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1091.321	Logged by:	CRC/MH



Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH725
Page: 2 of 3

Client:	Sears Canada Inc.	Northing:	5658566.797	Date Drilled:	16-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6799.155	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1091.410	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1091.321	Logged by:	CRC/MH

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-10		occasional clay laminations. @ 9.8 m, clay lens (0.3 m, silty, laminated grey, moist, soft).		725-14				400	50 mm, 0.010" horizontally slotted schd. 40 PVC.
-11		SILT: silt, trace sand, trace clay, interbedded with fine grained poorly graded silty sand, trace clay, poorly graded, and silt, trace clay, olive brown, oxidized, moist, compact, Fe staining, coal specks, occasional silt and clay laminations.		725-15				420	Sil-9 Sand.
-12				725-16				500	
-13		CLAY: some silt, trace sand, occasional pebble, mottled olive/reddish brown, moist and firm, laminated and jointed, coal specks, Fe staining along sand seams, occasional silt inclusions, Mn staining, sand seams and laminations (2 mm to 4 mm, reddish brown).		725-17 (lab)				>10,000	
-14				725-18 (lab)		ML		>10,000	Water level measured on 07 Oct 2003.
-15		SAND: fine grained, poorly graded, and silt, occasional pebble, grey brown, oxidized, moist, loose to compact, massive, hydrocarbon-like odour. @ 12.8 m, olive grey.		725-19				400	
-16		@ 15.2 m, increase to little silt, dilatent.		725-20				150	
-17				725-21				140	
-18				725-22				200	
-19		@ 18.9 m, clay lens (0.2 m, trace silt, dark brown, unoxidized, moist, firm, laminated, Fe staining).		725-23				75	
-20		SILT: and sand, trace sand, trace gravel, dark grey, unoxidized, moist, soft to loose, laminated.		725-24 (lab)				200	
				725-25				60	Slough.
				725-26				70	

Env BH m elev CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH725
Page: 3 of 3

Client:	Sears Canada Inc.	Northing:	5658566.797	Date Drilled:	16-Sep-03
Project:	Offsite Environmental Site Investigation	Easting:	-6799.155	Drill:	B-61
Location:	Hounsfield Heights, Calgary	Ground Elev.:	1091.410	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1091.321	Logged by:	CRC/MH

Elev (m) Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit ▲ Natural Moisture ● Liquid Limit ◆ (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
-20		SILT: and sand, trace sand, trace gravel, dark grey, unoxidized, moist, soft to loose, laminated.		725-27				70	Slough.
-21				725-28 (lab)				75	
-22		NOTES: End of hole @ 21.3 m. Sloughing to 12.8 m. Seepage to 12.2 m Monitoring well installed to 18.3 m, completed at grade and enclosed in a protective steel road box.							
-23									
-24									
-25									
-26									
-27									
-28									
-29									
-30									

Env BH m CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH1703
Page: 1 of 1

Client:	Sears Canada	Northing:	5658613.124	Date Drilled:	08 July 2008
Project:	Monitor Well Decommissioning	Easting:	-6873.553	Drill:	B-61
Location:	Hounsfield Heights NW, Calgary, AB	Ground Elev.:	1089.771	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.689	Logged by:	BHP

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit △ Natural Moisture ● Liquid Limit · (0 – 50 – 100)	Headspace Vapour ppm	Monitor Well Construction Detail
0		ASPHALT							Road Box
1		GRAVEL: and SAND; some silt, trace clay		1703-1				40	
				1703-2				30	Cuttings
2				1703-3				22	
3		SAND: Silty, trace clay, trace gravel, light brown, moist, loose		1703-4				10	
				1703-5				28	
4				1703-6				30	
5		CLAY: Some silt, trace sand, trace gravel, light and olive brown, firm, moist, trace coal specks		1703-7				38	Bentonite Grout
6				1703-8				52	
7				1703-9				32	
				1703-10				24	
8				1703-11				28	
9				1703-12				600	
		SAND: Some silt, trace clay, trace gravel, moist, loose, hydrocarbon odour		1703-13				440	50 mm, 0.010" horizontally slotted schd. 40 PVC
10				1703-14				1000	
11				1703-15				680	
12				1703-16				400	4-8 mesh Sand
				1703-17				60	
13				1703-18				90	
14		NOTES: EOH at 13.72 m. Monitor well installed to 13.72 m, completed at grade and enclosed in a protective steel road box.							
15									
16									

Env BH m CAL v03.idf

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BORE HOLE LOG

Bore Hole: BH1704
Page: 1 of 1

Client:	Sears Canada	Northing:	5658623.856	Date Drilled:	08 July 2008
Project:	Monitor Well Decommissioning	Easting:	-6839.086	Drill:	CME 55
Location:	Hounsfield Heights NW, Calgary, AB	Ground Elev.:	1089.580	Drilling Method:	Solid Stem Auger
Project No.:	CG909	Top Casing Elev.:	1089.460	Logged by:	BHP

Depth (m)	Symbol	Soil Description	Sample Type	Sample No.	SPT 'N'	USC	Moisture Content (percent) Plastic Limit △ Natural Moisture ● Liquid Limit · (0 – 50 – 100)	Headspace Vapour ppm (10 – 100 – 1000 – 10000)	Monitor Well Construction Detail
0		GRAVEL: and Sand; some silt, trace clay, brown, moist, loose		1704-1				40	Road Box
1		SAND: Silty, trace clay, trace gravel, light brown, moist, loose		1704-2				44	Cuttings
2				1704-3				240	
3				1704-4				240	
4				1704-5				260	
5		CLAY: trace sand, some silt, trace gravel, light and olive brown, moist, firm		1704-6				50	Bentonite Grout
6				1704-7				100	
7				1704-8				52	
8				1704-9				220	
9				1704-10				600	
10		SAND: some clay, some silt, trace gravel, greyish brown, wet, loose, hydrocarbon odour		1704-11				700	50 mm, 0.010" horizontally slotted schd. 40 PVC
11				1704-12				200	
12				1704-13				>10000	
13				1704-14				3800	
14		NOTES: EOH at 13.72 m. Monitor well installed to 13.72 m, completed at grade and enclosed in a protective steel road box.		1704-15				180	4-8 mesh Sand
15				1704-16				800	
16				1704-17				94	
				1704-18				86	

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH1303 Continued	13-Sep-11		-	7.646	0.000	-	1075.236	10	
	13-Dec-11		-	7.645	0.000	-	1075.237	40	
	21-Mar-12		-	7.790	0.000	-	1075.092	8	
	1-Oct-12		-	7.709	0.000	-	1075.173	85	O2 sock with rusty cable
	29-Apr-13		-	7.654	0.000	-	1075.228	165	
BH1701	23-Sep-10	1088.191	-	9.470	0.000	-	1078.721	76	
	4-Oct-10		-	9.462	0.000	-	1078.729	12	
	8-Apr-11		-	9.525	0.000	-	1078.666	280	
	1-Jun-11		-	9.545	0.000	-	1078.646	64	
	13-Sep-11		-	9.451	0.000	-	1078.740	170	
	15-Dec-11		-	9.424	0.000	-	1078.767	15	
	23-Mar-12		-	9.540	0.000	-	1078.651	88	
	4-Oct-12		-	9.522	0.000	-	1078.669	110	
	30-Apr-13		-	9.610	0.000	-	1078.551	0	Top of pipe elevation w/o collar was 1088.161m.
BH1702	23-Sep-10	1090.039	-	11.367	0.000	-	1078.672	86	
	4-Oct-10		-	11.345	0.000	-	1078.694	50	
	5-Apr-11		-	11.295	0.000	-	1078.744	80	
	2-Jun-11		-	11.262	0.000	-	1078.777	64	
	13-Sep-11		-	11.270	0.000	-	1078.769	160	
	15-Dec-11		-	11.243	0.000	-	1078.796	80	
	22-Mar-12		-	11.305	0.000	-	1078.734	60	dry @ 11.305
	4-Oct-12		-	11.340	0.000	-	1078.699	95	
	30-Apr-13		-	11.319	0.000	-	1078.690	0	Top of pipe elevation w/o collar was 1090.009m.
BH1703	23-Sep-10	1089.689	-	11.031	0.000	-	1078.658	1,000	
	4-Oct-10		-	11.095	0.000	-	1078.594	12	
	5-Apr-11		-	11.043	0.000	-	1078.646	30	
	2-Jun-11		11.002	11.992	0.015	-	1077.697	1,000	
	13-Sep-11		10.912	11.230	0.318	-	1078.459	5,000	
	13-Dec-11		10.910	10.930	0.020	-	1078.459	6,100	
	22-Mar-12		11.091	11.092	0.010	-	1078.598	5,000	Recovered 1.0L from passive bailer
	4-Oct-12		10.972	10.973	0.010	-	1078.716	20	Recovered 1.0L from passive bailer
	1-May-13		-	11.035	-	-	1078.654	120	Top of pipe elevation w/o collar was 1089.689m.
BH1704	23-Sep-10	1089.460	-	10.525	0.000	-	1078.935	180	
	4-Oct-10		-	10.582	0.000	-	1078.878	10	
	8-Apr-11		-	-	0.000	-	-	590	Blocked with ice and bailer at 0.1m. Bailer top broke off.
	2-Jun-11		-	10.473	0.000	-	1078.987	1,600	
	13-Sep-11		-	10.477	0.000	-	1078.983	40	
	15-Dec-11		-	10.430	0.000	-	1079.030	15	
	23-Mar-12		-	-	0.000	-	-		Blocked with ice

Notes:

1 Elevations are geodetic based on ASCM 75838 elevation 1091.349, Coordinates are 3TM NAD 83.

2 Depth relative to top of standpipe.

3 Water elevation referenced to Geodetic. Water elevation adjusted for presence of LPHs (using LPH density of 0.8).

4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH508 Continued	3-Oct-05		-	11.444	0.000	-	1079.732	62	
	18-Jan-06		-	11.071	0.000	-	1080.105	390	
	10-May-06		-	10.695	0.000	-	1080.481	84	
	25-Jul-06		-	10.803	0.000	-	1080.373	90	
	24-Jan-07		-	9.205	0.000	-	1081.971	118	
	23-May-07		-	9.405	0.000	-	1081.771	65	
	21-Aug-07		-	8.965	0.000	-	1082.211	80	
	22-Nov-07		-	8.817	0.000	-	1082.359	74	
	13-Mar-08		-	8.699	0.000	-	1082.477	200	
	3-Jun-08		-	8.743	0.000	-	1082.433	82	
	26-Jun-08		-	8.613	0.000	-	1082.563	58	well decommissioned on June 26, 2008
BH509	5-Dec-02	1089.588	-	11.194	0.029	-	1078.417	>10,000	P.B. installed from BH213
	14-Jan-03		11.793	11.854	0.061	-	1077.783	nm	recovered 400 ml product from P.B.
	19-Feb-03		11.783	11.814	0.031	-	1077.799	nm	recovered 400 mL
	7-Mar-03		11.755	11.815	0.060	-	1077.821	nm	recovered 500 ml from P.B.
	25-Apr-03		11.2	11.255	0.055	-	1078.377	nm	recovered 800 mL
	29-Apr-03		-	11.761	0.000	-	1077.827	nm	recovered 300 mL
	12-May-03		11.68	11.682	0.002	-	1077.908	-	recovered 200 ml product from P.B.
	28-May-03		11.536	11.538	0.002	-	1078.052	nm	recovered 200 ml product from P.B.
	4-Jun-03		nm	nm	nm	-	nm	nm	recovered 300 ml product from P.B.
	1-Jul-03		11.567	11.580	0.013	-	1078.018	nm	recovered 200 ml product from P.B.
	24-Jul-03		11.568	11.573	0.005	-	1078.019	nm	recovered 300 ml product from P.B.
	5-Aug-03		11.686	11.689	0.003	-	1077.901	-	recovered 300 ml product from P.B.
	16-Sep-03		nm	nm	nm	-	-	nm	recovered 200 ml product from P.B.
	12-Nov-03		nm	nm	nm	-	nm	nm	bailed 100 ml of clear orange product
	20-Nov-03		11.162	11.602	0.440	-	1078.338	1,200	
	3-Dec-03		11.535	11.795	0.260	-	1078.001	nm	
	4-Dec-03		11.685	11.690	0.005	-	1077.902	-	
	8-Dec-03		-	11.848	0.000	-	1077.740	260	recovered 800 ml from P.B. and 500 ml from H.B.
	17-Dec-03		-	11.830	0.000	-	1077.758	1,600	
	22-Dec-03		nm	nm	nm	-	nm	nm	recovered 250 ml product from P.B.
	7-Jan-04		-	11.730	0.000	-	1077.858	nm	recovered 750 ml product from P.B.
	10-Jan-04		-	11.615	0.000	-	1077.973	nm	recovered 100 ml product from P.B.
	12-Jan-04		-	11.605	0.000	-	1077.983	nm	recovered 100 ml product from P.B.
	15-Jan-04		cnm	cnm	cnm	-	cnm	cnm	CNM - Plugged with ice

Notes:

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2 Depth relative to top of standpipe.

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH509 Continued	16-Jan-04		-	11.170	0.000	-	1078.418	nm	bailer was caught on ice and not set at depth
	20-Jan-04		-	11.540	0.000	-	1078.048	nm	recovered 50 ml product from P.B.
	23-Jan-04		-	10.703	0.000	-	1078.885	nm	recovered 300 ml product from P.B.
	5-Feb-04		-	11.779	0.000	-	1077.809	nm	recovered 500 ml from P.B.
	9-Feb-04		-	11.823	0.000	-	1077.765	nm	recovered 300 ml product from P.B.
	19-Feb-04		-	11.655	0.000	-	1077.933	nm	recovered 300 ml product from P.B.
	23-Feb-04		-	11.650	0.000	-	1077.938	nm	recovered 300 ml product from P.B.
	26-Feb-04		-	11.682	0.000	-	1077.906	nm	recovered 200 ml from passive bailer
	3-Mar-04		-	11.773	0.000	-	1077.815	nm	recovered 150 ml product from P.B.
	22-Mar-04		cnm	cnm	cnm	-	cnm	cnm	P.B. stuck in well; unable to retrieve
	31-Mar-04		11.626	11.823	0.197	-	1077.923	nm	300 ml product recovered from P.B. - before hand bailing
	31-Mar-04		11.740	11.793	0.053	-	1077.837	nm	350 ml product recovered by hand bailer
	12-Apr-04		11.592	11.660	0.068	-	1077.982	nm	recovered 200 ml product from P.B.; H.B. 50 ml
	13-Apr-04		11.565	11.608	0.043	-	1078.014	nm	recovered 150 ml from P.B.; not enough to hand bail
	15-Apr-04		11.635	11.645	0.010	-	1077.951	nm	recovered 350 ml product from P.B.
	16-Apr-04		-	11.695	0.000	-	1077.893	nm	recovered 200 ml product from P.B.
	19-Apr-04		11.570	11.580	0.010	-	1078.016	nm	recovered 250 ml product from P.B.; not enough to H.B.
	22-Apr-04		11.754	11.756	0.002	-	1077.834	nm	recovered 300 ml product from P.B.
	30-Apr-04		-	11.688	0.000	-	1077.900	nm	recovered 50 ml product from P.B.; H.B. 1 mm product
	6-May-04		-	11.760	0.000	-	1077.828	nm	recovered 250 ml from passive bailer
	7-May-04		-	11.653	0.000	-	1077.935	nm	recovered 30 ml from passive bailer
	10-May-04		-	11.685	0.000	-	1077.903	nm	recovered 250 ml from passive bailer
	17-May-04		-	11.748	0.000	-	1077.840	nm	recovered 200 ml from passive bailer
	20-May-04		-	11.680	0.000	-	1077.908	nm	recovered 150 ml from passive bailer
	28-May-04		11.595	11.600	0.005	-	1077.992	nm	300 ml recovered from passive bailer
	15-Jun-04		-	11.704	0.000	-	1077.884	6,000	800 ml recovered; hand bailer checked - no visible product
	18-Jun-04		-	11.759	0.000	-	1077.829	nm	bailer checked; no visible product
	14-Jul-04		-	11.742	0.000	-	1077.846	>10,000	600 ml recovered
	28-Jul-04		11.754	11.760	0.006	-	1077.833	nm	700 ml recovered
	6-Aug-04		-	11.690	0.000	-	1077.898	nm	150 ml recovered
	10-Aug-04		-	11.760	0.000	-	1077.828	nm	100 ml recovered
	11-Aug-04		-	11.754	0.000	-	1077.834	nm	10 ml recovered
	13-Aug-04		-	11.765	0.000	-	1077.823	nm	10 ml recovered
	18-Aug-04		-	11.785	0.000	-	1077.803	nm	100 ml recovered
	24-Aug-04		-	11.664	0.000	-	1077.924	>10,000	300ml product in PB. Bailer check showed 1mm in bailer.

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH509 Continued	7-Sep-04		-	11.723	0.000	-	1077.865	nm	500 ml recovered
	9-Sep-04		-	11.715	0.000	-	1077.873	nm	50 ml recovered
	13-Sep-04		-	11.659	0.000	-	1077.929	nm	200 ml recovered
	15-Sep-04		-	11.667	0.000	-	1077.921	nm	50 ml recovered
	17-Sep-04		-	11.623	0.000	-	1077.965	nm	100 ml recovered
	20-Sep-04		11.700	11.701	0.001	-	1077.888	nm	75 ml recovered
	22-Sep-04		-	11.705	0.000	-	1077.883	nm	50 ml recovered
	24-Sep-04		-	11.733	0.000	-	1077.855	nm	25 ml recovered
	29-Sep-04		-	11.735	0.000	-	1077.853	nm	150 ml recovered
	4-Oct-04		-	11.757	0.000	-	1077.831	nm	150 ml recovered
	6-Oct-04		-	11.693	0.000	-	1077.895	nm	25 ml recovered
	12-Oct-04		-	11.805	0.000	-	1077.783	nm	200 ml recovered
	15-Oct-04		-	11.743	0.000	-	1077.845	nm	50 ml recovered
	5-Nov-04		-	11.719	0.000	-	1077.869	nm	650 ml recovered
	8-Nov-04		-	11.725	0.000	-	1077.863	nm	150 ml recovered
	10-Nov-04		-	11.795	0.000	-	1077.793	nm	20 ml recovered
	17-Nov-04		-	11.775	0.000	-	1077.813	nm	150 ml recovered
	25-Nov-04		-	11.688	0.000	-	1077.900	nm	200 ml recovered
	29-Nov-04		-	11.713	0.000	-	1077.875	nm	50 ml recovered
	1-Dec-04		-	11.755	0.000	-	1077.833	nm	50 ml product recovered from P.B.
	17-Jan-05		11.775	11.780	0.005	-	1077.812	nm	800 ml product recovered from P.B.
	24-Jan-05		11.755	11.755	trace	-	1077.833	nm	200 ml product recovered from P.B.
	26-Jan-05		11.665	11.665	trace	-	1077.923	nm	20 ml product recovered from P.B.
	28-Jan-05		11.767	11.767	trace	-	1077.821	nm	20 ml product recovered from P.B.
	2-Feb-05		11.746	11.746	trace	-	1077.842	>10,000	recovered 150 ml product from P.B.
	18-Feb-05		11.150	11.175	0.025	-	1078.433	nm	check of bailer showed no visible product
	22-Feb-05		11.502	11.540	0.038	-	1078.078	nm	recovered 10 ml product from P.B.
	24-Feb-05		11.796	11.796	trace	-	1077.792	nm	recovered 150 ml product from P.B.; H.B. 1 mm product
	2-Mar-05		11.790	11.791	0.001	-	1077.798	2,600	recovered 50 ml product from P.B.
	22-Mar-05		11.854	11.855	0.001	-	1077.734	nm	recovered 400 ml product from P.B.
	24-Mar-05		11.835	11.839	0.004	-	1077.752	nm	recovered 10 ml product from P.B.; H.B. 2 mm product
	28-Mar-05		11.674	11.675	0.001	-	1077.914	nm	recovered 20 ml product from P.B.
	30-Mar-05		11.822	11.823	0.001	-	1077.766	nm	recovered 50 ml product from P.B.
	1-Apr-05		11.736	11.738	0.002	-	1077.852	nm	recovered 20 ml product from P.B.
	5-Apr-05		11.859	11.860	0.001	-	1077.729	nm	recovered 100 ml product from P.B.

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

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BH509 Continued	11-Apr-05		11.790	11.791	0.001	-	1077.798	nm	recovered 100 ml product from P.B.
	15-Apr-05		-	11.826	0.000	-	1077.762	nm	recovered 50 ml product from P.B.
	18-Apr-05		11.856	11.857	0.001	-	1077.732	nm	recovered 25 ml product from P.B.
	20-Apr-05		11.818	11.819	0.001	-	1077.770	nm	recovered 10 ml product from P.B.
	22-Apr-05		-	11.834	0.000	-	1077.754	nm	recovered 10 ml product from P.B.
	25-Apr-05		11.822	11.823	0.000	-	1077.765	nm	recovered 50 ml product from P.B.
	27-Apr-05		11.863	11.864	0.001	-	1077.725	nm	recovered 20 ml product from P.B.
	4-May-05		11.881	11.882	0.001	-	1077.707	nm	recovered 200 ml product from P.B.
	6-May-05		11.523	11.524	0.001	-	1078.065	nm	recovered 10 ml product from P.B.; H.B. 0 mm product
	9-May-05		-	11.817	0.000	-	1077.771	nm	recovered 10 ml product from P.B.
	13-May-05		-	11.805	0.000	-	1077.783	nm	recovered 20 ml product from P.B.
	16-May-05		-	11.764	0.000	-	1077.824	nm	recovered 100 ml product from P.B.
	26-May-05			11.880	0.000	-	1077.708	nm	recovered 100 ml product from P.B.
	2-Jun-05		11.846	11.847	0.001	-	1077.742	>10,000	recovered 150 ml product from P.B.
	10-Jun-05		11.854	11.855	0.001	-	1077.734	nm	recovered 70 ml product from P.B.
	15-Jun-05		11.860	11.860	trace	-	1077.728	nm	recovered 100 ml product from P.B.
	17-Jun-05		11.810	11.810	trace	-	1077.778	nm	recovered 75 ml product from P.B.
	20-Jun-05		11.845	11.845	trace	-	1077.743	nm	recovered 10 ml product from P.B.
	22-Jun-05		11.783	11.783	trace	-	1077.805	nm	recovered 10 ml product from P.B.
	24-Jun-05		-	11.800	0.000	-	1077.788	nm	recovered 25 ml product from P.B.; H.B. conf no product in well.
	27-Jun-05		11.180	11.185	0.005	-	1078.407	nm	
	29-Jun-05		11.173	11.174	0.001	-	1078.415	nm	hand bailer had 2 mm of product
	6-Jul-05		11.120	11.128	0.008	-	1078.466	nm	Installed Passive bailer from BH706
	11-Jul-05		11.543	11.595	0.052	-	1078.035	nm	
	20-Jul-05		11.435	11.495	0.060	-	1078.141	nm	recovered 10 ml product from P.B., H.B. 300ml product
	22-Jul-05		11.423	11.503	0.080	-	1078.149	nm	65ml hand bailed, PB reset
	28-Jul-05		11.307	11.308	0.001	-	1078.281	nm	10 ml recovered from PB; H.B. 100 ml
	9-Aug-05		11.425	11.436	0.011	-	1078.161	nm	recovered 500 ml product from P.B.
	10-Aug-05		11.495	11.497	0.002	-	1078.093	nm	recovered 200 ml product from P.B.
	12-Aug-05		11.568	11.572	0.004	-	1078.019	nm	recovered 520 ml product from P.B.
	16-Aug-05		11.485	11.487	0.002	-	1078.103	nm	recovered 200 ml product from P.B.
	17-Aug-05		11.570	11.572	0.002	-	1078.018	nm	recovered 250 ml product from P.B.
	24-Aug-05		11.544	11.547	0.003	-	1078.043	nm	recovered 300 ml product from P.B.
	31-Aug-05		11.509	11.558	0.049	-	1078.069	nm	recovered 500 ml product from P.B.
	6-Sep-05		11.535	11.610	0.075	-	1078.038	nm	recovered 330 ml product from P.B. H.B 30 mm
	12-Sep-05		11.354	11.358	0.004	-	1078.233	nm	recovered 220 ml product from P.B.
	14-Sep-05		11.159	11.162	0.003	-	1078.428	nm	recovered 240 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH509 Continued	16-Sep-05		11.347	11.470	0.123	-	1078.216	nm	recovered 240 ml product from P.B.
	19-Sep-05		11.159	11.325	0.166	-	1078.396	nm	recovered 300 ml product from P.B.
	21-Sep-05		11.186	11.303	0.117	-	1078.379	nm	recovered 300 ml product from P.B.
	26-Sep-05		11.077	11.175	0.098	-	1078.491	nm	recovered 800 ml product from P.B.
	28-Sep-05		11.116	11.185	0.069	-	1078.458	nm	recovered 230 ml product from P.B.
	5-Oct-05		11.089	11.380	0.291	-	1078.441	nm	passive bailer = 0 ml reset
	18-Oct-05		10.967	11.505	0.538	-	1078.513	nm	passive bailer checked = 1000 mm, hand bailed 5.5L
	24-Oct-05		11.405	11.509	0.104	-	1078.162	nm	P.B. full of water; hand bailed 4.3 L product
	24-Oct-05		11.230	11.242	0.012	-	1078.356	nm	reset bailer after hand bailing as above
	1-Nov-05		10.966	11.500	0.534	-	1078.515	nm	0 ml product in P.B.; hand bailed 2.8 L
	1-Nov-05		11.185	11.195	0.010	-	1078.401	nm	reset passive bailer
	3-Nov-05		11.029	11.038	0.009	-	1078.557	nm	recovered 500 ml product from P.B.
	8-Nov-05		10.988	11.195	0.207	-	1078.559	nm	0 ml product in P.B.; H.B. 500 ml product
	10-Nov-05		11.105	11.314	0.209	-	1078.441	nm	0 ml product in P.B.
	14-Nov-05		cnm	cnm	cnm	-	cnm	cnm	P.B. fell in well; could not retrieve
	28-Nov-05		cnm	cnm	cnm	-	cnm	cnm	blocked with P.B. @ 9.970; P.B. retrieved
	30-Nov-05		10.865	10.887	0.022	-	1078.719	nm	P.B. full of water; reset
	6-Dec-05		10.848	11.325	0.477	-	1078.645	nm	P.B. had 100 ml product and 700 ml water
	12-Dec-05		10.818	10.827	0.009	-	1078.768	nm	PB-Recovered 100 ml
	14-Dec-05		10.836	10.840	0.004	-	1078.751	nm	PB-Recovered 100 ml
	16-Dec-05		10.837	10.854	0.017	-	1078.748	nm	PB-Recovered 10 ml
	19-Dec-05		10.853	10.859	0.006	-	1078.734	nm	PB-Recovered 20 ml
	22-Dec-05		10.840	10.923	0.083	-	1078.731	nm	PB-Recovered 20 ml
	23-Dec-05		10.853	10.597	-0.256	-	1078.786	nm	PB-Recovered 0 ml - PB reset
	3-Jan-06		10.851	10.987	0.136	-	1078.710	nm	PB-Recovered 800 ml
	5-Jan-06		10.863	10.967	0.104	-	1078.704	nm	PB-Recovered 800 ml
	6-Jan-06		11.870	12.101	0.231	-	1077.672	nm	PB-Recovered 800 ml
	9-Jan-06		10.857	10.960	0.103	-	1078.710	nm	PB-Recovered 800 ml
	12-Jan-06		10.864	10.978	0.114	-	1078.701	nm	PB-Recovered 800 ml
	13-Jan-06		11.863	11.983	0.120	-	1077.701	nm	PB-Recovered 800 ml. Hand bailed 6 L
	16-Jan-06		10.935	11.595	0.660	-	1078.521	nm	PB-Recovered 800 ml.
	19-Jan-06		10.906	11.670	0.764	-	1078.529	>10,000	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

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BH509 Continued	20-Jan-06		11.910	12.768	0.858	-	1077.506	nm	PB-Recovered 800 ml.
	23-Jan-06		10.904	11.700	0.796	-	1078.525	nm	PB-Recovered 800 ml. Hand bailed 5.9 L
	30-Jan-06		10.905	11.507	0.602	-	1078.563	nm	PB-Recovered 800 ml. Hand bailed 4 L
	1-Feb-06		10.975	11.077	0.102	-	1078.593	nm	PB-Recovered 800 ml.
	3-Feb-06		10.960	11.477	0.517	-	1078.525	nm	P.B. had 0 ml product; bailer checked - 150 mm
	3-Feb-06		11.173	11.189	0.016	-	1078.412	nm	hand bailed 3 L product
	6-Feb-06		11.005	11.113	0.108	-	1078.561	nm	P.B. had 800 ml product; reset bailer
	8-Feb-06		11.049	11.347	0.298	-	1078.479	nm	P.B. had 800 ml product
	8-Feb-06		11.107	11.119	0.012	-	1078.479	nm	hand bailed 900 ml product
	10-Feb-06		11.158	11.163	0.005	-	1078.429	nm	P.B. had 200 ml product
	27-Feb-06		10.915	11.409	0.494	-	1078.574	nm	recovered 10 ml product from P.B.
	2-Mar-06		10.934	11.003	0.069	-	1078.640	nm	recovered 500 ml product from P.B.
	4-Mar-06		10.947	11.480	0.533	-	1078.534	nm	no product recovery in P.B.
	6-Mar-06		10.905	11.902	0.997	-	1078.484	nm	hand bailed 6.0 L product
	6-Mar-06		11.362	11.384	0.022	-	1078.222	nm	P.B. had 0 ml product; reset
	8-Mar-06		10.999	11.017	0.018	-	1078.585	nm	recovered 700 ml product from P.B.
	10-Mar-06		11.035	11.097	0.062	-	1078.541	nm	recovered 800 ml product from P.B.
	14-Mar-06		11.047	11.069	0.022	-	1078.537	nm	recovered 800 ml product from P.B.
	22-Mar-06		11.028	11.560	0.532	-	1078.454	nm	no product recovery in P.B.
	24-Mar-06		10.975	11.372	0.397	-	1078.534	nm	no product recovery in P.B.
	27-Mar-06		10.970	11.500	0.530	-	1078.512	nm	no product recovery in P.B.; switched bailers with 706
	29-Mar-06		10.964	11.535	0.571	-	1078.510	nm	recovered 150 ml product from P.B.
	31-Mar-06		10.954	11.594	0.640	-	1078.506	nm	recovered 50 ml product from P.B.
	7-Apr-06		10.957	11.505	0.548	-	1078.521	nm	no product recovery in P.B.
	12-Apr-06		10.966	11.583	0.617	-	1078.499	nm	recovered 800 ml product from P.B.
	17-Apr-06		10.970	11.595	0.625	0.800	1078.493	nm	recovered 800 ml product from P.B.
	18-Apr-06		11.003	11.665	0.662	0.650	1078.453	nm	recovered 650 ml product from P.B.
	21-Apr-06		10.985	11.584	0.599	0.750	1078.483	nm	recovered 750 ml product from P.B.
	26-Apr-06		10.930	11.194	0.264	-	1078.605	nm	recovered 0 ml product from P.B. Reset PB.
	28-Apr-06		10.993	11.602	0.609	0.300	1078.473	nm	recovered 300 ml product from P.B.
	1-May-06		10.998	11.605	0.607	1.000	1078.469	nm	recovered 1 L ml product from P.B.
	3-May-06		11.155	11.740	0.585	0.800	1078.316	nm	recovered 800 ml product from P.B.
	9-May-06		11.150	11.634	0.484	0.800	1078.341	nm	recovered 800 ml product from P.B.
	7-Jun-06		11.317	11.612	0.295	0.800	1078.212	nm	recovered 800 ml product from P.B.
	12-Jun-06		11.357	11.500	0.143	0.700	1078.202	nm	recovered 700 ml product from P.B.

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH509 Continued	14-Jun-06		11.196	11.216	0.020	0.400	1078.388	nm	recovered 400 ml product from P.B.
	16-Jun-06		11.266	11.267	0.001	0.100	1078.322	nm	recovered 100 ml product from P.B.
	20-Jun-06		11.334	11.335	0.001	0.250	1078.254	nm	recovered 250 ml product from P.B.
	22-Jun-06		11.309	11.326	0.017	0.000	1078.276	nm	recovered 0 ml product from P.B.
	23-Jun-06		11.338	11.339	0.001	0.050	1078.250	nm	recovered 50 ml product from P.B.
	26-Jun-06		11.313	11.314	0.001	0.150	1078.275	nm	recovered 150 ml product from P.B.
	28-Jun-06		11.248	11.249	0.001	0.050	1078.340	nm	recovered 50 ml product from P.B.
	4-Jul-06		11.292	11.295	0.003	0.300	1078.295	nm	recovered 300 ml product from P.B.
	7-Jul-06		11.309	11.310	0.001	0.200	1078.279	nm	recovered 200 ml product from P.B.
	12-Jul-06		11.109	11.165	0.056	0.200	1078.468	nm	recovered 200 ml product from P.B.
	19-Jul-06		11.075	11.155	0.080	-	1078.497	nm	
	21-Jul-06		11.289	11.291	0.002	0.500	1078.299	nm	recovered 500 ml product from P.B.
	24-Jul-06		11.215	11.232	0.017	0.200	1078.370	nm	recovered 200 ml product from P.B.
	31-Jul-06		11.175	11.187	0.012	0.600	1078.411	nm	Hand bailed 600 ml of product
	3-Aug-06		11.246	11.248	0.002	0.250	1078.342	nm	Hand bailed 250 ml of product
	9-Aug-06		11.214	11.216	0.002	0.400	1078.374	nm	Hand Bailed 400 ml
	15-Aug-06		11.116	11.480	0.364	0.250	1078.399	nm	Hand Bailed 250 ml
	17-Aug-06		11.232	11.234	0.002	0.150	1078.356	nm	hand Bailed 150 ml
	18-Aug-06		11.245	11.246	0.001	0.100	1078.343	nm	Hand Bailed 100ml
	21-Aug-06		11.246	11.247	0.001	0.150	1078.342	nm	Hand Bailed 150ml
	24-Aug-06		11.204	11.207	0.003	0.200	1078.383	nm	Hand Bailed 200 ml
	25-Aug-06		11.285	11.286	0.001	0.050	1078.303	nm	Hand Bailed 50 ml
	28-Aug-06		11.233	11.236	0.003	0.110	1078.354	nm	Hand Bailed 110 ml
	30-Aug-06		11.195	11.196	0.001	0.150	1078.393	nm	Hand Bailed 150 ml
	18-Sep-06		11.233	11.234	0.001	0.010	1078.355	nm	hand bailed 10 ml
	20-Sep-06		11.189	11.190	0.001	0.005	1078.399	nm	hand bailed 5 ml
	22-Sep-06		11.188	11.192	0.004	0.050	1078.399	nm	recovered 50 ml product from passive bailer
	25-Sep-06		11.269	11.271	0.002	0.005	1078.319	nm	recovered 5 ml product from passive bailer
	3-Oct-06		11.255	11.256	0.001	0.010	1078.333	nm	recovered 10 ml product from passive bailer
	5-Oct-06		11.155	11.158	0.003	0.010	1078.432	nm	recovered 10 ml product from passive bailer
	4-Dec-06		11.029	11.485	0.456	2.800	1078.468	nm	HB - 2.3 L product - bailer checked 500ml
	19-Jan-07		11.060	11.520	0.460	-	1078.436	nm	
	22-Jan-07		11.070	11.400	0.330	0.100	1078.452	nm	recovered 100 ml product from passive bailer
	12-Mar-07		11.010	11.475	0.465	0.050	1078.485	nm	recovered 50 ml product from passive bailer
	15-Mar-07		10.995	11.203	0.208	0.050	1078.551	nm	recovered 50 ml product from passive bailer

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BH509 Continued	17-Apr-07		11.010	11.420	0.410	-	1078.496	nm	passive bailer full of water; reset
	24-Apr-07		11.015	11.347	0.332	-	1078.507	nm	
	1-May-07		10.997	11.120	0.123	0.800	1078.566	nm	recovered 800 ml product from passive bailer
	4-May-07		11.063	11.195	0.132	-	1078.499	nm	
	8-May-07		11.215	11.224	0.009	0.800	1078.371	nm	recovered 800 ml product from passive bailer
	10-May-07		11.234	11.236	0.002	0.400	1078.354	nm	recovered 400 ml product from passive bailer
	8-Jun-07		11.100	11.110	0.010	0.750	1078.486	nm	recovered 750 ml product from passive bailer
	11-Jun-07		11.061	11.063	0.002	0.300	1078.527	nm	recovered 300 ml product from passive bailer
	13-Jun-07		11.050	11.055	0.005	0.120	1078.537	nm	recovered 120 ml product from passive bailer
	3-Jul-07		11.010	11.015	0.005	0.800	1078.577	nm	recovered 800 ml product from passive bailer
	5-Jul-07		11.016	11.019	0.003	0.300	1078.571	nm	recovered 300 ml product from passive bailer
	16-Jul-07		10.907	11.297	0.390	0.800	1078.603	nm	recovered 800 ml product from passive bailer
	20-Jul-07		10.883	11.010	0.127	0.200	1078.680	nm	recovered 200 ml product from passive bailer
	26-Jul-07		10.845	10.851	0.006	0.050	1078.742	nm	recovered 50 ml product from passive bailer
	30-Jul-07		10.845	11.000	0.155	0.210	1078.712	nm	recovered 210 ml product from passive bailer
	2-Aug-07		10.825	11.012	0.187	0.250	1078.726	nm	recovered 250 ml product from P.B.
	7-Aug-07		10.795	11.002	0.207	0.020	1078.752	nm	recovered 20 ml product from passive bailer
	9-Aug-07		10.870	11.201	0.331	0.100	1078.652	nm	recovered 100 ml product from P.B.
	24-Aug-07		10.895	11.435	0.540	0.750	1078.585	nm	recovered 750 ml product from passive bailer
	27-Aug-07		10.895	11.205	0.310	0.800	1078.631	nm	recovered 800 ml product from P.B.
	29-Aug-07		10.925	11.639	0.714	0.800	1078.520	nm	recovered 800 ml product from P.B.
	4-Sep-07		10.975	11.619	0.644	0.800	1078.484	nm	recovered 800 ml product from P.B.
	6-Sep-07		10.955	11.615	0.660	0.800	1078.501	nm	recovered 800 ml product from P.B.
	10-Sep-07		11.092	11.511	0.419	0.800	1078.412	nm	recovered 800 ml product from passive bailer
	12-Sep-07		10.974	11.530	0.556	0.800	1078.503	nm	recovered 800 ml product from passive bailer
	14-Sep-07		11.030	11.501	0.471	0.800	1078.464	nm	recovered 800 ml product from passive bailer
	17-Sep-07		11.005	11.521	0.516	0.510	1078.480	nm	recovered 510 ml product from passive bailer
	19-Sep-07		11.101	11.508	0.407	0.800	1078.406	nm	recovered 800 ml product from passive bailer
	21-Sep-07		11.040	11.455	0.415	0.800	1078.465	nm	recovered 800 ml product from passive bailer
	24-Sep-07		11.030	11.541	0.511	0.800	1078.456	nm	recovered 800 ml product from P.B.
	26-Sep-07		11.041	11.486	0.445	0.700	1078.458	nm	recovered 700 ml product from P.B.
	28-Sep-07		11.051	11.273	0.222	0.650	1078.493	nm	recovered 650 ml product from P.B.
	1-Oct-07		11.025	11.481	0.456	0.800	1078.472	nm	recovered 800 ml product from P.B.
	3-Oct-07		11.030	11.423	0.393	0.650	1078.479	nm	recovered 650 ml product from P.B.
	9-Oct-07		11.022	11.489	0.467	0.800	1078.473	nm	recovered 800 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

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BH509 Continued	12-Oct-07		11.100	11.512	0.412	0.800	1078.406	nm	recovered 800 ml product from P.B.
	16-Oct-07		11.002	11.510	0.508	0.800	1078.484	nm	recovered 800 ml product from P.B.
	20-Oct-07		11.000	11.571	0.571	0.800	1078.474	nm	recovered 800 ml product from P.B.
	29-Oct-07		11.047	11.667	0.620	0.800	1078.417	nm	recovered 800 ml product from P.B.
	1-Nov-07		11.061	11.478	0.417	0.800	1078.444	nm	recovered 800 ml product from P.B.
	2-Nov-07		11.050	11.792	0.742	0.800	1078.390	nm	recovered 800 ml product from P.B.
	5-Nov-07		11.125	11.783	0.658	0.800	1078.331	nm	recovered 800 ml product from P.B.
	13-Nov-07		11.131	11.685	0.554	0.800	1078.346	nm	recovered 800 ml product from P.B.
	19-Nov-07		11.050	11.703	0.653	0.800	1078.407	nm	recovered 800 ml product from P.B.
	23-Nov-07		11.085	11.600	0.515	-	1078.400	nm	
	26-Nov-07		11.171	11.570	0.399	0.800	1078.337	nm	recovered 800 ml product from P.B.
	28-Nov-07		11.175	11.562	0.387	0.800	1078.336	nm	recovered 800 ml product from P.B.
	30-Nov-07		11.179	11.571	0.392	0.800	1078.331	nm	recovered 800 ml product from P.B.
	3-Dec-07		10.972	11.482	0.510	0.800	1078.514	nm	recovered 800 ml product from P.B.
	5-Dec-07		10.980	11.305	0.325	0.500	1078.543	nm	recovered 500 ml product from P.B.
	7-Dec-07		10.984	11.311	0.327	0.600	1078.539	nm	recovered 600 ml product from passive bailer
	10-Dec-07		10.973	11.507	0.534	0.800	1078.508	nm	recovered 800 ml product from passive bailer
	14-Dec-07		10.977	11.308	0.331	0.450	1078.545	nm	recovered 450 ml product from passive bailer
	17-Dec-07		10.976	11.409	0.433	0.800	1078.525	nm	recovered 800 ml product from passive bailer
	19-Dec-07		10.979	11.301	0.322	0.500	1078.545	nm	recovered 500 ml product from P.B.
	21-Dec-07		10.983	11.284	0.301	0.450	1078.545	nm	recovered 450 ml product from passive bailer
	2-Jan-08		10.974	11.478	0.504	0.800	1078.513	nm	recovered 800 ml product from passive bailer
	4-Jan-08		11.040	11.382	0.342	0.650	1078.480	nm	recovered 650 ml product from P.B.
	23-Jan-08		11.135	11.510	0.375	0.800	1078.378	nm	recovered 800 ml product from passive bailer
	25-Jan-08		11.160	11.295	0.135	0.500	1078.401	nm	recovered 500 ml product from P.B.
	7-Feb-08		11.416	11.420	0.004	0.100	1078.171	nm	recovered 100 ml product from P.B.
	9-Feb-08		11.419	11.423	0.004	0.200	1078.168	nm	recovered 200 ml product from passive bailer
	6-Mar-08		11.167	11.642	0.475	0.600	1078.326	nm	recovered 600 ml product from passive bailer
	7-Apr-08		11.295	11.302	0.007	0.400	1078.292	nm	recovered 400 ml product from passive bailer
	9-Apr-08		11.301	11.304	0.003	0.300	1078.286	nm	recovered 300 ml product from passive bailer
	11-Apr-08		11.304	11.307	0.003	0.200	1078.283	nm	recovered 200 ml product from passive bailer
	14-Apr-08		11.328	11.332	0.004	0.200	1078.259	nm	recovered 200 ml product from passive bailer
	16-Apr-08		11.415	11.417	0.002	0.500	1078.173	nm	recovered 500 ml product from P.B.
	28-Apr-08		11.633	11.645	0.012	0.350	1077.953	nm	recovered 350 ml product from P.B.
	30-Apr-08		11.638	11.649	0.011	0.250	1077.948	nm	recovered 250 ml product from passive bailer

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

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BH509 Continued	2-May-08		11.641	11652.000	0.011	0.300	1077.945	nm	recovered 300 ml product from passive bailer
	5-May-08		11.412	11.416	0.004	0.200	1078.175	nm	recovered 200 ml product from passive bailer
	12-May-08		11.396	11.399	0.003	0.100	1078.191	nm	recovered 100 ml product from passive bailer
	14-May-08		11.399	11.401	0.002	0.050	1078.189	nm	recovered 50 ml product from passive bailer
	26-May-08		11.388	11.397	0.009	0.150	1078.198	nm	recovered 150 ml product from passive bailer
	28-May-08		11.392	11.395	0.003	0.050	1078.195	nm	recovered 50 ml product from passive bailer
	30-May-08		11.394	11.397	0.003	0.050	1078.193	nm	recovered 50 ml product from passive bailer
	9-Jun-08		11.363	11.369	0.006	0.020	1078.224	nm	recovered 20 ml product from P.B.
	11-Jun-08		11.309	11.313	0.004	0.100	1078.278	nm	recovered 100 ml product from P.B.
	13-Jun-08		11.311	11.315	0.004	0.050	1078.276	nm	recovered 50 ml product from passive bailer
	27-Jun-08		10.975	10.977	0.002	-	1078.613	>10,000	well decommissioned on 27 June 2008
BH510	5-Dec-02	1091.037	-	13.352	0.000	-	1077.685	>10,000	
	12-May-03		13.377	13.468	0.091	-	1077.642	>10,000	amber coloured LPH
	28-May-03		13.371	13.462	0.091	-	1077.648	n.m.	passive bailer installed from BH214.
	4-Jun-03		nm	nm	nm	-	nm	n.m	recovered 400 ml product from P.B.
	1-Jul-03		13.612	13.614	0.002	-	1077.425	n.m.	recovered 300 ml product from P.B.
	24-Jul-03		-	13.604	0.000	-	1077.433	-	moved passive bailer to BH214
	5-Aug-03		-	13.408	0.000	-	1077.629	-	
	7-Oct-03		-	13.295	0.000	-	1077.742	>10,000	
	13-Nov-03		13.321	13.335	0.014	-	1077.713	-	measured approx. 4 mm of clear pinkish product in bailer
	20-Nov-03		13.412	13.432	0.020	-	1077.621	7,400	
	3-Dec-03		13.377	13.413	0.036	-	1077.653	-	
	4-Dec-03		nm	nm	nm	-	nm	nm	recovered 100 ml product from P.B.
	8-Dec-03		-	13.584	0.000	-	1077.453	6,200	recovered 250 ml product from P.B.
	17-Dec-03		-	13.673	0.000	-	1077.364	>10,000	
	22-Dec-03		nm	nm	nm	-	nm	nm	recovered 40 ml product from P.B.
	7-Jan-04		-	13.508	0.000	-	1077.529	nm	recovered 100 ml product from P.B.
	10-Jan-04		-	13.524	0.000	-	1077.513	nm	recovered 50 ml product from P.B.
	12-Jan-04		-	13.578	0.000	-	1077.459	nm	recovered 50 ml product from P.B.
	15-Jan-04		-	13.500	0.000	-	1077.537	nm	recovered 50 ml product from P.B.
	20-Jan-04		-	14.234	0.000	-	1076.803	nm	water level too low; recovered 100 ml product from P.B.
	23-Jan-04		-	13.523	0.000	-	1077.514	nm	recovered 20 ml product from P.B.
	5-Feb-04		-	13.587	0.000	-	1077.450	nm	recovered 200 ml product from P.B.
	9-Feb-04		-	13.565	0.000	-	1077.472	nm	recovered 25 ml product from P.B.

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Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH510 Continued	19-Feb-04		-	13.550	0.000	-	1077.487	nm	recovered 50 ml product from P.B.
	23-Feb-04		-	13.450	0.000	-	1077.587	nm	recovered 50 ml product from P.B.
	26-Feb-04		-	13.284	0.000	-	1077.753	nm	check of bailer showed no visible product
	3-Mar-04		-	13.368	0.000	-	1077.669	nm	check of bailer showed no visible product
	8-Mar-04		-	13.265	0.000	-	1077.772	>10,000	iced; check of bailer showed no visible product
	31-Mar-04		13.360	13.367	0.007	-	1077.670	nm	not enough to hand bail
	12-Apr-04		-	13.307	0.000	-	1077.730	nm	no passive bailer; H.B. 2 ml product
	13-Apr-04		-	13.355	0.000	-	1077.682	nm	no passive bailer
	15-Apr-04		-	13.310	0.000	-	1077.727	nm	no passive bailer
	16-Apr-04		-	13.355	0.000	-	1077.682	nm	no passive bailer
	19-Apr-04		-	13.310	0.000	-	1077.727	nm	no passive bailer
	22-Apr-04		13.395	13.397	0.002	-	1077.640	nm	no passive bailer
	30-Apr-04		13.395	13.400	0.005	-	1077.637	nm	no P.B.; hand bailed 1 cm product
	6-May-04		-	13.388	0.000	-	1077.649	nm	no P.B.; hand bailed 3 ml product
	7-May-04		-	13.345	0.000	-	1077.692	nm	no passive bailer
	10-May-04		-	13.336	0.000	-	1077.701	nm	no passive bailer
	17-May-04		-	13.367	0.000	-	1077.670	nm	no P.B.; hand bailed 1 ml product
	28-May-04		13.318	13.320	0.002	-	1077.717	nm	hand bailed 3 ml product
	15-Jun-04		-	13.389	0.000	-	1077.648	18	
	18-Jun-04		-	13.380	0.000	-	1077.657	nm	no passive bailer
	14-Jul-04		-	13.368	0.000	-	1077.669	2,000	bailer checked: 3 mm product
	28-Jul-04		13.355	13.360	0.005	-	1077.677	nm	no passive bailer
	6-Aug-04		13.359	13.363	0.004	-	1077.674	nm	no passive bailer
	10-Aug-04		13.375	13.380	0.005	-	1077.657	nm	no passive bailer
	11-Aug-04		13.355	13.357	0.002	-	1077.680	nm	no passive bailer
	13-Aug-04		-	13.360	0.000	-	1077.677	nm	no passive bailer
	18-Aug-04		-	13.375	0.000	-	1077.662	nm	no passive bailer
	24-Aug-04		-	13.313	0.000	-	1077.724	>10,000	Bailer check showed 2mm product
	7-Sep-04		-	13.355	0.000	-	1077.682	nm	no passive bailer
	9-Sep-04		-	13.364	0.000	-	1077.673	nm	no passive bailer
	13-Sep-04		-	13.328	0.000	-	1077.709	nm	no passive bailer
	15-Sep-04		-	13.340	0.000	-	1077.697	nm	no passive bailer
	17-Sep-04		-	13.320	0.000	-	1077.717	nm	no passive bailer
	20-Sep-04		13.395	13.410	0.015	-	1077.627	nm	no passive bailer
	22-Sep-04		13.355	13.360	0.005	-	1077.677	nm	no passive bailer

Notes:

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2 Depth relative to top of standpipe.

3 Water elevation referenced to Geodetic. Water elevation adjusted for presence of LPHs (using LPH density of 0.8).

4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH510 Continued	24-Sep-04		13.368	13.370	0.002	-	1077.667	nm	no passive bailer
	29-Sep-04		-	13.343	0.000	-	1077.694	nm	
	4-Oct-04		-	13.310	0.000	-	1077.727	nm	
	6-Oct-04		13.312	13.315	0.003	-	1077.722	nm	no passive bailer
	12-Oct-04		-	13.448	0.000	-	1077.589	nm	bailer checked; 3 ml recovered
	15-Oct-04		-	13.332	0.000	-	1077.705	nm	no passive bailer
	5-Nov-04		-	13.320	0.000	-	1077.717	nm	no passive bailer; disposable bailer had 1 mm product
	8-Nov-04		-	13.324	0.000	-	1077.713	nm	no passive bailer
	10-Nov-04		13.448	13.450	0.002	-	1077.587	nm	no passive bailer
	17-Nov-04		13.144	13.146	0.002	-	1077.891	nm	no passive bailer
	25-Nov-04		-	13.355	0.000	-	1077.682	nm	no passive bailer
	29-Nov-04		-	13.335	0.000	-	1077.702	nm	no passive bailer
	1-Dec-04		13.384	13.386	0.002	-	1077.651	nm	no passive bailer
	11-Jan-05		-	13.364	0.000	-	1077.673	>10,000	bailer check showed no visible product
	17-Jan-05		-	13.375	0.000	-	1077.662	nm	no passive bailer
	24-Jan-05		13.413	13.413	trace	-	1077.624	nm	no passive bailer
	26-Jan-05		-	13.436	0.000	-	1077.601	nm	no passive bailer
	28-Jan-05		-	13.439	0.000	-	1077.598	nm	no passive bailer
	2-Feb-05		13.417	13.417	trace	-	1077.620	5,000	slight odour; slight sheen on probe
	18-Feb-05		13.419	13.420	0.001	-	1077.617	nm	no passive bailer
	22-Feb-05		13.450	13.452	0.002	-	1077.585	nm	no passive bailer
	24-Feb-05		13.431	13.431	trace	-	1077.606	nm	no visible product in P.B.; sheen present
	2-Mar-05	1091.086	-	13.455	0.000	-	1077.631	5,400	checked bailer - sheen on water; well resurveyed
	22-Mar-05		-	13.485	0.000	-	1077.601	nm	
	24-Mar-05		-	13.484	0.000	-	1077.602	nm	checked bailer - no visible product
	28-Mar-05		-	13.375	0.000	-	1077.711	nm	
	30-Mar-05		-	13.490	0.000	-	1077.596	nm	
	1-Apr-05		-	13.415	0.000	-	1077.671	nm	
	5-Apr-05		-	13.520	0.000	-	1077.566	nm	
	11-Apr-05		-	13.455	0.000	-	1077.631	nm	
	15-Apr-05		-	13.494	0.000	-	1077.592	nm	
	18-Apr-05		-	13.518	0.000	-	1077.568	nm	
	20-Apr-05		-	13.490	0.000	-	1077.596	nm	
	22-Apr-05		-	13.487	0.000	-	1077.599	nm	
	25-Apr-05		-	13.475	0.000	-	1077.611	nm	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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Calgary, Alberta

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BH510 Continued	27-Apr-05		-	13.513	0.000	-	1077.573	nm	
	4-May-05		-	13.505	0.000	-	1077.581	nm	
	6-May-05		-	13.464	0.000	-	1077.622	nm	checked bailer - no visible product
	9-May-05		-	13.475	0.000	-	1077.611	nm	
	13-May-05		-	13.498	0.000	-	1077.588	nm	
	16-May-05		-	13.404	0.000	-	1077.682	nm	
	26-May-05		-	13.525	0.000	-	1077.561	nm	
	2-Jun-05		-	13.479	0.000	-	1077.607	40	
	10-Jun-05		-	13.467	0.000	-	1077.619	nm	
	15-Jun-05		-	13.469	0.000	-	1077.617	nm	
	17-Jun-05		13.460	13.461	0.001	-	1077.625	nm	checked bailer - no visible product
	20-Jun-05		-	13.505	0.000	-	1077.581	nm	
	22-Jun-05		-	13.430	0.000	-	1077.656	nm	
	24-Jun-05		-	13.490	0.000	-	1077.596	nm	well could be slightly shortened or j-plug installed
	27-Jun-05		-	13.472	0.000	-	1077.614	nm	
	29-Jun-05		-	13.470	0.000	-	1077.616	nm	
	6-Jul-05		-	13.410	0.000	-	1077.676	nm	
	11-Jul-05		-	13.461	0.000	-	1077.625	nm	
	20-Jul-05		-	13.448	0.000	-	1077.638	nm	
	22-Jul-05		-	13.423	0.000	-	1077.663	nm	
	28-Jul-05		-	13.405	0.000	-	1077.681	nm	
	9-Aug-05		-	13.425	0.000	-	1077.661	nm	
	10-Aug-05		-	13.430	0.000	-	1077.656	nm	
	12-Aug-05		-	13.435	0.000	-	1077.651	nm	
	16-Aug-05		-	13.377	0.000	-	1077.709	nm	
	17-Aug-05		-	13.409	0.000	-	1077.677	nm	
	24-Aug-05		-	13.385	0.000	-	1077.701	nm	
	31-Aug-05		-	13.395	0.000	-	1077.691	nm	
	6-Sep-05		-	13.406	0.000	-	1077.680	nm	
	12-Sep-05		-	13.368	0.000	-	1077.718	nm	
	14-Sep-05		-	13.343	0.000	-	1077.743	nm	
	16-Sep-05		-	13.375	0.000	-	1077.711	nm	
	19-Sep-05		-	13.337	0.000	-	1077.749	nm	well needs clean-out cap replaced with j-plug
	21-Sep-05		-	13.375	0.000	-	1077.711	nm	
	26-Sep-05		-	13.311	0.000	-	1077.775	nm	

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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BH510 Continued	28-Sep-05		-	13.348	0.000	-	1077.738	nm	
	18-Oct-05		-	13.347	0.000	-	1077.739	nm	
	24-Oct-05		-	13.309	0.000	-	1077.777	nm	
	1-Nov-05		-	13.297	0.000	-	1077.789	nm	
	3-Nov-05		-	13.268	0.000	-	1077.818	nm	0 ml product in P.B.
	8-Nov-05		-	13.334	0.000	-	1077.752	nm	
	10-Nov-05		-	13.325	0.000	-	1077.761	nm	
	14-Nov-05		-	13.352	0.000	-	1077.734	nm	
	28-Nov-05		-	13.339	0.000	-	1077.747	nm	
	30-Nov-05		-	13.298	0.000	-	1077.788	nm	
	6-Dec-05		-	13.323	0.000	-	1077.763	nm	
	12-Dec-05		-	13.238	0.000	-	1077.848	nm	
	14-Dec-05		-	13.327	0.000	-	1077.759	nm	
	16-Dec-05		-	13.284	0.000	-	1077.802	nm	
	19-Dec-05		-	13.270	0.000	-	1077.816	nm	
	22-Dec-05		-	13.195	0.000	-	1077.891	nm	
	23-Dec-05		-	13.309	0.000	-	1077.777	nm	
	3-Jan-06		-	13.298	0.000	-	1077.788	nm	
	5-Jan-06		-	13.274	0.000	-	1077.812	nm	
	6-Jan-06		-	13.265	0.000	-	1077.821	nm	
	9-Jan-06		-	13.229	0.000	-	1077.857	nm	
	12-Jan-06		-	13.308	0.000	-	1077.778	nm	
	13-Jan-06		-	13.238	0.000	-	1077.848	nm	
	16-Jan-06		-	13.292	0.000	-	1077.794	nm	
	20-Jan-06		-	13.262	0.000	-	1077.824	nm	
	23-Jan-06		-	13.264	0.000	-	1077.822	nm	
	30-Jan-06		-	13.187	0.000	-	1077.899	nm	
	1-Feb-06		-	13.193	0.000	-	1077.893	nm	
	3-Feb-06		-	13.323	0.000	-	1077.763	nm	
	6-Feb-06		-	13.337	0.000	-	1077.749	nm	
	8-Feb-06		-	13.268	0.000	-	1077.818	nm	
	10-Feb-06		-	13.368	0.000	-	1077.718	nm	
	27-Feb-06		-	13.187	0.000	-	1077.899	nm	
	2-Mar-06		-	13.343	0.000	-	1077.743	nm	
	4-Mar-06		-	13.279	0.000	-	1077.807	nm	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH510 Continued	6-Mar-06		-	13.242	0.000	-	1077.844	nm	
	8-Mar-06		-	13.305	0.000	-	1077.781	nm	
	10-Mar-06		-	13.301	0.000	-	1077.785	nm	
	14-Mar-06		-	13.267	0.000	-	1077.819	nm	
	22-Mar-06		cnm	cnm	cnm	-	cnm	cnm	iced up
	24-Mar-06		-	13.268	0.000	-	1077.818	nm	
	27-Mar-06		-	13.320	0.000	-	1077.766	nm	
	29-Mar-06		-	13.273	0.000	-	1077.813	nm	
	31-Mar-06		cnm	cnm	cnm	-	cnm	cnm	High volume traffic
	12-Apr-06		-	13.307	0.000	-	1077.779	nm	
	19-Jul-06		-	13.350	0.000	-	1077.736	nm	
	21-Jul-06		-	13.370	0.000	-	1077.716	nm	
	24-Jul-06		-	13.295	0.000	-	1077.791	nm	
	31-Jul-06		-	13.316	0.000	-	1077.770	nm	
	3-Aug-06		-	13.355	0.000	-	1077.731	nm	
	9-Aug-06		-	13.338	0.000	-	1077.748	nm	
	15-Aug-06		-	13.323	0.000	-	1077.763	nm	
	17-Aug-06		-	13.340	0.000	-	1077.746	nm	
	18-Aug-06		-	13.335	0.000	-	1077.751	nm	
	21-Aug-06		-	13.316	0.000	-	1077.770	nm	
	24-Aug-06		-	13.321	0.000	-	1077.765	nm	
	25-Aug-06		-	13.349	0.000	-	1077.737	nm	
	28-Aug-06		-	13.308	0.000	-	1077.778	nm	
	30-Aug-06		-	13.307	0.000	-	1077.779	nm	
	18-Sep-06		-	13.324	0.000	-	1077.762	nm	
	20-Sep-06		-	13.268	0.000	-	1077.818	nm	
	22-Sep-06		-	13.266	0.000	-	1077.820	nm	
	25-Sep-06		-	13.319	0.000	-	1077.767	nm	
	3-Oct-06		-	13.360	0.000	-	1077.726	nm	
	5-Oct-06		-	13.259	0.000		1077.827	nm	
	4-Dec-06		cnm	cnm	cnm	cnm	cnm	cnm	iced
	25-Jan-07		-	13.259	0.000	-	1077.827	>10,000	No bailer
	15-Mar-07		-	13.201	0.000	-	1077.885	nm	
	17-Apr-07		-	13.296	0.000	-	1077.790	nm	
	24-Apr-07		-	13.307	0.000	-	1077.779	nm	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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BH510 Continued	1-May-07		-	13.295	0.000	-	1077.791	nm	
	4-May-07		-	13.272	0.000	-	1077.814	nm	
	8-May-07		-	13.299	0.000	-	1077.787	nm	
	10-May-07		-	13.324	0.000	-	1077.762	nm	
	8-Jun-07		-	13.270	0.000	-	1077.816	nm	
	11-Jun-07		-	13.250	0.000	-	1077.836	nm	
	13-Jun-07		-	13.266	0.000	-	1077.820	nm	
	3-Jul-07		-	13.235	0.000	-	1077.851	nm	
	5-Jul-07		-	13.235	0.000	-	1077.851	nm	
	16-Jul-07		-	13.190	0.000	-	1077.896	nm	
	20-Jul-07		-	13.194	0.000	-	1077.892	nm	
	26-Jul-07		-	13.215	0.000	-	1077.871	nm	
	30-Jul-07		-	13.205	0.000	-	1077.881	nm	
	7-Aug-07		-	13.133	0.000	-	1077.953	nm	
	9-Aug-07		-	13.121	0.000	-	1077.965	nm	
	24-Aug-07		-	13.177	0.000	-	1077.909	nm	
	27-Aug-07		-	13.177	0.000	-	1077.909	nm	
	29-Aug-07		-	13.178	0.000	-	1077.908	nm	
	4-Sep-07		-	13.193	0.000	-	1077.893	nm	
	6-Sep-07		-	13.183	0.000	-	1077.903	nm	
	10-Sep-07		-	13.186	0.000	-	1077.900	nm	
	12-Sep-07		-	13.103	0.000	-	1077.983	nm	
	14-Sep-07		-	13.222	0.000	-	1077.864	nm	
	17-Sep-07		-	13.195	0.000	-	1077.891	nm	
	19-Sep-07		-	13.193	0.000	-	1077.893	nm	
	21-Sep-07		-	13.214	0.000	-	1077.872	nm	
	24-Sep-07		-	13.100	0.000	-	1077.986	nm	
	26-Sep-07		-	13.155	0.000	-	1077.931	nm	
	28-Sep-07		-	13.110	0.000	-	1077.976	nm	
	1-Oct-07		-	13.153	0.000	-	1077.933	nm	
	3-Oct-07		-	13.152	0.000	-	1077.934	nm	
	9-Oct-07		-	13.144	0.000	-	1077.942	nm	
	12-Oct-07		-	13.150	0.000	-	1077.936	nm	
	16-Oct-07		-	13.190	0.000	-	1077.896	nm	
	20-Oct-07		-	13.210	0.000	-	1077.876	nm	

Notes:

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2 Depth relative to top of standpipe.

3 Water elevation referenced to Geodetic. Water elevation adjusted for presence of LPHs (using LPH density of 0.8).

4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH510 Continued	29-Oct-07		-	13.207	0.000	-	1077.879	nm	
	1-Nov-07		-	13.204	0.000	-	1077.882	nm	
	2-Nov-07		-	13.200	0.000	-	1077.886	nm	
	5-Nov-07		-	13.181	0.000	-	1077.905	nm	
	13-Nov-07		-	13.184	0.000	-	1077.902	nm	
	19-Nov-07		-	13.228	0.000	-	1077.858	nm	
	23-Nov-07		-	13.179	0.000	-	1077.907	5,000	
	26-Nov-07		-	13.215	0.000	-	1077.871	nm	
	28-Nov-07		-	13.228	0.000	-	1077.858	nm	
	30-Nov-07		-	13.232	0.000	-	1077.854	nm	
	3-Dec-07		-	13.180	0.000	-	1077.906	nm	
	5-Dec-07		-	13.182	0.000	-	1077.904	nm	
	7-Dec-07		-	13.185	0.000	-	1077.901	nm	
	10-Dec-07		-	13.188	0.000	-	1077.898	nm	
	14-Dec-07		-	13.185	0.000	-	1077.901	nm	
	17-Dec-07		-	13.188	0.000	-	1077.898	nm	
	19-Dec-07		-	13.189	0.000	-	1077.897	nm	
	21-Dec-07		-	13.192	0.000	-	1077.894	nm	
	2-Jan-08		-	13.183	0.000	-	1077.903	nm	
	4-Jan-08		-	13.251	0.000	-	1077.835	nm	
	23-Jan-08		-	13.176	0.000	-	1077.910	nm	
	25-Jan-08		-	13.185	0.000	-	1077.901	nm	
	7-Feb-08		-	13.297	0.000	-	1077.789	nm	
	9-Feb-08		-	13.295	0.000	-	1077.791	nm	
	6-Mar-08		-	13.279	0.000	-	1077.807	nm	
	6-Mar-08		-	13.254	0.000	-	1077.832	nm	
	10-Mar-08		-	13.235	0.000	-	1077.851	1,300	
	7-Apr-08		-	13.239	0.000	-	1077.847	nm	
	9-Apr-08		-	13.242	0.000	-	1077.844	nm	
	11-Apr-08		-	13.243	0.000	-	1077.843	nm	
	14-Apr-08		-	13.242	0.000	-	1077.844	nm	
	16-Apr-08		-	13.254	0.000	-	1077.832	nm	
	28-Apr-08		-	13.303	0.000	-	1077.783	nm	
	30-Apr-08		-	13.309	0.000	-	1077.777	nm	
	2-May-08		-	13.315	0.000	-	1077.771	nm	

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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	5-May-08		-	13.292	0.000	-	1077.794	nm	
	12-May-08		-	13.298	0.000	-	1077.788	nm	
	14-May-08		-	13.300	0.000	-	1077.786	nm	
	26-May-08		-	13.227	0.000	-	1077.859	nm	
	28-May-08		-	13.230	0.000	-	1077.856	nm	
	30-May-08		-	13.240	0.000	-	1077.846	nm	
	9-Jun-08		-	13.260	0.000	-	1077.826	nm	
	11-Jun-08		-	13.258	0.000	-	1077.828	nm	
	13-Jun-08		-	13.262	0.000	-	1077.824	nm	
	3-Jul-08		-	13.227	0.000	-	1077.859	>10,000	well decommissioned on 03 July 2008
BH510A	11-Jan-05	1091.090	-	13.450	0.000	-	1077.640	>10,000	bailer check showed no product
	2-Feb-05		-	13.517	0.000	-	1077.573	6,200	4 inch well
	18-Feb-05		13.504	13.506	0.002	-	1077.586	nm	no P.B.; 4 inch well
	22-Feb-05		-	13.565	0.000	-	1077.525	nm	4 inch well
	24-Feb-05		-	13.529	0.000	-	1077.561	nm	bailer check showed no product, no sheen
	2-Mar-05		-	13.535	0.000	-	1077.555	8,200	checked bailer - sheen on water; well surveyed
	22-Mar-05		-	13.585	0.000	-	1077.505	nm	
	24-Mar-05		-	13.572	0.000	-	1077.518	nm	checked bailer - no product
	28-Mar-05		-	13.474	0.000	-	1077.616	nm	
	30-Mar-05		-	13.588	0.000	-	1077.502	nm	
	1-Apr-05		-	13.499	0.000	-	1077.591	nm	
	5-Apr-05		-	13.624	0.000	-	1077.466	nm	
	11-Apr-05		-	13.545	0.000	-	1077.545	nm	
	15-Apr-05		-	13.585	0.000	-	1077.505	nm	
	18-Apr-05		-	13.616	0.000	-	1077.474	nm	
	20-Apr-05		-	13.584	0.000	-	1077.506	nm	
	22-Apr-05		-	13.579	0.000	-	1077.511	nm	
	25-Apr-05		-	13.569	0.000	-	1077.521	nm	
	27-Apr-05		-	13.607	0.000	-	1077.483	nm	
	4-May-05		-	13.601	0.000	-	1077.489	nm	
	6-May-05		-	13.560	0.000	-	1077.530	nm	checked bailer - no product
	9-May-05		-	13.566	0.000	-	1077.524	nm	
	13-May-05		-	13.598	0.000	-	1077.492	nm	
	16-May-05		-	13.495	0.000	-	1077.595	nm	
	26-May-05		-	13.625	0.000	-	1077.465	nm	
	2-Jun-05		-	13.575	0.000	-	1077.515	>10,000	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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Calgary, Alberta

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BH211 Continued	25-May-07		-	11.138	0.000	-	1078.200	68	
	23-Aug-07		-	11.004	0.000	-	1078.334	92	
	22-Nov-07		-	11.045	0.000	-	1078.293	14	
	10-Mar-08		-	11.065	0.000	-	1078.273	300	
	4-Jun-08		-	11.147	0.000	-	1078.191	62	
	3-Jul-08		-	-	0.000	-	-	1,000	well decommissioned on 03 July 2008
BH212	29-Oct-98	1088.070	-	9.044	0.000	-	1079.030	44	
	9-Nov-98		-	9.020	0.000	-	1079.050	200	
	22-Apr-99		-	9.350	0.000	-	1078.720	14	
	26-Jul-01		-	9.320	0.000	-	1078.750	22	cap labelled 211
	5-Dec-02	1088.127	-	9.418	0.000	-	1078.709	290	
	12-May-03		-	9.474	0.000	-	1078.653	50	
	7-Oct-03		-	9.315	0.000	-	1078.812	55	
	20-Nov-03		-	9.355	0.000	-	1078.772	210	
	17-Dec-03		-	9.310	0.000	-	1078.817	210	
	13-Jan-04		-	9.248	0.000	-	1078.879	20	
	8-Mar-04		-	8.765	0.000	-	1079.362	180	some surface water entered well (200ml)
	7-Apr-04		-	9.188	0.000	-	1078.939	120	was frozen
	16-Jun-04		-	9.300	0.000	-	1078.827	10	
	14-Jul-04		-	9.319	0.000	-	1078.808	20	
	23-Aug-04			9.318	0.000	-	1078.809	22	One bolt missing - could not be replaced
	14-Oct-04		-	9.349	0.000	-	1078.778	42	
	2-Feb-05		-	9.417	0.000	-	1078.710	20	
	2-Mar-05		-	9.393	0.000	-	1078.734	240	
	5-Oct-05		-	9.273	0.000	-	1078.854	65	
	19-Jan-06		-	9.235	0.000	-	1078.892	10	
	11-May-06		-	9.358	0.000	-	1078.769	220	
	25-Jan-07		-	6.284	0.000	-	1081.843	100	
	23-May-07		-	9.292	0.000	-	1078.835	68	
	23-Aug-07		-	9.074	0.000	-	1079.053	74	
	22-Nov-07		-	9.112	0.000	-	1079.015	160	
	13-Mar-08		cnm	cnm	cnm	cnm	cnm	88	well frozen in
	4-Jun-08		-	9.289	0.000	-	1078.838	20	
	23-Jun-08		-	9.241	0.000	-	1078.886	55	well decommissioned on 24 June 2008
BH213	29-Oct-98	1088.950	9.496	9.624	0.128	-	1079.430	2,000	passive bailer

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH213 Continued	3-Nov-98		9.875	9.876	0.001	-	1079.430	nm	recovered 150 ml product from P.B.
	5-Nov-98		-	9.677	0.000	-	1079.430	nm	recovered 75 ml product from P.B.
	13-Nov-98		-	9.630	0.000	-	1079.320	-	recovered 200 ml product from P.B.; H.B. 200 ml
	22-Nov-98		nm	nm	nm	-	nm	nm	recovered 200 ml product from P.B.; H.B. 200 ml
	26-Nov-98		-	9.648	0.000	-	1079.036	40	measured 60 mm product in bailer
	9-Dec-98		-	9.914	0.000	-	1079.036	1,200	recovered 200 ml product from passive bailer
	23-Dec-98		-	9.772	0.000	-	1079.178	nm	recovered 100 ml product from passive bailer
	4-Jan-99		-	9.705	0.000	-	1079.245	-	passive bailer
	11-Jan-99		nm	nm	nm	-	nm	nm	recovered 100 ml product from passive bailer
	29-Jan-99		nm	nm	nm	-	nm	nm	recovered 150 ml product from P.B.
	2-Feb-99		nm	nm	nm	-	nm	nm	recovered 200 ml product from P.B.
	22-Apr-99		-	10.408	0.000	-	1078.542	>10,000	passive bailer
	20-Aug-99		10.145	10.148	0.003	-	1078.804	120	
	27-Aug-99		-	10.087	0.000	-	1078.863	28	
	17-Sep-99		-	9.928	0.000	-	1079.022	nm	75 ml product in passive bailer
	22-Nov-99		-	9.766	0.000	-	1079.184	20	75 ml product in passive bailer
	20-Nov-03		-	9.724	0.000	-	1079.557	2,000	
	3-Dec-03		-	9.693	0.000	-	1079.588	nm	Heavy sheen, no LPH, no passive bailer
	8-Dec-03		-	9.725	0.000	-	1079.556	500	no passive bailer; disposable bailer shows no product
	17-Dec-03		-	9.723	0.000	-	1079.558	60	
	7-Jan-04		-	9.672	0.000	-	1079.609	nm	no passive bailer; checked with hand bailer - no product
	13-Jan-04		-	9.671	0.000	-	1079.610	60	Bailer Check - No product
	10-Mar-04		-	9.730	0.000	-	1079.551	6,000	cap broken; retrieved bailer stuck in well
	22-Mar-04		cnm	cnm	cnm	-	cnm	cnm	P.B. stuck in well (frozen)
	6-Apr-04		10.183	10.185	0.002	-	1079.098	>10,000	product in well
	16-Jun-04		-	10.020	0.000	-	1079.261	70	cap broken
	14-Jul-04		-	10.147	0.000	-	1079.134	72	cap has a hole
	24-Aug-04		-	10.366	0.000	-	1078.915	1,000	
	14-Oct-04		-	10.424	0.000	-	1078.857	1,000	
	2-Feb-05		10.094	10.094	trace	-	1079.187	5,400	bailer checked: 2 mm product in well
	2-Mar-05		cnm	cnm	cnm	-	cnm	cnm	well completely frozen
	5-Oct-05		-	10.294	0.000	-	1078.987	1,000	
	19-Jan-06		-	9.924	0.000	-	1079.357	1,000	
	11-May-06	1088.950	-	10.256	-	-	1079.025	>10,000	
	27-Jul-06		-	10.360	-	-	1078.921	200	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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ppm parts per million; 1% LEL (lower explosive limit)=110ppm

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BH213 Continued	25-Jan-07		-	10.334	-	-	1078.947	4,000	
	23-Aug-07		-	9.815	-	-	1079.466	200	
	23-Nov-07		-	9.823	-	-	1079.458	6,000	
	10-Mar-08		-	9.915	-	-	1079.366	240	
	4-Jun-08		-	9.945	-	-	1079.336	60	
	23-Jun-08		-	9.891	-	-	1079.390	520	well decommissioned on 23 June 2008
BH214	29-Oct-98	1089.100	-	8.006	0.000	-	1081.094	60	
	9-Nov-98		-	8.020	0.000	-	1081.080	1,100	
	26-Nov-98		7.946	7.963	0.017	-	1081.151	420	bailed 10 ml product
	9-Dec-98		nm	nm	0.000	-	nm	1,200	skim of product in passive bailer
	23-Dec-98		7.906	7.932	0.026	-	1081.189	nm	bailed 20 ml product
	4-Jan-99		-	7.933	0.016	-	1081.180	-	
	7-Mar-99		-	8.465	0.000	-	1080.635	-	passive bailer
	22-Apr-99		-	8.842	0.000	-	1080.258	1,200	passive bailer
	20-Aug-99		-	8.523	0.000	-	1080.577	1,000	
	27-Aug-99		-	8.489	0.000	-	1080.611	400	
	17-Sep-99		-	8.406	0.000	-	1080.694	nm	
	22-Nov-99		-	8.287	0.000	-	1080.813	600	
	10-Dec-99		-	8.235	0.000	-	1080.865	116	
	16-Dec-99		-	8.226	0.000	-	1080.874	860	
	5-Aug-03		9.187	9.211	0.024	-	1080.255	nm	
	16-Sep-03		nm	nm	nm	-	-	nm	repaired well cap and bailer chain
	7-Oct-03		-	-	-	-	-	>10,000	
	12-Nov-03		nm	nm	nm	-	nm	nm	did not measure because of P.B.; bailed 3.6 L product
	20-Nov-03		-	-	-	-	-	>10,000	CNM-PB Frozen
	3-Dec-03		-	8.979	0.000	-	1080.468	nm	
	4-Dec-03		nm	nm	nm	-	nm	nm	P.B. check showed approx. 5 ml product
	8-Dec-03		-	9.310	0.000	-	1080.137	260	recovered 150 ml product from P.B.
	17-Dec-03		-	9.345	0.000	-	1080.102	7,000	
	22-Dec-03		nm	nm	nm	-	nm	nm	recovered 80 ml product from P.B.
	7-Jan-04		-	9.020	0.000	-	1080.427	nm	recovered 100 ml product from P.B.
	10-Jan-04		-	9.140	0.000	-	1080.307	nm	recovered 50 ml product from passive bailer
	12-Jan-04		-	9.243	0.000	-	1080.204	nm	recovered 50 ml product from passive bailer
	15-Jan-04		-	9.210	0.000	-	1080.237	nm	recovered 100 ml product from P.B.
	20-Jan-04		-	9.335	0.000	-	1080.112	nm	recovered 100 ml product from P.B.

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

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cnm could not monitor.

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ppm parts per million; 1% LEL (lower explosive limit)=110ppm

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH214 Continued	23-Jan-04		-	9.072	0.000	-	1080.375	nm	recovered 10 ml product from P.B.
	5-Feb-04		-	9.342	0.000	-	1080.105	nm	recovered 100 ml product from P.B.
	9-Feb-04		-	9.434	0.000	-	1080.013	nm	recovered 100 ml product from P.B.
	19-Feb-04		-	8.890	0.000	-	1080.557	nm	recovered 50 ml product from passive bailer
	23-Feb-04		-	8.920	0.000	-	1080.527	nm	recovered 50 ml product from passive bailer
	26-Feb-04		cnm	cnm	cnm	-	cnm	cnm	iced - bailer frozen down well
	3-Mar-04		cnm	cnm	cnm	-	cnm	cnm	bailer frozen down well
	8-Mar-04		cnm	cnm	cnm	-	cnm	1,600	passive bailer frozen to side
	31-Mar-04		-	9.620	0.000	-	1079.827	nm	recovered 200 ml product from P.B.
	12-Apr-04		-	9.645	0.000	-	1079.802	nm	product in P.B. is greyish black with a slight sheen
	13-Apr-04		-	9.667	0.000	-	1079.780	nm	recovered 50 ml product from passive bailer
	15-Apr-04		-	9.644	0.000	-	1079.803	nm	product is blackish; recovered 100 ml from P.B.
	16-Apr-04		-	9.659	0.000	-	1079.788	nm	product is blackish; recovered 150 ml from P.B.
	19-Apr-04		-	9.664	0.000	-	1079.783	nm	product is black; recovered 300 ml from P.B.
	22-Apr-04		-	9.693	0.000	-	1079.754	nm	recovered 350 ml black product from P.B.
	30-Apr-04		-	9.735	0.000	-	1079.712	nm	recovered 150 ml product from P.B
	6-May-04		-	9.686	0.000	-	1079.761	nm	recovered 100 ml from passive bailer
	7-May-04		-	9.674	0.000	-	1079.773	nm	recovered 10 ml from passive bailer
	10-May-04		-	9.669	0.000	-	1079.778	nm	recovered 50 ml from passive bailer
	17-May-04		-	9.690	0.000	-	1079.757	nm	recovered 10 ml from passive bailer
	20-May-04		-	9.689	0.000	-	1079.758	nm	recovered 10 ml from passive bailer
	28-May-04		-	9.650	0.000	-	1079.797	nm	hand bailed 5 ml
	16-Jun-04		-	9.860	0.000	-	1079.587	10,000	
	18-Jun-04		-	10.860	0.000	-	1078.587	nm	passive bailer checked - no product
	14-Jul-04		-	9.920	0.000	-	1079.527	70	passive bailer checked - no product
	28-Jul-04		9.935	9.960	0.025	-	1079.507	nm	10 ml recovered
	6-Aug-04		9.935	9.982	0.047	-	1079.503	nm	10 ml recovered
	10-Aug-04		9.960	10.020	0.060	-	1079.475	nm	0 ml recovered
	11-Aug-04		9.935	10.000	0.065	-	1079.499	nm	10 ml recovered
	13-Aug-04		-	9.935	0.000	-	1079.512	nm	10 ml recovered
	18-Aug-04		-	9.955	0.000	-	1079.492	nm	10 ml recovered
	24-Aug-04		-	9.874	0.000	-	1079.573	2,800	No product in PB.
	7-Sep-04		-	9.975	0.000	-	1079.472	nm	0 ml recovered
	9-Sep-04		-	9.985	0.000	-	1079.462	nm	0 ml recovered
	13-Sep-04		-	9.935	0.000	-	1079.512	nm	0 ml recovered

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

Updated Site Management Plan (2014)
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Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH214 Continued	15-Sep-04		-	9.957	0.000	-	1079.490	nm	0 ml recovered
	17-Sep-04		-	9.923	0.000	-	1079.524	nm	0 ml recovered
	20-Sep-04		9.980	10.025	0.045	-	1079.458	nm	0 ml recovered
	22-Sep-04		-	9.954	0.000	-	1079.493	nm	0 ml recovered
	24-Sep-04		-	9.975	0.000	-	1079.472	nm	0 ml recovered
	29-Sep-04		-	9.945	0.000	-	1079.502	nm	0 ml recovered
	4-Oct-04		-	9.895	0.000	-	1079.552	nm	0 ml recovered
	6-Oct-04		9.855	9.884	0.029	-	1079.586	nm	0 ml recovered
	12-Oct-04		-	9.965	0.000	-	1079.482	nm	0 ml recovered
	15-Oct-04		-	9.880	0.000	-	1079.567	nm	0 ml recovered
	5-Nov-04		9.845	9.849	0.004	-	1079.601	nm	0 ml recovered
	8-Nov-04		9.859	9.862	0.003	-	1079.587	nm	0 ml recovered
	10-Nov-04		9.986	9.988	0.002	-	1079.461	nm	0 ml recovered
	17-Nov-04		-	9.906	0.000	-	1079.541	nm	0 ml recovered
	25-Nov-04		-	9.725	0.000	-	1079.722	nm	10 ml recovered
	29-Nov-04		9.863	9.865	0.002	-	1079.584	nm	0 ml recovered
	1-Dec-04		9.899	9.901	0.002	-	1079.548	nm	0 ml recovered
	17-Jan-05		9.616	9.616	trace	-	1079.831	nm	trace product; no P.B. in well
	24-Jan-05		9.655	9.700	0.045	-	1079.783	nm	no passive bailer
	26-Jan-05		9.804	9.804	trace	-	1079.643	nm	passive bailer full of water; reset P.B.
	28-Jan-05		9.970	9.970	trace	-	1079.477	nm	recovered 2 ml product and 20 ml water from P.B.
	2-Feb-05		9.957	9.957	trace	-	1079.490	>10,000	passive bailer checked - no product; sheen on probe
	18-Feb-05		9.943	9.948	0.005	-	1079.503	nm	recovered 4 ml product and 150 ml water from P.B.
	22-Feb-05		10.004	10.006	0.002	-	1079.443	nm	recovered 5 ml product from passive bailer
	24-Feb-05		9.908	9.908	trace	-	1079.539	nm	P.B. full of water; observed 4 mm product in H.B.
	2-Mar-05		9.985	9.989	0.004	-	1079.461	>10,000	recovered 1 mm of product from P.B.
	22-Mar-05		10.010	10.015	0.005	-	1079.436	nm	recovered 10 ml product from P.B.
	24-Mar-05		10.085	10.100	0.015	-	1079.359	nm	no product in P.B.; hand bailed 10 mm product
	28-Mar-05		9.926	9.928	0.002	-	1079.521	nm	no product in P.B.
	30-Mar-05		10.053	10.055	0.002	-	1079.394	nm	no product in P.B.
	1-Apr-05		9.984	9.984	trace	-	1079.463	nm	no product in P.B.
	5-Apr-05		10.095	10.098	0.003	-	1079.351	nm	no product in P.B.
	11-Apr-05		10.036	10.038	0.002	-	1079.411	nm	no product in P.B.
	15-Apr-05		10.090	10.091	0.001	-	1079.357	nm	no product in P.B.
	18-Apr-05		10.110	10.111	0.001	-	1079.337	nm	no product in P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH214 Continued	20-Apr-05		10.087	10.089	0.002	-	1079.360	nm	no product in P.B.
	22-Apr-05		10.102	10.104	0.002	-	1079.345	nm	no product in P.B.
	25-Apr-05		10.085	10.088	0.003	-	1079.361	nm	no product in P.B.
	27-Apr-05		-	10.105	0.000	-	1079.342	nm	no product in P.B.
	4-May-05		-	10.220	0.000	-	1079.227	nm	no product in P.B.
	6-May-05		-	10.375	0.000	-	1079.072	nm	no product in P.B.
	9-May-05		-	10.100	0.000	-	1079.347	nm	
	13-May-05		10.112	10.114	0.002	-	1079.335	nm	no product in P.B.
	16-May-05		-	10.029	0.000	-	1079.418	nm	no product in P.B.
	26-May-05		-	10.148	0.000	-	1079.299	nm	no product in P.B.
	10-Jun-05		10.165	10.168	0.003	-	1079.281	nm	no product in P.B.
	15-Jun-05		10.159	10.162	0.003	-	1079.287	nm	no product in P.B.
	17-Jun-05		10.150	10.159	0.009	-	1079.295	nm	no product in P.B.
	20-Jun-05		10.155	10.158	0.003	-	1079.291	nm	no product in P.B.
	22-Jun-05		10.124	10.130	0.006	-	1079.322	nm	no product in P.B.
	24-Jun-05		10.145	10.147	0.002	-	1079.302	nm	no product in P.B.
	27-Jun-05		10.124	10.126	0.002	-	1079.323	nm	no product in P.B.
	29-Jun-05		10.115	10.117	0.002	-	1079.332	nm	no product in P.B.
	6-Jul-05		9.984	9.985	0.001	-	1079.463	nm	no product in P.B.
	11-Jul-05		7.045	7.049	0.004	-	1082.401	nm	no product in P.B.
	20-Jul-05		9.989	9.992	0.003	-	1079.457	nm	no product in P.B.
	22-Jul-05		9.962	9.963	0.001	-	1079.485	nm	no product in P.B.
	28-Jul-05		9.893	9.895	0.002	-	1079.554	nm	no product in P.B.
	9-Aug-05		9.985	9.990	0.005	-	1079.461	nm	no product in P.B.
	10-Aug-05		9.976	9.978	0.002	-	1079.471	nm	no product in P.B.
	12-Aug-05		9.949	9.951	0.002	-	1079.498	nm	no product in P.B.
	16-Aug-05		9.738	9.739	0.001	-	1079.709	nm	no product in P.B.
	17-Aug-05		9.905	9.907	0.002	-	1079.542	nm	no product in P.B.
	24-Aug-05		9.758	9.759	0.001	-	1079.689	nm	no product in P.B.
	31-Aug-05		9.799	9.802	0.003	-	1079.647	nm	no product in P.B.
	6-Sep-05		9.862	9.864	0.002	-	1079.585	nm	no product in P.B.
	12-Sep-05		9.734	9.738	0.004	-	1079.712	nm	recovered 5 ml product from P.B.
	14-Sep-05		9.698	9.699	0.001	-	1079.749	nm	no product in P.B.
	16-Sep-05		9.715	9.716	0.001	-	1079.732	nm	no product in P.B.
	19-Sep-05		-	9.665	0.000	-	1079.782	nm	no product in P.B.

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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BH214 Continued	21-Sep-05		-	9.705	0.000	-	1079.742	nm	no product in P.B.
	26-Sep-05		9.607	9.608	0.001	-	1079.840	nm	recovered 10 ml product from P.B.
	28-Sep-05		9.641	9.642	0.001	-	1079.806	nm	recovered 5 ml product from P.B.
	18-Oct-05		9.560	9.562	0.002	-	1079.887	nm	recovered 10 ml product from P.B.
	24-Oct-05		-	9.537	0.000	-	1079.910	nm	recovered 10 ml product from P.B.
	1-Nov-05		9.505	9.507	0.002	-	1079.942	nm	recovered 10 ml product from P.B.
	3-Nov-05		9.628	9.629	0.001	-	1079.819	nm	recovered 50 mm dark product and 115 mm light product
	8-Nov-05		9.653	9.654	0.001	-	1079.794	nm	recovered 20 ml black product
	10-Nov-05		9.527	9.529	0.002	-	1079.920	nm	recovered 10 ml product from P.B.
	14-Nov-05		9.664	9.665	0.001	-	1079.783	nm	recovered 10 ml product from P.B.
	28-Nov-05		9.610	9.612	0.002	-	1079.837	nm	recovered 30 ml product from P.B.
	30-Nov-05		9.567	9.569	0.002	-	1079.880	nm	recovered 10 ml product from P.B.
	6-Dec-05		9.599	9.602	0.003	-	1079.847	nm	recovered 10 ml product from P.B.
	12-Dec-05		9.473	9.475	0.002	-	1079.974	nm	PB-Recovered 10 ml
	14-Dec-05		9.594	9.596	0.002	-	1079.853	nm	PB-Recovered 10 ml
	16-Dec-05		9.528	9.530	0.002	-	1079.919	nm	PB-Recovered 10 ml
	19-Dec-05		9.509	9.510	0.001	-	1079.938	nm	PB-Recovered 10 ml
	22-Dec-05		9.378	9.379	0.001	-	1080.069	nm	PB-Recovered 5 ml
	23-Dec-05		9.428	9.930	0.502	-	1079.919	nm	PB-Recovered 10 ml
	3-Jan-06		9.554	9.556	0.002	-	1079.893	nm	PB-Recovered 5 ml
	5-Jan-06		9.561	9.562	0.001	-	1079.886	nm	PB-Recovered 5 ml
	6-Jan-06		9.552	9.553	0.001	-	1079.895	nm	PB-Recovered 5 ml
	9-Jan-06		9.450	9.451	0.001	-	1079.997	nm	
	12-Jan-06		9.245	9.247	0.002	-	1080.202	nm	PB-Recovered 5 ml
	13-Jan-06		9.194	9.195	0.001	-	1080.253	nm	PB-Recovered 10 ml
	16-Jan-06		9.578	9.580	0.002	-	1079.869	nm	PB-Recovered 10 ml
	20-Jan-06		9.533	9.534	0.001	-	1079.914	nm	PB-Recovered 5 ml
	23-Jan-06		8.835	8.836	0.001	-	1080.612	nm	
	30-Jan-06		8.698	8.699	0.001	-	1080.749	nm	moved PB to 706
	1-Feb-06		8.685	8.687	0.002	-	1080.762	nm	
	3-Feb-06		9.004	9.005	0.001	-	1080.443	nm	
	6-Feb-06		9.101	9.102	0.001	-	1080.346	nm	
	8-Feb-06		8.903	8.904	0.001	-	1080.544	nm	
	10-Feb-06		9.182	9.184	0.002	-	1080.265	nm	
	27-Feb-06		8.703	8.705	0.002	-	1080.744	nm	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH214 Continued	2-Mar-06		9.104	9.106	0.002	-	1080.343	nm	
	4-Mar-06		9.236	9.237	0.001	-	1080.211	nm	
	6-Mar-06		8.840	8.841	0.001	-	1080.607	nm	
	8-Mar-06		9.024	9.025	0.001	-	1080.423	nm	
	10-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	14-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	22-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	24-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	27-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	29-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	30-Mar-06		9.223	9.224	0.001	-	1080.224	nm	Chipped ice out
	31-Mar-06		cnm	cnm	cnm	-	cnm	nm	High volume of traffic
	12-Apr-06		cnm	cnm	cnm	-	cnm	nm	
	18-Apr-06		10.255	10.420	0.165	0.040	1079.159	nm	Hand bailed 40 ml
	26-Apr-06		9.145	9.147	0.002	-	1080.302	nm	
	28-Apr-06		9.320	9.321	0.001	-	1080.127	nm	
	1-May-06		9.216	9.217	0.001	-	1080.231	nm	
	3-May-06		9.432	9.433	0.001	-	1080.015	nm	
	9-May-06		9.366	9.368	0.002	-	1080.081	nm	
	7-Jun-06		9.567	9.571	0.004	-	1079.879	nm	
	12-Jun-06		9.526	9.529	0.003	-	1079.920	nm	
	14-Jun-06		9.235	9.239	0.004	-	1080.211	nm	
	16-Jun-06		9.214	9.215	0.001	-	1080.233	nm	
	20-Jun-06		9.242	9.243	0.001	-	1080.205	nm	
	22-Jun-06		9.375	9.379	0.004	-	1080.071	nm	
	23-Jun-06		9.380	9.381	0.001	-	1080.067	nm	
	26-Jun-06		9.293	9.294	0.001	-	1080.154	nm	
	28-Jun-06		9.129	9.131	0.002	-	1080.318	nm	
	4-Jul-06		9.263	9.266	0.003	-	1080.183	nm	
	7-Jul-06		9.190	9.193	0.003	-	1080.256	nm	
	12-Jul-06		9.094	9.096	0.002	-	1080.353	nm	
	19-Jul-06		9.209	9.211	0.002	-	1080.238	nm	
	21-Jul-06		9.268	9.269	0.001	-	1080.179	nm	
	24-Jul-06		9.065	9.067	0.002	-	1080.382	nm	
	31-Jul-06		9.095	9.096	0.001	-	1080.352	nm	

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passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH214 Continued	3-Aug-06		9.245	9.246	0.001	-	1080.202	nm	
	9-Aug-06		9.213	9.214	0.001	-	1080.234	nm	
	15-Aug-06		9.082	9.084	0.002	-	1080.365	nm	
	17-Aug-06		11.355	11.356	0.001	-	1078.092	nm	
	18-Aug-06		9.173	9.175	0.002	-	1080.274	nm	
	21-Aug-06		9.157	9.159	0.002	-	1080.290	nm	
	24-Aug-06		9.191	9.193	0.002	-	1080.256	nm	
	25-Aug-06		9.274	9.275	0.001	-	1080.173	nm	
	28-Aug-06		9.233	9.234	0.001	-	1080.214	nm	
	30-Aug-06		9.134	9.136	0.002	-	1080.313	nm	
	18-Sep-06		9.330	9.331	0.001	-	1080.117	nm	
	20-Sep-06		9.165	9.167	0.002	-	1080.282	nm	
	22-Sep-06		9.160	9.162	0.002	-	1080.287	nm	
	25-Sep-06		9.215	9.218	0.003	-	1080.231	nm	
	3-Oct-06		9.329	9.330	0.001	-	1080.118	nm	
	5-Oct-06		9.054	9.056	0.002	-	1080.393	nm	
	4-Dec-06		8.709	8.731	0.022	-	1080.734	nm	
	17-Apr-07		8.705	8.728	0.023	-	1080.737	nm	
	24-Apr-07		8.970	8.982	0.012	-	1080.475	nm	
	1-May-07		8.923	8.928	0.005	0.005	1080.523	nm	recovered 5 ml product from passive bailer
	4-May-07		8.865	8.869	0.004	-	1080.581	nm	
	8-May-07		8.935	8.944	0.009	-	1080.510	nm	
	10-May-07		9.005	9.009	0.004	-	1080.441	nm	
	8-Jun-07		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	3-Jul-07		8.105	8.127	0.022	-	1081.338	nm	
	5-Jul-07		8.111	8.130	0.019	-	1081.332	nm	
	16-Jul-07		8.063	8.082	0.019	-	1081.380	nm	
	20-Jul-07		8.065	8.069	0.004	-	1081.381	nm	
	26-Jul-07		8.150	8.155	0.005	-	1081.296	nm	
	30-Jul-07		8.155	8.174	0.019	-	1081.288	nm	
	2-Aug-07		8.160	8.172	0.012	-	1081.285	nm	
	7-Aug-07		8.115	8.123	0.008	-	1081.330	nm	
	9-Aug-07		8.009	8.038	0.029	-	1081.432	nm	
	24-Aug-07		8.347	8.355	0.008	-	1081.098	nm	
	27-Aug-07		8.360	8.388	0.028	-	1081.081	nm	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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BH214 Continued	29-Aug-07		8.355	8.392	0.037	-	1081.085	nm	
	4-Sep-07		8.382	8.389	0.007	-	1081.064	nm	
	6-Sep-07		8.385	8.391	0.006	-	1081.061	nm	
	10-Sep-07		10.700	10.705	0.005	-	1078.746	nm	
	12-Sep-07		10.523	10.525	0.002	-	1078.924	nm	
	14-Sep-07		10.491	10.493	0.002	-	1078.956	nm	
	17-Sep-07		10.711	10.715	0.004	0.010	1078.735	nm	recovered 10 ml product from passive bailer
	19-Sep-07		10.450	10.453	0.003	-	1078.996	nm	
	21-Sep-07		10.500	10.503	0.003	-	1078.946	nm	
	24-Sep-07		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	26-Sep-07		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	28-Sep-07		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	1-Oct-07		8.395	8.399	0.004	-	1081.051	nm	
	3-Oct-07		8.399	8.402	0.003	-	1081.047	nm	no recovery
	9-Oct-07		8.392	8.396	0.004	-	1081.054	nm	
	12-Oct-07		8.382	8.387	0.005	-	1081.064	nm	
	16-Oct-07		8.503	8.508	0.005	-	1080.943	nm	
	20-Oct-07		8.557	8.559	0.002	-	1080.890	nm	
	29-Oct-07		8.414	8.417	0.003	-	1081.032	nm	
	1-Nov-07		8.410	8.412	0.002	-	1081.037	nm	
	2-Nov-07		8.412	8.416	0.004	-	1081.034	nm	
	5-Nov-07		nm	nm	nm	nm	nm	nm	
	13-Nov-07		8.441	8.445	0.004	-	1081.005	nm	
	19-Nov-07		8.376	8.379	0.003	-	1081.070	nm	
	23-Nov-07		8.338	8.340	0.002	-	1081.109	4,000	
	26-Nov-07		8.368	8.372	0.004	-	1081.078	nm	
	28-Nov-07		8.371	8.374	0.003	-	1081.075	nm	
	30-Nov-07		8.381	8.385	0.004	-	1081.065	nm	
	3-Dec-07		8.100	8.104	0.004	-	1081.346	nm	
	5-Dec-07		8.115	8.117	0.002	-	1081.332	nm	
	7-Dec-07		8.119	8.121	0.002	-	1081.328	nm	
	10-Dec-07		8.201	8.203	0.002	-	1081.246	nm	
	14-Dec-07		8.205	8.207	0.002	-	1081.242	nm	
	17-Dec-07		8.207	8.209	0.002	-	1081.240	nm	
	19-Dec-07		8.207	8.209	0.002	-	1081.240	nm	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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BH214 Continued	21-Dec-07		8.203	8.205	0.002	-	1081.244	nm	
	2-Jan-08		8.200	8.201	0.001	-	1081.247	nm	
	4-Jan-08		8.152	8.155	0.003	-	1081.294	nm	
	23-Jan-08		8.343	8.359	0.016	-	1081.101	nm	
	25-Jan-08		8.340	8.352	0.012	-	1081.105	nm	
	7-Feb-08		nm	nm	nm	nm	nm	nm	
	9-Feb-08		nm	nm	nm	nm	nm	nm	
	6-Mar-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	7-Apr-08		8.523	8.538	0.015	-	1080.921	nm	
	9-Apr-08		8.525	8.537	0.012	-	1080.920	nm	
	11-Apr-08		8.524	8.535	0.011	-	1080.921	nm	
	14-Apr-08		8.480	8.489	0.009	-	1080.965	nm	
	16-Apr-08		8.472	8.475	0.003	-	1080.974	nm	
	28-Apr-08		8.601	8.606	0.005	-	1080.845	nm	
	30-Apr-08		8.603	8.608	0.005	-	1080.843	nm	
	2-May-08		8.600	8.606	0.006	-	1080.846	nm	
	5-May-08		nm	nm	nm	nm	nm	nm	
	12-May-08		8.548	8.559	0.011	-	1080.897	nm	
	14-May-08		8.550	8.560	0.010	-	1080.895	nm	
	26-May-08		8.450	8.455	0.005	-	1080.996	nm	
	28-May-08		8.455	8.458	0.003	-	1080.991	nm	
	30-May-08		8.460	8.462	0.002	-	1080.987	nm	
	9-Jun-08		8.384	8.387	0.003	-	1081.062	nm	
	11-Jun-08		nm	nm	nm	nm	nm	nm	
	13-Jun-08		8.390	8.393	0.003	-	1081.056	nm	
	23-Jun-08		8.345	8.357	0.012	-	1081.100	>10,000	well decommissioned on June 23, 2008
BH501	5-Dec-02	1090.027	-	12.065	0.000	-	1077.962	>10,000	
	12-May-03		-	12.078	0.000	-	1077.949	>10,000	
	7-Oct-03		-	12.010	0.000	-	1078.017	>10,000	
	12-Nov-03		-	12.074	0.000	-	1077.953	nm	no odour, no sheen
	20-Nov-03		-	12.099	0.000	-	1077.928	1,300	
	17-Dec-03		-	12.104	0.000	-	1077.923	70	
	13-Jan-04		-	12.012	0.000	-	1078.015	80	
	8-Mar-04		-	11.965	0.000	-	1078.062	>10,000	inside of well had to be chipped out
	6-Apr-04		-	11.950	0.000	-	1078.077	480	

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH208 Continued	14-Jul-04		-	10.172	0.000	-	1078.765	46	
	24-Aug-04		-	10.146	0.000	-	1078.791	3,200	
	14-Oct-04		-	10.187	0.000	-	1078.750	290	
	2-Feb-05		-	10.185	0.000	-	1078.752	5,000	
	2-Mar-05		cnm	cnm	cnm	-	cnm	>10,000	
	5-Oct-05		-	10.117	0.000	-	1078.820	>10,000	
	19-Jan-06		-	10.010	0.000	-	1078.927	4,000	
	11-May-06		-	10.060	-	-	1078.877	>10,000	
	27-Jul-06		-	10.125	-	-	1078.812	320	
	25-Jan-07		-	10.063	-	-	1078.874	>10,000	
	29-May-07		-	10.153	-	-	1078.784	50	
	23-Aug-07		-	9.971	-	-	1078.966	1,400	
	23-Nov-07		-	10.001	-	-	1078.936	2,000	
	10-Mar-08		-	10.065	-	-	1078.872	>10,000	
	4-Jun-08		-	10.125	-	-	1078.812	5,000	
	24-Jun-08		-	10.114	-	-	1078.823	>10,000	well decommissioned on 24 June 2008
BH209	29-Oct-98	1088.800	-	10.056	0.000	-	1078.744	640	
	9-Nov-98		-	10.030	0.000	-	1078.770	880	
	22-Apr-99		-	inaccessible	-	-	-	nm	
	26-Jul-01		-	10.293	0.000	-	1078.507	2,200	
	5-Dec-02	1089.124	-	10.390	0.000	-	1078.734	>10,000	
	25-Apr-03		-	10.111	0.000	-	1079.013	n.m.	
	12-May-03		-	10.413	0.000	-	1078.711	1,800	
	7-Oct-03		-	10.335	0.000	-	1078.789	>10,000	
	20-Nov-03		-	10.436	0.000	-	1078.688	160	
	17-Dec-03		-	10.454	0.000	-	1078.670	140	
	13-Jan-04		-	10.358	0.000	-	1078.766	1,200	
	8-Mar-04		-	10.386	0.000	-	1078.738	1,400	
	6-Apr-04		cnm	cnm	cnm	-	cnm	cnm	
	16-Jun-04		-	10.404	0.000	-	1078.720	600	
	14-Jul-04		-	10.388	0.000	-	1078.736	38	
	24-Aug-04		-	10.347	0.000	-	1078.777	5,000	
	14-Oct-04		-	10.376	0.000	-	1078.748	300	
	2-Feb-05		-	10.395	0.000	-	1078.729	2,000	bailer checked: slight odour, no sheen
	2-Mar-05		-	10.369	0.000	-	1078.755	>10,000	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH209 Continued	5-Oct-05		-	10.319	0.000	-	1078.805	1,000	
	19-Jan-06		10.195	10.320	0.125	-	1078.904	3,400	Product
	20-Jan-06		10.175	10.178	0.003	-	1078.948	nm	Bailer checked - 1 mm
	23-Jan-06		10.165	10.425	0.260	-	1078.907	nm	Hand Bailed - 1.1 L.
	30-Jan-06		10.070	10.378	0.308	-	1078.992	nm	Hand Bailed - 700 ml.
	1-Feb-06		10.113	10.217	0.104	-	1078.990	nm	Hand Bailed - 330 ml.
	3-Feb-06		10.195	10.395	0.200	-	1078.889	nm	200 mm product in passive bailer
	3-Feb-06		10.413	10.417	0.004	-	1078.710	nm	hand bailed 400 ml product
	6-Feb-06		10.203	10.409	0.206	-	1078.880	nm	hand bailed 500 ml product
	6-Feb-06		10.405	10.409	0.004	-	1078.718	nm	
	8-Feb-06		10.204	10.407	0.203	-	1078.879	nm	hand bailed 500 ml product
	8-Feb-06		10.307	10.312	0.005	-	1078.816	nm	
	10-Feb-06		10.250	10.311	0.061	-	1078.862	nm	hand bailed 300 ml product
	10-Feb-06		10.346	10.348	0.002	-	1078.778	nm	
	27-Feb-06		10.004	10.873	0.869	-	1078.946	nm	800 ml product in P.B.
	27-Feb-06		10.505	10.514	0.009	-	1078.617	nm	hand bailed 2.1 L product
	2-Mar-06		10.197	10.480	0.283	-	1078.870	nm	hand bailed 1.2 L product
	2-Mar-06		10.451	10.459	0.008	-	1078.671	nm	
	4-Mar-06		10.164	10.169	0.005	-	1078.959	nm	
	6-Mar-06		10.135	10.331	0.196	-	1078.950	nm	hand bailed 300 ml product
	6-Mar-06		10.314	10.319	0.005	-	1078.809	nm	
	8-Mar-06		10.149	10.243	0.094	-	1078.956	nm	hand bailed 200 ml product
	8-Mar-06		10.289	10.298	0.009	-	1078.833	nm	
	10-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	14-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	22-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	24-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	27-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	29-Mar-06		cnm	cnm	cnm	-	cnm	nm	
	30-Mar-06		10.073	10.885	0.812	-	1078.889	nm	Bailer checked - 1L; hand bailed 2.1 L
	31-Mar-06		cnm	cnm	cnm	-	cnm	nm	High volume traffic
	12-Apr-06		10.145	10.542	0.397	-	1078.900	nm	Hand bailed 1.1 L product
	18-Apr-06		cnm	cnm	cnm	cnm	cnm	cnm	Iced
	21-Apr-06		10.162	10.300	0.138	0.030	1078.934	nm	Hand bailed 30 ml
	26-Apr-06		10.170	10.319	0.149	0.350	1078.924	nm	Hand bailed 350 ml

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH209 Continued	28-Apr-06		10.232	10.265	0.033	-	1078.885	nm	
	1-May-06		10.189	10.262	0.073	-	1078.920	nm	
	3-May-06		10.260	10.355	0.095	0.500	1078.845	nm	Hand bailed 500 ml
	9-May-06		10.257	10.400	0.143	0.500	1078.838	nm	
	7-Jun-06		9.250	9.521	0.271	0.350	1079.820	nm	Hand bailed 350 ml
	12-Jun-06		10.309	10.401	0.092	0.300	1078.797	nm	Hand bailed 300 ml
	14-Jun-06		10.236	10.287	0.051	-	1078.878	nm	
	16-Jun-06		10.268	10.315	0.047	-	1078.847	nm	
	20-Jun-06		10.275	10.350	0.075	-	1078.834	nm	
	22-Jun-06		10.303	10.351	0.048	-	1078.811	nm	0 ml product in passive bailer
	23-Jun-06		10.310	10.355	0.045	-	1078.805	nm	
	26-Jun-06		10.274	10.298	0.024	-	1078.845	nm	
	28-Jun-06		10.255	10.293	0.038	-	1078.861	nm	
	4-Jul-06		10.279	10.355	0.076	-	1078.830	nm	
	7-Jul-06		10.287	10.289	0.002	-	1078.837	nm	
	12-Jul-06		9.250	9.334	0.084	-	1079.857	nm	no passive bailer
	19-Jul-06		10.287	10.322	0.035	-	1078.830	nm	
	21-Jul-06		10.309	10.325	0.016	-	1078.812	nm	
	24-Jul-06		10.255	10.318	0.063	0.100	1078.856	nm	recovered 100 ml product
	24-Jul-06		10.262	10.269	0.007	-	1078.861	nm	
	31-Jul-06		10.265	10.297	0.032	-	1078.853	nm	
	3-Aug-06		10.295	10.364	0.069	0.040	1078.815	nm	Hand Bailed 40 ml
	9-Aug-06		10.293	10.360	0.067	0.020	1078.818	nm	Hand bailed 20 ml
	15-Aug-06		10.270	10.321	0.051	0.100	1078.844	nm	Hand bailed 100 ml
	17-Aug-06		10.293	10.295	0.002	-	1078.831	nm	
	18-Aug-06		9.285	9.330	0.045	-	1079.830	nm	
	21-Aug-06		10.267	10.320	0.053	-	1078.846	nm	
	24-Aug-06		10.275	10.310	0.035	0.100	1078.842	nm	Hand Bailed 100 ml
	25-Aug-06		10.301	10.309	0.008	-	1078.821	nm	
	28-Aug-06		10.260	10.289	0.029	-	1078.858	nm	
	30-Aug-06		10.269	10.309	0.040	-	1078.847	nm	
	18-Sep-06		10.275	10.276	0.001	-	1078.849	nm	
	20-Sep-06		10.237	10.267	0.030	0.030	1078.881	nm	before purge - hand bailed 30 ml
	20-Sep-06		10.241	10.242	0.001	-	1078.883	nm	after purge
	22-Sep-06		10.238	10.240	0.002	-	1078.886	nm	

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH209 Continued	25-Sep-06		10.266	10.343	0.077	-	1078.843	nm	
	3-Oct-06		10.305	10.390	0.085	0.100	1078.802	nm	hand bailed 100 ml
	5-Oct-06		10.229	10.241	0.012	-	1078.893	nm	
	4-Dec-06		cnm	cnm	cnm	cnm	cnm	cnm	iced
	17-Apr-07		9.950	10.503	0.553	1.000	1079.063	nm	recovered 700 ml product from P.B.; hand bailed 300 ml
	24-Apr-07		10.265	10.372	0.107	1.000	1078.838	nm	hand bailed 1.0 L
	1-May-07		10.283	10.293	0.010	0.010	1078.839	nm	recovered 10 ml product from passive bailer
	4-May-07		10.260	10.300	0.040	-	1078.856	nm	
	8-May-07		10.279	10.289	0.010	0.010	1078.843	nm	recovered 10 ml product from passive bailer
	10-May-07		10.295	10.300	0.005	-	1078.828	nm	
	29-May-07		10.301	10.365	0.064	-	1078.810	>10,000	Product, not sampled
	8-Jun-07		10.255	10.286	0.031	0.050	1078.863	nm	hand bailed 50 ml
	11-Jun-07		10.239	10.245	0.006	-	1078.884	nm	
	13-Jun-07		10.245	10.326	0.081	0.050	1078.863	nm	recovered 50 ml from PB
	3-Jul-07		10.193	10.300	0.107	-	1078.910	nm	
	5-Jul-07		10.190	10.302	0.112	-	1078.912	nm	
	16-Jul-07		10.128	10.203	0.075	-	1078.981	nm	
	20-Jul-07		10.110	10.207	0.097	-	1078.995	nm	
	26-Jul-07		10.095	10.208	0.113	-	1079.006	nm	
	30-Jul-07		10.092	10.207	0.115	-	1079.009	nm	
	2-Aug-07		10.060	10.225	0.165	-	1079.031	nm	
	7-Aug-07		10.024	10.310	0.286	-	1079.043	nm	
	9-Aug-07		10.575	10.709	0.134	0.400	1078.522	nm	recovered 400 ml product from passive bailer
	24-Aug-07		10.631	10.633	0.002	0.800	1078.493	nm	recovered 800 ml product from passive bailer
	27-Aug-07		10.681	10.684	0.003	0.060	1078.442	nm	recovered 60 ml from PB
	29-Aug-07		10.670	10.672	0.002	0.100	1078.454	nm	recovered 100 ml from PB
	4-Sep-07		10.675	10.677	0.002	0.150	1078.449	nm	recovered 150 ml from PB
	6-Sep-07		10.696	10.698	0.002	0.100	1078.428	nm	recovered 100 ml from PB
	10-Sep-07		10.672	10.675	0.003	0.060	1078.451	nm	recovered 60 ml product from passive bailer
	12-Sep-07		10.553	10.557	0.004	0.100	1078.570	nm	recovered 100 ml product from passive bailer
	14-Sep-07		10.680	10.684	0.004	0.100	1078.443	nm	recovered 100 ml product from passive bailer
	17-Sep-07		10.613	10.616	0.003	-	1078.510	nm	
	19-Sep-07		10.688	10.692	0.004	0.250	1078.435	nm	recovered 250 ml product from passive bailer
	21-Sep-07		10.698	10.701	0.003	0.300	1078.425	nm	recovered 300 ml product from passive bailer
	24-Sep-07		10.655	10.664	0.009	0.300	1078.467	nm	recovered 300 ml from PB

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

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BH209 Continued	26-Sep-07		10.665	10.667	0.002	0.200	1078.459	nm	recovered 200 ml from PB
	28-Sep-07		10.672	10.675	0.003	0.100	1078.451	nm	recovered 100 ml from PB
	1-Oct-07		10.690	10.693	0.003	0.110	1078.433	nm	recovered 110 ml from PB
	3-Oct-07		10.688	10.690	0.002	0.050	1078.436	nm	recovered 50 ml from PB
	9-Oct-07		10.694	10.699	0.005	0.080	1078.429	nm	recovered 80 ml from PB
	12-Oct-07		10.701	10.705	0.004	0.100	1078.422	nm	recovered 100 ml from PB
	16-Oct-07		10.703	10.705	0.002	0.200	1078.421	nm	recovered 200 ml from PB
	20-Oct-07		10.725	10.728	0.003	0.100	1078.398	nm	recovered 100 ml from PB
	29-Oct-07		10.652	10.800	0.148	0.800	1078.442	nm	recovered 800 ml product from passive bailer
	1-Nov-07		10.653	10.660	0.007	0.200	1078.470	nm	recovered 200 ml product from passive bailer
	2-Nov-07		10.655	10.658	0.003	0.100	1078.468	nm	recovered 100 ml product from passive bailer
	5-Nov-07		10.725	10.741	0.016	0.450	1078.396	nm	recovered 450 ml product from passive bailer
	13-Nov-07		10.721	10.727	0.006	0.100	1078.402	nm	recovered 100 ml product from passive bailer
	19-Nov-07		10.729	10.783	0.054	0.600	1078.384	nm	recovered 600 ml product from passive bailer
	23-Nov-07		10.673	10.675	0.002	0.200	1078.451	>10,000	recovered 200 ml product from passive bailer
	26-Nov-07		10.700	10.708	0.008	0.300	1078.422	nm	recovered 300 ml product from passive bailer
	28-Nov-07		10.705	10.706	0.001	0.200	1078.419	nm	recovered 200 ml product from passive bailer
	30-Nov-07		10.714	10.716	0.002	0.080	1078.410	nm	recovered 80 ml product from passive bailer
	3-Dec-07		10.577	10.579	0.002	0.400	1078.547	nm	recovered 400 ml product from passive bailer
	5-Dec-07		10.583	10.586	0.003	0.100	1078.540	nm	recovered 100 ml product from passive bailer
	7-Dec-07		10.587	10.589	0.002	0.020	1078.537	nm	recovered 20 ml product from passive bailer
	10-Dec-07		10.583	10.589	0.006	0.200	1078.540	nm	recovered 200 ml product from passive bailer
	14-Dec-07		10.582	10.585	0.003	0.150	1078.541	nm	recovered 150 ml product from passive bailer
	17-Dec-07		10.584	10.589	0.005	0.200	1078.539	nm	recovered 200 ml product from passive bailer
	19-Dec-07		10.588	10.592	0.004	0.040	1078.535	nm	recovered 40 ml product from passive bailer
	21-Dec-07		10.591	10.593	0.002	0.010	1078.533	nm	recovered 10 ml product from passive bailer
	2-Jan-08		10.582	10.595	0.013	0.800	1078.539	nm	recovered 800 ml product from passive bailer
	4-Jan-08		10.637	10.645	0.008	0.040	1078.485	nm	recovered 40 ml product from passive bailer
	23-Jan-08		10.695	10.743	0.048	0.500	1078.419	nm	recovered 500 ml product from passive bailer
	25-Jan-08		10.700	10.703	0.003	0.040	1078.423	nm	recovered 40 ml product from passive bailer
	7-Feb-08		10.722	10.775	0.053	0.100	1078.391	nm	recovered 100 ml product from passive bailer
	9-Feb-08		10.725	10.797	0.072	0.100	1078.385	nm	recovered 100 ml product from passive bailer
	6-Mar-08		10.708	10.711	0.003	0.800	1078.415	nm	recovered 800 ml product from passive bailer
	7-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	9-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	well frozen

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH209 Continued	11-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	well frozen
	14-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	well frozen
	16-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	well frozen
	28-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	30-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	2-May-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	5-May-08		10.723	10.777	0.054	0.100	1078.390	nm	recovered 100 ml product from passive bailer
	12-May-08		10.753	10.911	0.158	0.100	1078.339	nm	recovered 100 ml product from passive bailer
	14-May-08		10.755	10.915	0.160	0.100	1078.337	nm	recovered 100 ml product from passive bailer
	26-May-08		11.008	11.015	0.007	0.300	1078.115	nm	recovered 300 ml product from passive bailer
	28-May-08		11.002	11.017	0.015	0.100	1078.119	nm	recovered 100 ml product from passive bailer
	30-May-08		11.009	11.014	0.005	0.010	1078.114	nm	recovered 10 ml product from passive bailer
	9-Jun-08		11.045	11.069	0.024	0.100	1078.074	nm	recovered 100 ml product from passive bailer
	11-Jun-08		10.895	10.897	0.002	0.050	1078.229	nm	recovered 50 ml product from passive bailer
	13-Jun-08		10.898	10.899	0.001	0.050	1078.226	nm	recovered 50 ml product from passive bailer
	23-Jun-08		10.869	10.871	0.002	0.200	1078.255	>10,000	well decommissioned on 23 June 2008
BH210	29-Oct-98	1088.860	-	10.286	0.000	-	1078.570	800	
	9-Nov-98		-	10.270	0.000	-	1078.590	1,100	
	22-Apr-99		-	10.445	0.000	-	1078.415	82	
	26-Jul-01		-	10.468	0.000	-	1078.392	8	cap labelled 212
	5-Dec-02	1088.895	cnl	cnl	cnl	-	cnl	cnl	
	12-May-03		cnm	cnm	cnm	-	cnm	1,100	
	7-Oct-03		-	10.525	0.000	-	1078.370	1,100	
	20-Nov-03		-	10.600	0.000	-	1078.295	180	
	17-Dec-03		-	10.614	0.000	-	1078.281	20	
	13-Jan-04		-	10.533	0.000	-	1078.362	15	
	8-Mar-04		-	10.435	0.000	-	1078.460	1,000	iced; no bolts
	6-Apr-04		-	10.468	0.000	-	1078.427	72	well was completely frozen in
	15-Jun-04		-	10.544	0.000	-	1078.351	32	
	14-Jul-04		-	10.549	0.000	-	1078.346	8	
	23-Aug-04		-	10.515	0.000	-	1078.380	34	
	14-Oct-04		-	10.554	0.000	-	1078.341	540	
	2-Feb-05		-	10.576	0.000	-	1078.319	10	
	2-Mar-05		-	10.554	0.000	-	1078.341	1,200	
	2-Jun-05		-	10.630	0.000	-	1078.265	1,000	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

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nm not measured.

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BH701 Continued	23-Aug-07		-	10.317	0.000	-	1079.011	200	
	23-Nov-07		-	10.355	0.000	-	1078.973	660	
	10-Mar-08		-	10.422	0.000	-	1078.906	360	
	4-Jun-08		-	10.472	0.000	-	1078.856	58	
	23-Jun-08		-	10.436	0.000	-	1078.892	56	well decommissioned on 23 June 2008
BH702	7-Oct-03	1089.187	-	10.440	0.000	-	1078.747	3,000	
	20-Nov-03		-	10.694	0.000	-	1078.493	130	
	17-Dec-03		-	10.545	0.000	-	1078.642	400	
	13-Jan-04		-	10.468	0.000	-	1078.719	40	
	11-Mar-04		-	10.436	0.000	-	1078.751	>10,000	iced; bailer stuck
	6-Apr-04		-	10.459	0.000	-	1078.728	76	
	16-Jun-04		-	10.510	0.000	-	1078.677	200	
	14-Jul-04		-	10.495	0.000	-	1078.692	52	
	24-Aug-04		-	10.443	0.000	-	1078.744	500	
	14-Oct-04		-	10.483	0.000	-	1078.704	76	
	2-Feb-05		-	10.516	0.000	-	1078.671	200	
	2-Mar-05		-	10.518	0.000	-	1078.669	1,000	
	5-Oct-05		-	10.395	0.000	-	1078.792	200	
	19-Jan-06		-	10.325	0.000	-	1078.862	700	
	11-May-06		-	10.371	0.000	-	1078.816	100	
	27-Jul-06		-	10.396	0.000	-	1078.791	200	
	23-Nov-07		10.185	10.344	0.159	0.200	1078.970	>10,000	recovered 200 ml product from passive bailer
	23-Nov-07		10.445	10.448	0.003	0.700	1078.741		hand bailed 700 ml product
	25-Jan-07		10.339	10.343	0.004	-	1078.847	300	
	29-May-07		10.415	10.427	0.012	-	1078.770	210	product in well
	23-Aug-07		-	10.197	0.000	-	1078.990	160	
	28-Nov-07		10.289	10.295	0.006	-	1078.897	nm	
	30-Nov-07		10.293	10.297	0.004	0.040	1078.893	nm	recovered 40 ml product from passive bailer
	3-Dec-07		10.592	10.597	0.005	0.080	1078.594	nm	recovered 80 ml product from passive bailer
	5-Dec-07		10.598	10.601	0.003	0.030	1078.588	nm	recovered 30 ml product from passive bailer
	7-Dec-07		10.602	10.604	0.002	0.010	1078.585	nm	recovered 10 ml product from passive bailer
	10-Dec-07		10.607	10.610	0.003	0.100	1078.579	nm	recovered 100 ml product from passive bailer
	14-Dec-07		10.609	10.611	0.002	0.040	1078.578	nm	recovered 40 ml product from passive bailer
	17-Dec-07		10.608	10.610	0.002	0.100	1078.579	nm	recovered 100 ml product from passive bailer
	19-Dec-07		10.612	10.614	0.002	0.030	1078.575	nm	recovered 30 ml product from passive bailer

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

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BH702 Continued	21-Dec-07		10.615	10.617	0.002	0.020	1078.572	nm	recovered 20 ml product from passive bailer
	2-Jan-08		10.605	10.608	0.003	0.050	1078.581	nm	recovered 50 ml product from passive bailer
	4-Jan-08		10.665	10.705	0.040	0.010	1078.514	nm	recovered 10 ml product from passive bailer
	23-Jan-08		10.710	10.719	0.009	0.030	1078.475	nm	recovered 30 ml product from passive bailer
	25-Jan-08		10.710	10.712	0.002	0.020	1078.477	nm	recovered 20 ml product from passive bailer
	7-Feb-08		10.783	10.795	0.012	0.050	1078.402	nm	recovered 50 ml product from passive bailer
	9-Feb-08		10.785	10.799	0.014	0.030	1078.399	nm	recovered 30 ml product from passive bailer
	6-Mar-08		10.562	10.617	0.055	-	1078.614	nm	
	7-Apr-08		10.645	10.679	0.034	0.020	1078.535	nm	recovered 20 ml product from passive bailer
	9-Apr-08		10.649	10.678	0.029	0.010	1078.532	nm	recovered 10 ml product from passive bailer
	11-Apr-08		10.643	10.650	0.007	0.010	1078.543	nm	recovered 10 ml product from passive bailer
	14-Apr-08		10.701	10.706	0.005	0.030	1078.485	nm	recovered 30 ml product from passive bailer
	16-Apr-08		10.740	10.744	0.004	0.020	1078.446	nm	recovered 20 ml product from passive bailer
	28-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	30-Apr-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	2-May-08		cnm	cnm	cnm	cnm	cnm	cnm	car parked over well
	5-May-08		10.780	10.791	0.011	0.100	1078.405	nm	recovered 100 ml product from passive bailer
	12-May-08		10.910	10.914	0.004	0.200	1078.276	nm	recovered 200 ml product from passive bailer
	14-May-08		10.913	10.915	0.002	0.150	1078.274	nm	recovered 150 ml product from passive bailer
	26-May-08		10.901	10.910	0.009	0.050	1078.284	nm	recovered 50 ml product from passive bailer
	28-May-08		10.905	10.909	0.004	0.010	1078.281	nm	recovered 10 ml product from passive bailer
	30-May-08		10.908	10.910	0.002	0.010	1078.279	nm	recovered 10 ml product from passive bailer
	9-Jun-08		10.980	10.983	0.003	0.020	1078.206	nm	recovered 20 ml product from passive bailer
	11-Jun-08		10.971	10.973	0.002	0.010	1078.216	nm	recovered 10 ml product from passive bailer
	13-Jun-08		10.975	10.979	0.004	0.010	1078.211	nm	recovered 10 ml product from passive bailer
	23-Jun-08		10.949	10.950	0.001	-	1078.238	>10,000	well decommissioned on 24 June 2008
BH703	7-Oct-03	1090.172	-	11.395	0.000	-	1078.777	60	
	20-Nov-03		-	11.446	0.000	-	1078.726	175	
	17-Dec-03		-	11.459	0.000	-	1078.713	120	
	13-Jan-04		-	11.405	0.000	-	1078.767	40	
	11-Mar-04		-	11.358	0.000	-	1078.814	220	
	5-Apr-04		-	11.333	0.000	-	1078.839	70	
	16-Jun-04		-	11.405	0.000	-	1078.767	200	
	13-Jul-04		-	11.351	0.000	-	1078.821	54	
	23-Aug-04		-	11.320	0.000	-	1078.852	54	

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

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BH704 Continued	21-Aug-07		-	12.142	0.000	-	1080.226	60	
	22-Nov-07		-	12.039	0.000	-	1080.329	62	
	13-Mar-08		-	11.198	0.000	-	1081.170	210	
	3-Jun-08		-	11.059	0.000	-	1081.309	52	
	26-Jun-08		-	10.791	0.000	-	1081.577	52	well decommissioned on 26 June 2008
BH705	7-Oct-03	1089.614	-	11.046	0.000	-	1078.568	>10,000	
	20-Nov-03		10.985	10.987	trace	-	1078.629	1,200	
	17-Dec-03		10.99	11.615	0.625	-	1078.499	5,000	Bailed 800 mm with disposable bailer ~ 0.75L
	19-Dec-03		nm	nm	nm	-	nm	nm	Bailer check- 100 mm in bailer
	13-Jan-04		11.010	cnm	cnm	-	cnm	8,000	Depth to water not established due to probe malfunction
	9-Feb-04		nm	nm	nm	-	nm	nm	recovered 1.3 L product by hand bailing
	23-Feb-04		10.940	11.410	0.470	-	1078.580	nm	before installation of P.B.
	23-Feb-04		11.175	11.580	0.405	-	1078.358	nm	recovered 300 ml 5 minutes after installation of P.B.
	23-Feb-04		-	11.233	0.000	-	1078.381	nm	recovered 400 ml 15 minutes after installation of P.B.
	26-Feb-04		-	11.254	0.000	-	1078.360	nm	recovered 800 ml product from P.B.
	26-Feb-04		-	11.469	0.000	-	1078.145	nm	70 minutes later recovered 400 ml product from P.B.
	3-Mar-04		-	11.407	0.000	-	1078.207	nm	recovered 800 ml product from P.B.
	3-Mar-04		-	11.423	0.000	-	1078.191	nm	recovered 150 ml after hand bailing
	31-Mar-04		11.575	11.609	0.034	-	1078.032	nm	recovered 300 ml from P.B.; not enough to H.B.
	12-Apr-04		11.485	11.494	0.009	-	1078.127	nm	recovered 300 ml from passive bailer (before H.B.)
	12-Apr-04		-	11.505	0.000	-	1078.109	nm	recovered 100 ml product after hand bailing
	13-Apr-04		11.514	11.530	0.016	-	1078.097	nm	recovered 300 ml product from P.B.; not enough to H.B.
	15-Apr-04		-	11.490	0.000	-	1078.124	nm	recovered 250 ml from P.B.
	16-Apr-04		-	11.475	0.000	-	1078.139	nm	recovered 250 ml from P.B.
	19-Apr-04		11.515	11.529	0.014	-	1078.096	nm	recovered 300 ml from P.B.; not enough to H.B.
	22-Apr-04		-	11.565	0.000	-	1078.049	nm	recovered 400 ml product from P.B.
	30-Apr-04		-	11.555	0.000	-	1078.059	nm	no product in P.B.; H.B.- no product
	6-May-04		-	11.639	0.000	-	1077.975	nm	recovered 300 ml from passive bailer
	7-May-04		-	11.614	0.000	-	1078.000	nm	recovered 100 ml from passive bailer
	10-May-04		-	11.638	0.000	-	1077.976	nm	recovered 300 ml from passive bailer
	17-May-04		-	11.656	0.000	-	1077.958	nm	recovered 350 ml from passive bailer
	20-May-04		-	11.635	0.000	-	1077.979	nm	recovered 350 ml from passive bailer
	28-May-04		11.637	11.667	0.030	-	1077.971	nm	recovered 400 ml from passive bailer
	15-Jun-04		11.460	11.429	0.031	-	1078.210	1,000	800 ml recovered
	15-Jun-04		-	11.545	0.000	-	1078.069	-	hand bailed - 1.5 L recovered

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

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BH705 Continued	14-Jul-04		cnm	11.505	cnm	-	cnm	3,400	1.6 L recovered before hand bailing.
	14-Jul-04		cnm	11.055	cnm	-	cnm	3,400	0.4 L recovered by hand bailing
	28-Jul-04		11.470	11.859	0.389	-	1078.066	nm	800 ml recovered - before hand bailing
	28-Jul-04		11.645	11.649	0.004	-	1077.968	nm	800 ml recovered by hand bailing
	6-Aug-04		11.640	11.700	0.060	-	1077.962	nm	400 ml recovered
	10-Aug-04		11.726	11.785	0.059	-	1077.876	nm	400 ml recovered
	11-Aug-04		11.675	11.680	0.005	-	1077.938	nm	400 ml recovered
	13-Aug-04		-	11.695	0.000	-	1077.919	nm	300 ml recovered
	18-Aug-04		11.695	11.725	0.030	-	1077.913	nm	350 ml recovered
	24-Aug-04		11.443	11.565	0.122	-	1078.147	>10,000	400ml product in PB. HB 100ml.
	7-Sep-04		-	11.462	0.000	-	1078.152	nm	800 ml recovered
	9-Sep-04		-	11.605	0.000	-	1078.009	nm	hand bailer had 2 ml product
	13-Sep-04		-	11.605	0.000	-	1078.009	nm	500 ml recovered
	15-Sep-04		-	11.626	0.000	-	1077.988	nm	200 ml recovered
	17-Sep-04		-	11.625	0.000	-	1077.989	nm	200 ml recovered
	20-Sep-04		-	11.609	0.000	-	1078.005	nm	350 ml recovered
	22-Sep-04		-	11.615	0.000	-	1077.999	nm	150 ml recovered
	24-Sep-04		-	11.639	0.000	-	1077.975	nm	150 ml recovered
	29-Sep-04		-	11.627	0.000	-	1077.987	nm	425 ml product recovered from passive bailer
	4-Oct-04		-	11.640	0.000	-	1077.974	nm	450 ml product recovered from passive bailer
	6-Oct-04		-	11.620	0.000	-	1077.994	nm	150 ml product recovered fro P.B.
	12-Oct-04		-	11.613	0.000	-	1078.001	nm	650 ml product recovered from P.B.
	15-Oct-04		-	11.595	0.000	-	1078.019	nm	300 ml product recovered from passive bailer
	5-Nov-04		11.486	11.802	0.316	-	1078.065	nm	800 ml recovered from passive bailer
	5-Nov-04		11.670	11.685	0.015	-	1077.941	nm	hand bailed following removal of PB; recovered 700 ml
	8-Nov-04		-	11.603	0.000	-	1078.011	nm	recovered 600 ml
	10-Nov-04		-	11.653	0.000	-	1077.961	nm	recovered 100 ml
	17-Nov-04		-	11.612	0.000	-	1078.002	nm	recovered 750 ml
	25-Nov-04		-	11.615	0.000	-	1077.999	nm	recovered 650 ml
	29-Nov-04		-	11.625	0.000	-	1077.989	nm	recovered 350 ml
	1-Dec-04		-	11.636	0.000	-	1077.978	nm	recovered 150 ml product from P.B.
	17-Jan-05		11.519	11.519	trace	-	1078.095	nm	recovered 200 ml product from P.B.
	17-Jan-05		-	11.510	0.000	-	1078.104	nm	recovered 300 ml product by H.B.
	24-Jan-05		11.519	11.650	0.131	-	1078.069	nm	recovered 800 ml product from P.B. - before H.B.
	24-Jan-05		11.455	11.500	0.045	-	1078.150	nm	recovered 600 ml product by H.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH705 Continued	26-Jan-05		11.583	11.583	trace	-	1078.031	nm	recovered 300 ml product from P.B.
	28-Jan-05		11.615	11.615	trace	-	1077.999	nm	recovered 200 ml product from P.B.
	2-Feb-05		11.598	11.598	trace	-	1078.016	>10,000	recovered 300 ml product from P.B.
	18-Feb-05		11.570	11.594	0.024	-	1078.039	nm	recovered 800 ml product from P.B.
	22-Feb-05		11.609	11.612	0.003	-	1078.004	nm	recovered 350 ml product from P.B.
	24-Feb-05		11.573	11.573	0.002	-	1078.043	nm	100 ml from P.B.; bailer checked - no product; sheen present.
	2-Mar-05		11.508	11.509	0.001	-	1078.106	>10,000	recovered 500 ml product from passive bailer
	22-Mar-05		11.605	11.660	0.055	-	1077.998	nm	recovered 800 ml product from passive bailer
	24-Mar-05		11.619	11.635	0.016	-	1077.992	nm	recovered 200 ml product from P.B.; 7 mm in H.B.
	28-Mar-05		11.565	11.566	0.001	-	1078.049	nm	recovered 350 ml product from P.B.
	30-Mar-05		11.618	11.620	0.002	-	1077.996	nm	recovered 100 ml product from P.B.
	1-Apr-05		11.615	11.616	0.001	-	1077.999	nm	recovered 50 ml product from P.B.
	5-Apr-05		11.635	11.636	0.001	-	1077.979	nm	recovered 300 ml product from P.B.
	11-Apr-05		11.615	11.616	0.001	-	1077.999	nm	recovered 200 ml product from P.B.
	15-Apr-05		-	11.637	0.000	-	1077.977	nm	recovered 250 ml product from P.B.
	18-Apr-05		11.633	11.634	0.001	-	1077.981	nm	recovered 150 ml product from P.B.
	20-Apr-05		11.644	11.645	0.001	-	1077.970	nm	recovered 10 ml product from P.B.
	22-Apr-05		11.640	11.641	0.001	-	1077.974	nm	recovered 40 ml product from P.B.
	25-Apr-05		11.635	11.636	0.001	-	1077.979	nm	recovered 200 ml product from P.B.
	27-Apr-05		11.651	11.653	0.002	-	1077.963	nm	recovered 10 ml product from P.B.
	4-May-05		11.686	11.687	0.001	-	1077.928	nm	recovered 250 ml product from P.B.
	6-May-05		11.508	11.509	0.001	-	1078.106	nm	recovered 100 ml product from P.B.
	9-May-05		11.615	11.635	0.020	-	1077.995	nm	recovered 10 ml product from P.B.
	13-May-05		-	11.615	0.000	-	1077.999	nm	recovered 170 ml product from P.B.
	16-May-05		-	11.605	0.000	-	1078.009	nm	recovered 100 ml product from P.B.
	26-May-05		-	11.665	0.000	-	1077.949	nm	recovered 300 ml product from P.B.
	2-Jun-05		11.633	11.634	0.001	-	1077.981	20	recovered 300 ml product from P.B.
	10-Jun-05		11.665	11.666	0.001	-	1077.949	nm	recovered 300 ml product from P.B.
	15-Jun-05		11.645	11.645	trace	-	1077.969	nm	recovered 150 ml product from P.B.
	17-Jun-05		11.834	11.842	0.008	-	1077.778	nm	recovered 50 ml product from P.B.
	20-Jun-05		11.653	11.658	0.005	-	1077.960	nm	recovered 120 ml product from P.B.
	22-Jun-05		11.615	11.615	trace	-	1077.999	nm	recovered 50 ml product from P.B.
	24-Jun-05		-	11.605	0.000	-	1078.009	nm	recovered 50 ml product from P.B.; hand bailer -no LPH
	27-Jun-05		11.617	11.617	trace	-	1077.997	nm	recovered 100 ml product from P.B.
	29-Jun-05		11.615	11.615	trace	-	1077.999	nm	recovered 100 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

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BH705 Continued	6-Jul-05		11.500	11.500	trace	-	1078.114	nm	recovered 300 ml product from P.B.
	11-Jul-05		11.605	11.605	trace	-	1078.009	nm	recovered 300 ml product from P.B.
	20-Jul-05		11.575	11.577	0.002	-	1078.039	nm	recovered 500 ml product from P.B.
	22-Jul-05		11.567	11.568	0.001	-	1078.047	nm	recovered 100 ml product from P.B.
	28-Jul-05		11.518	11.519	0.001	-	1078.096	nm	recovered 360 ml product from P.B.
	9-Aug-05		11.569	11.569	trace	-	1078.045	nm	recovered 1L product from P.B.
	10-Aug-05		11.604	11.605	0.001	-	1078.010	nm	recovered 100 ml product from P.B.
	12-Aug-05		11.578	11.579	0.001	-	1078.036	nm	recovered 100 ml product from P.B.
	17-Aug-05		11.548	11.549	0.001	-	1078.066	nm	recovered 130 ml product from P.B.
	17-Aug-05		11.546	11.547	0.001	-	1078.068	nm	recovered 200 ml product from P.B.
	24-Aug-05		11.565	11.567	0.002	-	1078.049	nm	recovered 510 ml product from P.B.
	31-Aug-05		11.532	11.534	0.002	-	1078.082	nm	recovered 520 ml product from P.B.
	6-Sep-05		11.488	11.489	0.001	-	1078.126	nm	recovered 470 ml product from P.B.
	12-Sep-05		11.520	11.522	0.002	-	1078.094	nm	recovered 500 ml product from P.B.
	14-Sep-05		11.497	11.499	0.002	-	1078.117	nm	recovered 200 ml product from P.B.
	16-Sep-05		11.503	11.506	0.003	-	1078.110	nm	recovered 200 ml product from P.B.
	19-Sep-05		11.456	11.457	0.001	-	1078.158	nm	recovered 300 ml product from P.B.
	21-Sep-05		11.506	11.507	0.001	-	1078.108	nm	recovered 200 ml product from P.B.
	26-Sep-05		11.441	11.442	0.001	-	1078.173	nm	recovered 600 ml product from P.B.
	28-Sep-05		11.483	11.485	0.002	-	1078.131	nm	recovered 220 ml product from P.B.
	5-Oct-05		11.482	11.484	0.002	-	1078.132	nm	recovered 800 ml product from P.B.
	18-Oct-05		11.427	11.435	0.008	-	1078.185	nm	recovered 800 ml product from P.B.
	24-Oct-05		11.302	11.312	0.010	-	1078.310	nm	recovered 800 ml product from P.B.
	1-Nov-05		11.312	11.334	0.022	-	1078.298	nm	recovered 800 ml product from P.B.
	3-Nov-05		11.308	11.310	0.002	-	1078.306	nm	recovered 800 ml product from P.B.
	8-Nov-05		11.326	11.329	0.003	-	1078.287	nm	recovered 600 ml product from P.B.
	10-Nov-05		11.265	11.269	0.004	-	1078.348	nm	recovered 250 ml product from P.B.
	14-Nov-05		11.385	11.387	0.002	-	1078.229	nm	recovered 350 ml product from P.B.
	28-Nov-05		11.268	11.279	0.011	-	1078.344	nm	recovered 800 ml product from P.B.
	30-Nov-05		11.293	11.294	0.001	-	1078.321	nm	recovered 750 ml product form P.B.
	6-Dec-05		11.319	11.321	0.002	-	1078.295	nm	recovered 800 ml product from P.B.
	12-Dec-05		11.304	11.308	0.004	-	1078.309	nm	PB-Recovered 800 ml.
	14-Dec-05		11.364	11.366	0.002	-	1078.250	nm	PB-Recovered 350 ml.
	16-Dec-05		11.348	11.350	0.002	-	1078.266	nm	PB-Recovered 250 ml.
	19-Dec-05		11.301	11.303	0.002	-	1078.313	nm	PB-Recovered 320 ml.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH705 Continued	22-Dec-05		11.243	11.245	0.002	-	1078.371	nm	PB-Recovered 350 ml.
	23-Dec-05		11.329	11.331	0.002	-	1078.285	nm	PB-Recovered 100 ml.
	3-Jan-06		11.233	11.245	0.012	-	1078.379	nm	PB-Recovered 800 ml.
	5-Jan-06		11.375	11.379	0.004	-	1078.238	nm	PB-Recovered 400 ml.
	6-Jan-06		11.363	11.365	0.002	-	1078.251	nm	PB-Recovered 200 ml.
	9-Jan-06		11.304	11.306	0.002	-	1078.310	nm	PB-Recovered 400 ml.
	12-Jan-06		11.375	11.378	0.003	-	1078.238	nm	PB-Recovered 300 ml.
	13-Jan-06		11.286	11.289	0.003	-	1078.327	nm	PB-Recovered 200 ml.
	16-Jan-06		11.360	11.362	0.002	-	1078.254	nm	PB-Recovered 250 ml.
	20-Jan-06		11.387	11.389	0.002	-	1078.227	nm	PB-Recovered 300 ml.
	23-Jan-06		11.180	11.181	0.001	-	1078.434	nm	PB-Recovered 100 ml.
	30-Jan-06		11.254	11.256	0.002	-	1078.360	nm	PB-Recovered 500 ml.
	1-Feb-06		11.293	11.295	0.002	-	1078.321	nm	PB-Recovered 100 ml.
	3-Feb-06		11.307	11.308	0.001	-	1078.307	nm	10 ml product from P.B.; bailer check yielded 1 mm product
	6-Feb-06		11.168	11.169	0.001	-	1078.446	nm	recovered 200 ml product from P.B.
	8-Feb-06		11.214	11.219	0.005	-	1078.399	nm	recovered 20 ml product from P.B.
	10-Feb-06		11.107	11.111	0.004	-	1078.506	nm	recovered 10 ml product from P.B.
	27-Feb-06		11.186	11.217	0.031	-	1078.422	nm	recovered 500 ml product from P.B.
	2-Mar-06		11.403	11.407	0.004	-	1078.210	nm	recovered 400 ml product from P.B.
	4-Mar-06		11.140	11.171	0.031	-	1078.468	nm	No product recovered; reset
	6-Mar-06		11.326	11.327	0.001	-	1078.288	nm	recovered 200 ml product from P.B.
	8-Mar-06		11.265	11.268	0.003	-	1078.348	nm	recovered 100 ml product from P.B.
	10-Mar-06		11.115	11.124	0.009	-	1078.497	nm	recovered 10 ml product from P.B.
	14-Mar-06		11.065	11.089	0.024	-	1078.544	nm	
	22-Mar-06		11.223	11.300	0.077	-	1078.376	nm	recovered 10 ml product from P.B.
	24-Mar-06		11.215	11.216	0.001	-	1078.399	nm	recovered 10 ml product from P.B.
	27-Mar-06		11.176	11.197	0.021	-	1078.434	nm	recovered 10 ml product from P.B.
	29-Mar-06		11.161	11.163	0.002	-	1078.453	nm	No product recovered; reset
	31-Mar-06		11.040	11.062	0.022	-	1078.570	nm	recovered 50 ml product from P.B.
	7-Apr-06		11.215	11.332	0.117	-	1078.376	nm	No product recovered; reset
	12-Apr-06		11.225	11.227	0.002	-	1078.389	nm	recovered 150 ml product from P.B.
	17-Apr-06		11.182	11.199	0.017	0.400	1078.429	nm	recovered 400 ml product from P.B.
	18-Apr-06		11.304	11.307	0.003	0.010	1078.309	nm	recovered 10 ml product from P.B.
	21-Apr-06		11.267	11.268	0.001	0.010	1078.347	nm	recovered 10 ml product from P.B.
	26-Apr-06		11.217	11.311	0.094	0.100	1078.378	nm	recovered 100 ml product from P.B. Reset PB

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH705 Continued	28-Apr-06		11.029	11.034	0.005	0.400	1078.584	nm	recovered 400 ml product from P.B.
	1-May-06		10.923	10.952	0.029	-	1078.685	nm	recovered 0 ml product from P.B.
	3-May-06		11.323	11.329	0.006	0.010	1078.290	nm	recovered 10 ml product from P.B.
	9-May-06		11.284	11.303	0.019	0.150	1078.326	nm	recovered 150 ml product from P.B.
	7-Jun-06		11.421	11.428	0.007	0.600	1078.192	nm	recovered 600 ml product from P.B.
	12-Jun-06		11.433	11.500	0.067	0.200	1078.168	nm	recovered 200 ml product from P.B.
	14-Jun-06		11.398	11.404	0.006	0.050	1078.215	nm	recovered 50 ml product from P.B.
	16-Jun-06		11.437	11.439	0.002	0.750	1078.177	nm	recovered 750 ml product from P.B.
	20-Jun-06		11.382	11.384	0.002	0.150	1078.232	nm	recovered 150 ml product from P.B.
	22-Jun-06		11.392	11.398	0.006	0.010	1078.221	nm	recovered 10 ml product from P.B.
	23-Jun-06		11.449	11.452	0.003	0.020	1078.164	nm	recovered 20 ml product from P.B.
	26-Jun-06		11.377	11.378	0.001	0.050	1078.237	nm	recovered 50 ml product from P.B.
	28-Jun-06		11.351	11.353	0.002	0.050	1078.263	nm	recovered 50 ml product from P.B.
	4-Jul-06		11.389	11.390	0.001	0.100	1078.225	nm	recovered 100 ml product from P.B.
	7-Jul-06		11.382	11.386	0.004	0.075	1078.231	nm	recovered 75 ml product from P.B.
	12-Jul-06		11.256	11.265	0.009	0.200	1078.356	nm	recovered 200 ml product from P.B.
	19-Jul-06		11.355	11.357	0.002	0.200	1078.259	nm	recovered 200 ml product from P.B.
	21-Jul-06		11.365	11.367	0.002	0.050	1078.249	nm	recovered 50 ml product from P.B.
	24-Jul-06		11.241	11.249	0.008	0.100	1078.371	nm	recovered 100 ml product from P.B.
	18-Sep-06		11.372	11.374	0.002	0.400	1078.242	nm	recovered 400 ml product from P.B.
	20-Sep-06		11.386	11.387	0.001	0.030	1078.228	nm	recovered 30 ml product from P.B.
	22-Sep-06		11.388	11.389	0.001	0.050	1078.226	nm	recovered 50 ml product from P.B.
	25-Sep-06		11.403	11.404	0.001	0.100	1078.211	nm	recovered 100 ml product from P.B.
	3-Oct-06		11.404	11.406	0.002	0.300	1078.210	nm	recovered 300 ml product from P.B.
	5-Oct-06		11.329	11.331	0.002	0.100	1078.285	nm	recovered 100 ml product from P.B.
	4-Dec-06		11.312	11.314	0.002	0.600	1078.302	nm	recovered 600 ml product from P.B.
	12-Mar-07		cnm	cnm	cnm	cnm	cnm	cnm	passive bailer stuck in well
	15-Mar-07		10.844	10.846	0.002	0.000	1078.770	nm	passive bailer stuck in well
	17-Apr-07		10.883	10.892	0.009	0.000	1078.729	nm	passive bailer stuck in well
	24-Apr-07		cnm	cnm	cnm	cnm	cnm	cnm	passive bailer stuck in well
	23-Nov-07		cnm	cnm	cnm	cnm	cnm	nm	Blocked at 9.580 m below top of pipe
	19-Jan-07		11.389	11.391	0.002	0.500	1078.225	nm	recovered 500 ml product from passive bailer
	22-Jan-07		11.345	11.346	0.001	0.050	1078.269	nm	recovered 50 ml product from passive bailer
	27-Jun-08		cnm	cnm	cnm	cnm	cnm	>10,000	Well decommissioned on 27 June 2008
BH706	7-Oct-03	1089.518	-	11.223	0.000	-	1078.295	>10,000	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH706 Continued	20-Nov-03		11.206	11.208	0.002	-	1078.312	2,900	
	17-Dec-03		-	11.192	trace	-	1078.326	>10,000	Bailed 5 mm with disposable bailer
	13-Jan-04		-	11.189	0.000	-	1078.329	800	
	8-Mar-04		-	11.198	0.000	-	1078.320	120	checked bailer - trace product (1-2 mm)
	6-Apr-04		-	11.150	0.000	-	1078.368	>10,000	
	15-Jun-04		-	11.170	0.000	-	1078.348	2,000	bailer checked, 10 ml product
	14-Jul-04		-	11.165	0.000	-	1078.353	>10,000	bailer checked; 1 mm of product
	24-Aug-04		-	11.143	0.000	-	1078.375	>10,000	Bailer check showed 3mm product
	13-Oct-04		-	11.192	0.000	-	1078.326	>10,000	bailer checked, 7 ml product
	1-Feb-05		11.239	11.239	trace	-	1078.279	700	
	2-Mar-05		-	11.207	0.000	-	1078.311	>10,000	checked bailer - 10 mm of product
	27-Apr-05		-	11.285	0.000	-	1078.233	nm	
	1-Jun-05		-	11.244	trace	-	1078.274	5,000	checked bailer - 15 mm product
	24-Jun-05		11.225	11.259	0.034	-	1078.286	nm	installed PB from BH509; recovered 25 ml product from P.B.
	27-Jun-05	1088.878	11.255	11.260	0.005	-	1077.622	nm	checked bailer - no visible product
	29-Jun-05		11.619	11.621	0.002	-	1077.259	nm	recovered 5 ml product from passive bailer
	5-Oct-05		11.076	11.105	0.029	-	1077.796	>10,000	bailer checked, 35 mm product
	19-Jan-06		10.840	11.004	0.164	-	1078.005	1,000	
	20-Jan-06		10.827	11.833	1.006	-	1077.850	nm	PB-Recovered 800 ml. Hand bailed 1.4 L
	23-Jan-06		11.240	11.351	0.111	-	1077.616	nm	PB-Recovered 900 ml.
	30-Jan-06		11.076	11.265	0.189	-	1077.764	nm	PB-Recovered 330 ml. Hand bailed 600 ml
	1-Feb-06		11.145	11.303	0.158	-	1077.701	nm	PB-Recovered 220 ml. Hand bailed 250 ml
	3-Feb-06		11.290	11.500	0.210	-	1077.546	nm	0 ml product in P.B.; bailer check yielded 150 mm
	3-Feb-06		11.299	11.335	0.036	-	1077.572	nm	recovered 200 ml product from P.B.
	6-Feb-06		11.255	11.283	0.028	-	1077.617	nm	recovered 10 ml product from P.B.; reset bailer
	8-Feb-06		11.225	11.301	0.076	-	1077.638	nm	recovered 50 ml product from P.B.
	10-Feb-06		11.345	11.475	0.130	-	1077.507	nm	recovered 100 ml product from P.B.
	27-Feb-06		11.347	11.368	0.021	-	1077.527	nm	recovered 800 ml product from P.B.
	2-Mar-06		11.485	11.488	0.003	-	1077.392	nm	recovered 250 ml product from P.B.
	4-Mar-06		11.355	11.382	0.027	-	1077.518	nm	
	6-Mar-06		11.467	11.468	0.001	-	1077.411	nm	recovered 150 ml product from P.B.
	8-Mar-06		11.452	11.454	0.002	-	1077.426	nm	recovered 100 ml product from P.B.
	10-Mar-06		11.472	11.474	0.002	-	1077.406	nm	recovered 150 ml product from P.B.
	14-Mar-06		11.447	11.448	0.001	-	1077.431	nm	recovered 100 ml product from P.B.
	22-Mar-06		11.464	11.475	0.011	-	1077.412	nm	recovered 250 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

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BH706 Continued	24-Mar-06		11.465	11.467	0.002	-	1077.413	nm	recovered 300 ml product from P.B.
	27-Mar-06		11.486	11.487	0.001	-	1077.392	nm	recovered 300 ml product from P.B.
	29-Mar-06		11.405	11.417	0.012	-	1077.471	nm	recovered 10 ml product from P.B.
	31-Mar-06		11.394	11.439	0.045	-	1077.475	nm	recovered 10 ml product from P.B.
	7-Apr-06		11.369	11.385	0.016	-	1077.506	nm	recovered 100 ml product from P.B.
	12-Apr-06		11.365	11.500	0.135	-	1077.486	nm	recovered 50 ml product from P.B.
	17-Apr-06		11.455	11.478	0.023	0.600	1077.418	nm	recovered 600 ml product from P.B.
	18-Apr-06		11.386	11.392	0.006	0.010	1077.491	nm	recovered 10 ml product from P.B.
	21-Apr-06		11.433	11.439	0.006	0.250	1077.444	nm	recovered 250 ml product from P.B.
	26-Apr-06		11.356	11.365	0.009	0.300	1077.520	nm	recovered 300 ml product from P.B.
	28-Apr-06		11.130	11.133	0.003	-	1077.747	nm	
	1-May-06		11.167	11.184	0.017	-	1077.708	nm	
	3-May-06		11.476	11.481	0.005	0.020	1077.401	nm	recovered 20 ml product from P.B.
	9-May-06		11.415	11.434	0.019	0.300	1077.459	nm	recovered 300 ml product from P.B.
	7-Jun-06		11.364	11.455	0.091	0.350	1077.496	nm	recovered 350 ml product from P.B.
	12-Jun-06		11.385	11.550	0.165	0.100	1077.460	nm	recovered 100 ml product from P.B.
	14-Jun-06		11.332	11.348	0.016	0.600	1077.543	nm	recovered 600 ml product from P.B.
	16-Jun-06		11.575	11.577	0.002	0.050	1077.303	nm	recovered 50 ml product from P.B.
	20-Jun-06		11.556	11.557	0.001	0.020	1077.322	nm	recovered 20 ml product from P.B.
	22-Jun-06		11.503	11.504	0.001	0.050	1077.375	nm	recovered 50 ml product from P.B.
	23-Jun-06		-	11.372	0.000	-	1077.506	nm	
	26-Jun-06		11.584	11.585	0.001	0.010	1077.294	nm	recovered 10 ml product from P.B.
	28-Jun-06		11.516	11.518	0.002	0.200	1077.362	nm	recovered 200 ml product from P.B.
	4-Jul-06		11.375	11.376	0.001	0.010	1077.503	nm	recovered 10 ml product from P.B.
	7-Jul-06		11.523	11.527	0.004	0.150	1077.354	nm	recovered 150 ml product from P.B.
	12-Jul-06		11.321	11.326	0.005	-	1077.556	nm	
	19-Jul-06		11.533	11.535	0.002	0.100	1077.345	nm	recovered 100 ml product from P.B.
	21-Jul-06		11.531	11.532	0.001	0.010	1077.347	nm	recovered 10 ml product from P.B.
	24-Jul-06		11.237	11.239	0.002	0.200	1077.641	nm	recovered 200 ml product from P.B.
	31-Jul-06		11.490	11.491	0.001	0.050	1077.388	nm	Hand bailed 50 ml of product
	3-Aug-06		11.515	11.516	0.001	0.100	1077.363	nm	Hand Bailed 100 ml of product
	9-Aug-06		11.525	11.527	0.002	0.020	1077.353	nm	Hand Bailed 20 ml of product
	15-Aug-06		11.545	11.546	0.001	0.050	1077.333	nm	Hand Bailed 50 ml of product
	17-Aug-06		11.530	11.531	0.001	0.010	1077.348	nm	Hand Bailed 10 ml of product
	18-Aug-06		11.553	11.554	0.001	0.050	1077.325	nm	Hand Bailed 50 ml of product

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trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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BH706 Continued	21-Aug-06		11.550	11.552	0.002	0.020	1077.328	nm	Hand Bailed 20ml of product
	24-Aug-06		11.560	11.562	0.002	0.010	1077.318	nm	Hand Bailed 10 ml of product
	25-Aug-06		11.493	11.495	0.002	0.050	1077.385	nm	Hand bailed 50 ml of product
	28-Aug-06		11.517	11.519	0.002	0.100	1077.361	nm	Hand Bailed 100 ml of product
	30-Aug-06		11.531	11.532	0.001	0.010	1077.347	nm	Hand Bailed 10 ml of product
	18-Sep-06		11.627	11.628	0.001	0.200	1077.251	nm	recovered 200 ml product from P.B.
	20-Sep-06		11.575	11.577	0.002	0.020	1077.303	nm	recovered 20 ml product from P.B.
	22-Sep-06		11.573	11.575	0.002	0.050	1077.305	nm	recovered 50 ml product from P.B.
	25-Sep-06		11.574	11.575	0.001	0.010	1077.304	nm	recovered 10 ml product from P.B.
	3-Oct-06		11.554	11.556	0.002	0.200	1077.324	nm	recovered 200 ml product from P.B.
	5-Oct-06		11.535	11.537	0.002	0.050	1077.343	nm	recovered 50 ml product from P.B.
	4-Dec-06		11.485	11.489	0.004	0.600	1077.392	nm	recovered 600 ml product from P.B.
	19-Jan-07		11.673	11.674	0.001	0.030	1077.205	nm	recovered 30 ml product from passive bailer
	22-Jan-07		11.617	11.619	0.002	0.010	1077.261	nm	recovered 10 ml product from passive bailer
	12-Mar-07		11.537	11.542	0.005	0.600	1077.340	nm	recovered 600 ml product from passive bailer
	15-Mar-07		11.523	11.526	0.003	0.300	1077.354	nm	recovered 300 ml product from passive bailer
	17-Apr-07		11.585	11.587	0.002	0.010	1077.293	nm	recovered 10 ml product from P.B.
	24-Apr-07		11.584	11.589	0.005	0.020	1077.293	nm	recovered 20 ml product from passive bailer
	1-May-07		11.603	11.605	0.002	0.030	1077.275	nm	recovered 30 ml product from P.B.
	4-May-07		11.559	11.560	0.001	-	1077.319	nm	
	8-May-07		11.589	11.594	0.005	0.010	1077.288	nm	recovered 10 ml product from P.B.
	10-May-07		11.532	11.539	0.007	-	1077.345	nm	
	8-Jun-07		11.545	11.549	0.004	0.300	1077.332	nm	recovered 300 ml product from passive bailer
	11-Jun-07		11.500	11.512	0.012	0.010	1077.376	nm	recovered 10 ml product from P.B.
	13-Jun-07		11.509	11.511	0.002	0.030	1077.369	nm	recovered 30 ml product from P.B.
	3-Jul-07		11.479	11.482	0.003	0.250	1077.398	nm	recovered 250 ml product from P.B.
	5-Jul-07		11.483	11.488	0.005	0.120	1077.394	nm	recovered 120 ml product from P.B.
	16-Jul-07		11.309	11.312	0.003	0.020	1077.568	nm	recovered 20 ml product from P.B.
	20-Jul-07		11.311	11.317	0.006	0.020	1077.566	nm	recovered 20 ml product from P.B.
	26-Jul-07		11.373	11.382	0.009	0.150	1077.503	nm	recovered 150 ml product from P.B.
	30-Jul-07		11.376	11.379	0.003	0.020	1077.501	nm	recovered 20 ml product from P.B.
	2-Aug-07		11.405	11.409	0.004	0.200	1077.472	nm	recovered 200 ml product from P.B.
	7-Aug-07		11.243	11.292	0.049	0.100	1077.625	nm	recovered 100 ml product from P.B.
	9-Aug-07		11.415	11.419	0.004	0.150	1077.462	nm	recovered 150 ml product from P.B.
	24-Aug-07		11.468	11.470	0.002	0.100	1077.410	nm	recovered 100 ml product from passive bailer

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

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BH706 Continued	27-Aug-07		11.480	11.482	0.002	0.150	1077.398	nm	recovered 150 ml product from P.B.
	29-Aug-07		11.466	11.468	0.002	0.010	1077.412	nm	recovered 10 ml product from P.B.
	4-Sep-07		11.475	11.480	0.005	0.100	1077.402	nm	recovered 100 ml product from P.B.
	6-Sep-07		11.456	11.458	0.002	0.075	1077.422	nm	recovered 75 ml product from P.B.
	10-Sep-07		11.482	11.486	0.004	0.030	1077.395	nm	recovered 30 ml product from passive bailer
	12-Sep-07		11.450	11.453	0.003	0.100	1077.427	nm	recovered 100 ml product from passive bailer
	14-Sep-07		11.485	11.488	0.003	0.050	1077.392	nm	recovered 50 ml product from passive bailer
	17-Sep-07		11.512	11.515	0.003	0.300	1077.365	nm	recovered 300 ml product from passive bailer
	19-Sep-07		11.453	11.456	0.003	0.080	1077.424	nm	recovered 80 ml product from passive bailer
	21-Sep-07		11.470	11.473	0.003	0.100	1077.407	nm	recovered 100 ml product from passive bailer
	24-Sep-07		11.475	11.479	0.004	0.080	1077.402	nm	recovered 80 ml product from P.B.
	26-Sep-07		11.462	11.469	0.007	0.020	1077.415	nm	recovered 20 ml product from P.B.
	28-Sep-07		11.435	11.438	0.003	0.080	1077.442	nm	recovered 80 ml product from P.B.
	1-Oct-07		11.456	11.457	0.001	0.060	1077.422	nm	recovered 60 ml product from P.B.
	3-Oct-07		11.455	11.457	0.002	0.050	1077.423	nm	recovered 50 ml product from P.B.
	9-Oct-07		11.451	11.455	0.004	0.050	1077.426	nm	recovered 50 ml product from P.B.
	12-Oct-07		11.407	11.410	0.003	0.300	1077.470	nm	recovered 300 ml product from P.B.
	16-Oct-07		11.500	11.504	0.004	0.100	1077.377	nm	recovered 100 ml product from P.B.
	20-Oct-07		11.510	11.512	0.002	0.080	1077.368	nm	recovered 80 ml product from P.B.
	29-Oct-07		11.150	11.163	0.013	0.250	1077.725	nm	recovered 250 ml product from passive bailer
	1-Nov-07		11.146	11.152	0.006	0.200	1077.731	nm	recovered 200 ml product from passive bailer
	2-Nov-07		11.159	11.161	0.002	0.100	1077.719	nm	recovered 100 ml product from passive bailer
	5-Nov-07		11.583	11.587	0.004	0.080	1077.294	nm	recovered 80 ml product from passive bailer
	13-Nov-07		11.581	11.584	0.003	0.030	1077.296	nm	recovered 30 ml product from passive bailer
	19-Nov-07		11.434	11.438	0.004	0.100	1077.443	nm	recovered 100 ml product from passive bailer
	23-Nov-07		11.516	11.518	0.002	0.120	1077.362	nm	recovered 120 ml product from passive bailer
	26-Nov-07		11.263	11.274	0.011	0.100	1077.613	nm	recovered 100 ml product from passive bailer
	28-Nov-07		11.269	11.274	0.005	0.080	1077.608	nm	recovered 80 ml product from passive bailer
	30-Nov-07		11.271	11.275	0.004	0.050	1077.606	nm	recovered 50 ml product from passive bailer
	3-Dec-07		11.473	11.475	0.002	0.200	1077.405	nm	recovered 200 ml product from passive bailer
	5-Dec-07		11.478	11.481	0.003	0.080	1077.399	nm	recovered 80 ml product from passive bailer
	7-Dec-07		11.480	11.482	0.002	0.040	1077.398	nm	recovered 40 ml product from passive bailer
	10-Dec-07		11.484	11.486	0.002	0.100	1077.394	nm	recovered 100 ml product from passive bailer
	14-Dec-07		11.488	11.492	0.004	0.150	1077.389	nm	recovered 150 ml product from passive bailer
	17-Dec-07		11.488	11.490	0.002	0.180	1077.390	nm	recovered 180 ml product from passive bailer

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

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BH706 Continued	19-Dec-07		11.490	11.492	0.002	0.100	1077.388	nm	recovered 100 ml product from passive bailer
	21-Dec-07		11.494	11.496	0.002	0.080	1077.384	nm	recovered 80 ml product from passive bailer
	2-Jan-08		11.485	11.489	0.004	0.200	1077.392	nm	recovered 200 ml product from passive bailer
	4-Jan-08		11.445	11.447	0.002	0.020	1077.433	nm	recovered 20 ml product from passive bailer
	23-Jan-08		11.580	11.583	0.003	0.200	1077.297	nm	recovered 200 ml product from passive bailer
	25-Jan-08		11.502	11.505	0.003	0.050	1077.375	nm	recovered 50 ml product from passive bailer
	7-Feb-08		11.613	11.617	0.004	0.200	1077.264	nm	recovered 200 ml product from passive bailer
	9-Feb-08		11.615	11.618	0.003	0.100	1077.262	nm	recovered 100 ml product from passive bailer
	6-Mar-08		11.625	11.627	0.002	0.600	1077.253	nm	recovered 600 ml product from passive bailer
	7-Apr-08		11.480	11.489	0.009	0.010	1077.396	nm	recovered 10 ml product from passive bailer
	9-Apr-08		11.485	11.488	0.003	0.010	1077.392	nm	recovered 10 ml product from passive bailer
	11-Apr-08		11.484	11.488	0.004	0.010	1077.393	nm	recovered 10 ml product from passive bailer
	14-Apr-08		11.491	11.496	0.005	0.010	1077.386	nm	recovered 10 ml product from passive bailer
	16-Apr-08		11.500	11.504	0.004	0.010	1077.377	nm	recovered 10 ml product from passive bailer
	28-Apr-08		11.545	11.581	0.036	0.030	1077.326	nm	recovered 30 ml product from passive bailer
	30-Apr-08		11.548	11.578	0.030	0.020	1077.324	nm	recovered 20 ml product from passive bailer
	2-May-08		11.545	11.582	0.037	0.010	1077.326	nm	recovered 10 ml product from passive bailer
	5-May-08		11.611	11.615	0.004	0.350	1077.266	nm	recovered 350 ml product from passive bailer
	12-May-08		11.590	11.598	0.008	0.010	1077.286	nm	recovered 10 ml product from passive bailer
	14-May-08		11.594	11.596	0.002	-	1077.284	nm	no recovery from passive bailer; reset
	26-May-08		11.628	11.640	0.012	0.200	1077.248	nm	recovered 200 ml product from passive bailer
	28-May-08		11.632	11.635	0.003	0.100	1077.245	nm	recovered 100 ml product from passive bailer
	30-May-08		11.634	11.636	0.002	0.050	1077.244	nm	recovered 50 ml product from passive bailer
	9-Jun-08		11.575	11.580	0.005	0.050	1077.302	nm	recovered 50 ml product from passive bailer
	11-Jun-08		11.600	11.603	0.003	0.020	1077.277	nm	recovered 20 ml product from passive bailer
	13-Jun-08		11.603	11.605	0.002	0.010	1077.275	nm	recovered 10 ml product from passive bailer
	2-Jul-08		11.480	11.485	0.005	-	1077.397	>10,000	well decommissioned on 01 July 2008
BH707	7-Oct-03	1089.309	-	11.423	0.000	-	1077.886	6,500	
	20-Nov-03		-	11.492	0.000	-	1077.817	580	
	17-Dec-03		-	11.492	0.000	-	1077.817	15	
	13-Jan-04		-	11.463	0.000	-	1077.846	15	Bolt Required for RoadBox
	8-Mar-04		-	11.567	0.000	-	1077.742	36	bailer checked - no product
	6-Apr-04		-	11.439	0.000	-	1077.870	4,200	
	15-Jun-04		-	11.475	0.000	-	1077.834	240	
	13-Jul-04		-	11.455	0.000	-	1077.854	1,300	

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

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BH724 Continued	6-Apr-04		-	11.435	0.000	-	1078.136	200	J-plug
	15-Jun-04		-	11.505	0.000	-	1078.066	26	
	14-Jul-04		-	11.513	0.000	-	1078.058	500	
	23-Aug-04		-	11.486	0.000	-	1078.085	2,400	
	14-Oct-04		-	11.520	0.000	-	1078.051	300	
	2-Feb-05		-	11.545	0.000	-	1078.026	10	
	2-Mar-05		-	11.529	0.000	-	1078.042	700	
	2-Jun-05		-	11.626	0.000	-	1077.945	400	
	5-Oct-05		-	11.453	0.000	-	1078.118	420	
	19-Jan-06		-	11.421	0.000	-	1078.150	50	
	10-May-06		-	11.527	0.000	-	1078.044	420	
	26-Jul-06		-	11.500	0.000	-	1078.071	44	
	25-Jan-07		-	11.435	0.000	-	1078.136	400	
	25-May-07		-	11.457	0.000	-	1078.114	180	
	23-Aug-07		-	11.325	0.000	-	1078.246	80	
	22-Nov-07		-	11.366	0.000	-	1078.205	89	
	10-Mar-08		-	11.450	0.000	-	1078.121	260	
	4-Jun-08		-	11.471	0.000	-	1078.100	54	
	4-Jul-08		-	11.430	0.000	-	1078.141	300	well decommissioned on 04 July 2008
BH725	7-Oct-03	1091.321	-	13.652	0.000	-	1077.669	>10,000	
	13-Nov-03		13.534	13.965	0.431	-	1077.701	-	measured approx. 4 cm of product in bailer
	20-Nov-03		13.553	14.302	0.749	-	1077.618	>10,000	
	3-Dec-03		13.444	14.313	0.869	-	1077.703	nm	
	9-Dec-03		14.01	14.040	0.030	-	1077.305	1,900	800 ml product from P.B.; 300 ml product from H.B.
	10-Dec-03		13.884	13.965	0.081	-	1077.421	nm	monitored at 8:15 a.m.
	10-Dec-03		-	14.009	0.000	-	1077.223	nm	monitored at 4:50 p.m.
	11-Dec-03		-	14.163	0.000	-	1077.158	nm	monitored at 7:15 a.m.
	11-Dec-03		-	14.173	0.000	-	1077.148	nm	monitored at 3:15 p.m.
	12-Dec-03		14.156	14.221	0.065	-	1077.152	nm	monitored at 7:30 a.m.
	12-Dec-03		-	14.162	0.000	-	1077.159	nm	monitored at 1:40 p.m.
	15-Dec-03		-	14.440	0.000	-	1076.881	nm	
	17-Dec-03		-	14.061	0.000	-	1077.260	>10,000	
	19-Dec-03		14.12	14.392	0.272	-	1077.147	-	monitored at 10:05 a.m.
	19-Dec-03		14.285	14.370	0.085	-	1077.019	-	monitored at 10:15 a.m.
	19-Dec-03		-	14.264	0.000	-	1077.057	-	monitored at 10:30 a.m.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

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BH725 Continued	22-Dec-03		nm	nm	nm	-	nm	nm	recovered 150 ml product from P.B.
	24-Dec-03		nm	nm	nm	-	nm	nm	recovered 100 ml product from P.B.
	7-Jan-04		14.170	14.365	0.000	-	1076.956	nm	recovered 750 ml product from P.B.
	7-Jan-04		-	14.265	0.000	-	1077.056	nm	after 20 minutes recovered 300 ml product from P.B.
	10-Jan-04		-	14.288	0.000	-	1077.033	nm	recovered 250 ml product from P.B.
	12-Jan-04		-	14.355	0.000	-	1076.966	nm	recovered 350 ml product from P.B.
	15-Jan-04		14.220	14.335	0.115	-	1077.078	nm	recovered 650 ml product from P.B.
	15-Jan-04		-	14.200	0.000	-	1077.121	nm	after 10 minutes, recovered 300 ml product from P.B.
	20-Jan-04		-	14.296	0.000	-	1077.025	nm	recovered 600 ml product from P.B.
	23-Jan-04		-	14.197	0.000	-	1077.124	nm	recovered 300 ml product from P.B.
	23-Jan-04		-	13.938	0.000	-	1077.383	nm	after 34 minutes, checked P.B.; no product
	5-Feb-04		-	13.888	0.000	-	1077.433	nm	recovered 600 ml product from P.B.
	5-Feb-04		-	14.100	0.000	-	1077.221	nm	75 minutes later recovered 100 ml product from P.B.
	9-Feb-04		14.085	14.204	0.119	-	1077.212	nm	recovered 400 ml product from P.B.;
	9-Feb-04		-	14.289	0.000	-	1077.032	nm	25 minutes later recovered 500 ml product from P.B.
	19-Feb-04		14.111	14.350	0.239	-	1077.162	nm	recovered 750 ml product from P.B.
	23-Feb-04		14.105	14.250	0.145	-	1077.187	nm	recovered 750 ml product from P.B.
	23-Feb-04		-	13.570	0.000	-	1077.751	nm	10 minutes later recovered 100 ml from P.B.
	26-Feb-04		-	13.963	0.000	-	1077.358	nm	recovered 800 ml product from P.B.
	26-Feb-04		-	14.088	0.000	-	1077.233	nm	17 minutes later recovered 50 ml product from P.B
	3-Mar-04		-	13.443	0.000	-	1077.878	nm	recovered 30 ml product from P.B.
	3-Mar-04		-	13.499	0.000	-	1077.822	nm	no product in P.B.
	8-Mar-04		13.375	14.075	0.700	-	1077.806	>10,000	recovered 800 ml from passive bailer before H.B.
	8-Mar-04		13.955	14.110	0.155	-	1077.335	>10,000	hand bailed 150 ml product
	22-Mar-04		14.010	14.595	0.585	-	1077.194	nm	P.B. full of water; no product before H.B.
	22-Mar-04		14.135	14.203	0.068	-	1077.172	nm	hand bailed 1.4 L of product
	23-Mar-04		14.105	14.110	0.005	-	1077.215	nm	recovered 250 ml product from P.B.; H.B. had 1 cm product
	24-Mar-04		-	14.998	0.000	-	1076.323	nm	recovered 150 ml from P.B.; H.B. had 1.5 cm. product
	26-Mar-04		14.190	14.225	0.035	-	1077.124	nm	recovered 350 ml product from P.B.
	29-Mar-04		14.110	14.585	0.475	-	1077.116	nm	recovered 800 ml product from P.B.
	30-Mar-04		14.175	14.464	0.289	-	1077.088	nm	recovered 800 ml product from P.B. - before H.B.
	30-Mar-04		14.437	14.475	0.038	-	1076.876	nm	recovered 600 ml from hand bailing
	31-Mar-04		14.327	14.329	0.002	-	1076.994	nm	recovered 100 ml product from P.B.
	12-Apr-04		14.252	14.535	0.283	-	1077.012	nm	recovered 800 ml product from P.B. - before H.B.
	12-Apr-04		14.440	14.530	0.090	-	1076.863	nm	recovered 500 ml product after hand bailing

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nm not measured.

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BH725 Continued	13-Apr-04		14.375	14.390	0.015	-	1076.943	nm	recovered 300 ml product from P.B.; not enough to H.B.
	15-Apr-04		14.305	14.310	0.005	-	1077.015	nm	recovered 350 ml product from P.B.; not enough to H.B.
	16-Apr-04		-	14.239	0.000	-	1077.082	nm	recovered 250 ml product from P.B.; H.B. 1 mm prod.
	19-Apr-04		14.316	14.329	0.013	-	1077.002	nm	recovered 400 ml product from P.B.; not enough to H.B.
	22-Apr-04		14.422	14.465	0.043	-	1076.890	nm	recovered 650 ml product from P.B.
	30-Apr-04		-	14.319	0.000	-	1077.002	nm	recovered 600 ml from P.B.; H.B. 1 mm product
	6-May-04		-	14.374	0.000	-	1076.947	nm	recovered 10 ml from passive bailer
	7-May-04		-	14.334	0.000	-	1076.987	nm	recovered 5 ml from P.B.; hand bailed dry @ 6.0 L
	10-May-04		-	14.339	0.000	-	1076.982	nm	recovered 5 ml product from P.B.; no product HB
	17-May-04		-	14.355	0.000	-	1076.966	nm	recovered 350 ml from P.B.; hand bailed 1 ml product
	20-May-04		-	14.385	0.000	-	1076.936	nm	recovered 400 ml from passive bailer; H.B. 50 ml
	28-May-04		14.175	14.179	0.004	-	1077.145	nm	recovered 200 ml from passive bailer
	15-Jun-04		cnm	cnm	cnm	-	cnm	>10,000	probe not reading product; PB - 800 ml product
	15-Jun-04		-	14.435	0.000	-	1076.886	>10,000	bailer checked, 0.5 L recovered; hand bailed 1.0 L
	18-Jun-04		14.275	14.285	0.010	-	1077.044	nm	600 ml recovered
	14-Jul-04		-	12.217	0.000	-	1079.104	>10,000	passive bailer; bailer check showed 4 mm product.
	28-Jul-04		14.184	14.215	0.031	-	1077.131	nm	500 ml recovered
	6-Aug-04		14.092	14.100	0.008	-	1077.227	nm	50 ml recovered
	10-Aug-04		14.175	14.180	0.005	-	1077.145	nm	750 ml recovered
	11-Aug-04		14.110	14.112	0.002	-	1077.211	nm	50 ml recovered
	13-Aug-04		-	14.115	0.000	-	1077.206	nm	20ml recovered
	18-Aug-04		14.115	14.117	0.002	-	1077.206	nm	50 ml recovered
	24-Aug-04		-	14.017	0.000	-	1077.304	>10,000	100ml product in PB. Bailer check showed 2mm product
	7-Sep-04		-	14.135	0.000	-	1077.186	nm	200 ml recovered
	9-Sep-04		-	14.054	0.000	-	1077.267	nm	50 ml recovered
	13-Sep-04		14.035	14.064	0.029	-	1077.280	nm	100 ml recovered
	15-Sep-04		14.085	14.090	0.005	-	1077.235	nm	50 ml recovered
	17-Sep-04		-	14.045	0.000	-	1077.276	nm	75 ml recovered
	20-Sep-04		14.149	14.154	0.005	-	1077.171	nm	100 ml recovered
	22-Sep-04		14.115	14.119	0.004	-	1077.205	nm	100 ml recovered
	24-Sep-04		14.096	14.100	0.004	-	1077.224	nm	75 ml recovered
	29-Sep-04		14.075	14.078	0.003	-	1077.245	nm	200 ml recovered
	4-Oct-04		-	14.015	0.000	-	1077.306	--	200 ml recovered
	6-Oct-04		14.085	14.090	0.005	-	1077.235	nm	100 ml recovered
	12-Oct-04		-	14.142	0.000	-	1077.179	nm	bailer checked, 100 ml recovered; PB - 800 ml recovered

Notes:

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH725 Continued	15-Oct-04		-	14.130	0.000	-	1077.191	nm	
	5-Nov-04		14.123	14.125	0.002	-	1077.198	nm	800 ml recovered
	8-Nov-04		-	14.105	0.000	-	1077.216	nm	350 ml recovered
	10-Nov-04		14.204	14.209	0.005	-	1077.116	nm	700 ml recovered
	17-Nov-04		14.167	14.170	0.003	-	1077.153	nm	100 ml recovered
	25-Nov-04		14.120	14.122	0.002	-	1077.201	nm	400 ml recovered
	29-Nov-04		14.058	14.060	0.002	-	1077.263	nm	30 ml recovered
	1-Dec-04		14.131	14.139	0.008	-	1077.188	nm	recovered 75 ml product from P.B.
	11-Jan-05		13.680	13.705	0.025	-	1077.636	>10,000	
	17-Jan-05		13.669	13.700	0.031	-	1077.646	nm	no passive bailer; P.B. installed following monitoring
	24-Jan-05		13.740	13.740	trace	-	1077.581	nm	no product in P.B.; checked H.B. - 20 mm product
	26-Jan-05		13.823	13.850	0.027	-	1077.493	nm	recovered 800 ml product from P.B.
	28-Jan-05		13.815	13.815	trace	-	-	nm	0 ml product from P.B.; H.B. check showed 2 mm product
	2-Feb-05		13.574	13.574	trace	-	1077.747	1,000	P.B. full of water; ice inside well; HB had 10 mm product
	18-Feb-05		13.782	13.784	0.002	-	1077.539	nm	recovered 10 ml product from P.B.
	22-Feb-05		13.835	13.835	trace	-	1077.486	nm	recovered 5 ml product from P.B.
	24-Feb-05		13.799	13.799	trace	-	1077.522	nm	checked bailer - no visible product; sheen present
	2-Mar-05	1091.295	-	13.795	0.000	-	1077.500	3,800	checked bailer - sheen on water; well resurveyed
	22-Mar-05		-	13.805	0.000	-	1077.490	nm	checked bailer - no product; reset P.B.
	24-Mar-05		-	13.835	0.000	-	1077.460	nm	checked bailer - no product
	28-Mar-05		-	13.705	0.000	-	1077.590	nm	checked bailer - no product
	30-Mar-05		-	13.886	0.000	-	1077.409	nm	checked bailer - no product
	1-Apr-05		-	13.783	0.000	-	1077.512	nm	checked bailer - no product
	5-Apr-05		-	13.895	0.000	-	1077.400	nm	checked bailer - no product
	11-Apr-05		-	13.824	0.000	-	1077.471	nm	checked bailer - no product
	15-Apr-05		-	13.865	0.000	-	1077.430	nm	checked bailer - no product
	18-Apr-05		-	13.890	0.000	-	1077.405	nm	checked bailer - no product
	20-Apr-05		-	13.861	0.000	-	1077.434	nm	checked bailer - no product
	22-Apr-05		-	13.849	0.000	-	1077.446	nm	checked bailer - no product
	25-Apr-05		-	13.840	0.000	-	1077.455	nm	checked bailer - no product
	27-Apr-05		-	13.870	0.000	-	1077.425	nm	recovered 25 ml product from P.B.; H.B. 0 ml product
	4-May-05		-	13.876	0.000	-	1077.419	nm	recovered 150 ml product from P.B.
	6-May-05		-	13.835	0.000	-	1077.460	nm	recovered 50 ml product from P.B.; H.B. 0 ml product
	9-May-05		-	13.837	0.000	-	1077.458	nm	recovered 110 ml product from P.B.
	13-May-05		-	13.867	0.000	-	1077.428	nm	recovered 100 ml product from P.B.

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trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

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nm not measured.

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BH725 Continued	16-May-05		-	13.765	0.000	-	1077.530	nm	recovered 100 ml product from P.B.
	26-May-05		-	13.888	0.000	-	1077.407	nm	recovered 500 ml product from P.B. - 4" well
	10-Jun-05		13.839	13.841	0.002	-	1077.456	nm	recovered 400 ml product from P.B.
	15-Jun-05		13.842	13.842	trace	-	1077.453	nm	recovered 300 ml product from P.B.
	17-Jun-05		13.818	13.818	trace	-	1077.477	nm	recovered 150 ml product from P.B.
	20-Jun-05		-	13.876	0.000	-	1077.419	nm	checked bailer - no product
	22-Jun-05		13.814	13.814	trace	-	1077.481	nm	recovered 250 ml product from P.B.
	24-Jun-05		-	13.862	0.000	-	1077.433	nm	
	27-Jun-05		13.853	13.853	trace	-	1077.442	nm	recovered 200 ml from passive bailer
	29-Jun-05		13.855	13.855	trace	-	1077.440	nm	recovered 150 ml product from P.B.
	6-Jul-05		13.795	13.795	trace	-	1077.500	nm	recovered 400 ml product from P.B.
	11-Jul-05		13.845	13.850	0.005	-	1077.449	nm	recovered 100 ml product from P.B.
	20-Jul-05		13.825	13.827	0.002	-	1077.470	nm	recovered 500 ml product from P.B.
	22-Jul-05		-	13.807	0.000	-	1077.488	nm	recovered 200 ml product from P.B.
	28-Jul-05		13.794	13.796	0.002	-	1077.501	nm	recovered 300 ml product from P.B.
	9-Aug-05		13.719	13.875	0.156	-	1077.545	nm	100 ml product from P.B. & 900 ml water - Reset bailer
	10-Aug-05		13.805	nm	0.000	-	1091.295	nm	
	12-Aug-05		13.824	13.826	0.002	-	1077.471	nm	recovered 620 ml product from P.B.
	16-Aug-05		13.784	13.786	0.002	-	1077.511	nm	recovered 140 ml product from P.B.
	17-Aug-05		13.807	13.811	0.004	-	1077.487	nm	recovered 200 ml product from P.B.
	24-Aug-05		13.763	13.770	0.007	-	1077.531	nm	recovered 150 ml product and 350 ml water from P.B.
	31-Aug-05		13.738	13.772	0.034	-	1077.550	nm	
	6-Sep-05		13.797	13.799	0.002	-	1077.498	nm	recovered 80 ml product from P.B.
	12-Sep-05		13.725	13.736	0.011	-	1077.568	nm	recovered 100 ml product from P.B.
	14-Sep-05		13.746	13.748	0.002	-	1077.549	nm	recovered 800 ml product from P.B.
	16-Sep-05		13.787	13.789	0.002	-	1077.508	nm	recovered 200 ml product from P.B.
	19-Sep-05		-	13.740	0.000	-	1077.555	nm	recovered 200 ml product & 100 ml water from P.B.
	21-Sep-05		-	13.788	0.000	-	1077.507	nm	recovered 50 ml product & 25 ml water from P.B.
	26-Sep-05		13.706	13.707	0.001	-	1077.589	nm	recovered 320 ml product from P.B.
	5-Oct-05		13.775	13.777	0.002	-	1077.520	nm	recovered 360 ml product from P.B.
	18-Oct-05		13.735	13.746	0.011	-	1077.558	nm	recovered 600 ml product from P.B.
	24-Oct-05		13.726	13.729	0.003	-	1077.568	nm	recovered 600 ml product from P.B.
	1-Nov-05		-	13.703	0.000	-	1077.592	nm	recovered 650 ml product from P.B.
	3-Nov-05		13.684	13.684	0.000	-	1077.611	nm	recovered 20 ml product from P.B.; H.B. 0 mm
	8-Nov-05		13.737	13.748	0.011	-	1077.556	nm	recovered 500 ml product from P.B.
	10-Nov-05		13.624	13.627	0.003	-	1077.670	nm	recovered 350 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

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Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH725 Continued	14-Nov-05		13.789	13.793	0.004	-	1077.505	nm	recovered 350 ml product from P.B.
	28-Nov-05		13.729	13.739	0.010	-	1077.564	nm	recovered 450 ml product from P.B.
	30-Nov-05		13.712	13.719	0.007	-	1077.582	nm	recovered 400 ml product from P.B.
	6-Dec-05		13.724	13.726	0.002	-	1077.571	nm	recovered 750 ml product from P.B.
	12-Dec-05		13.639	13.641	0.002	-	1077.656	nm	PB-Recovered 450 ml.
	14-Dec-05		13.728	13.737	0.009	-	1077.565	nm	PB-Recovered 300 ml.
	16-Dec-05		13.688	13.691	0.003	-	1077.606	nm	PB-Recovered 300 ml.
	19-Dec-05		13.665	13.668	0.003	-	1077.629	nm	PB-Recovered 300 ml.
	22-Dec-05		13.582	13.583	0.001	-	1077.713	nm	PB-Recovered 300 ml.
	23-Dec-05		13.703	13.709	0.006	-	1077.591	nm	PB-Recovered 100 ml.
	3-Jan-06		13.679	13.683	0.004	-	1077.615	nm	PB-Recovered 800 ml.
	5-Jan-06		13.655	13.657	0.002	-	1077.640	nm	PB-Recovered 700 ml.
	6-Jan-06		13.644	13.646	0.002	-	1077.651	nm	PB-Recovered 10 ml.
	9-Jan-06		13.600	13.603	0.003	-	1077.694	nm	PB-Recovered 5 ml.
	12-Jan-06		13.703	13.706	0.003	-	1077.591	nm	PB-Recovered 350 ml.
	13-Jan-06		13.624	13.626	0.002	-	1077.671	nm	PB-Recovered 400 ml.
	16-Jan-06		13.654	13.665	0.011	-	1077.639	nm	PB-Recovered 10 ml.
	20-Jan-06		13.615	13.619	0.004	-	1077.679	nm	PB-Recovered 10 ml. Hand bailed 5 mm.
	23-Jan-06		13.647	13.649	0.002	-	1077.648	nm	PB-Recovered 750 ml.
	30-Jan-06		13.545	13.547	0.002	-	1077.750	nm	PB-Recovered 500 ml.
	1-Feb-06		13.574	13.575	0.001	-	1077.721	nm	PB-Recovered 10 ml.
	3-Feb-06		13.694	13.696	0.002	-	1077.601	nm	recovered 300 ml product from P.B.
	6-Feb-06		13.699	13.701	0.002	-	1077.596	nm	recovered 300 ml product from P.B.
	8-Feb-06		13.649	13.652	0.003	-	1077.645	nm	recovered 100 ml product from P.B.
	10-Feb-06		13.725	13.726	0.001	-	1077.570	nm	recovered 100 ml product from P.B.
	27-Feb-06		13.535	13.544	0.009	-	1077.758	nm	recovered 700 ml product from P.B.
	2-Mar-06		13.690	13.692	0.002	-	1077.605	nm	recovered 500 ml product form P.B.
	4-Mar-06		cnm	cnm	cnm	-	cnm	nm	Iced - P.B. stuck in well
	6-Mar-06		13.593	13.595	0.002	-	1077.702	nm	recovered 200 ml product from P.B.
	8-Mar-06		13.569	13.571	0.002	-	1077.726	nm	P.B. full of water; reset
	10-Mar-06		13.629	13.630	0.001	-	1077.666	nm	No recovery from P.B.; reset
	14-Mar-06		13.573	13.575	0.002	-	1077.722	nm	No recovery from P.B.; reset
	22-Mar-06		13.619	13.647	0.028	-	1077.670	nm	recovered 20 ml product from P.B.
	24-Mar-06		13.579	13.583	0.004	-	1077.715	nm	recovered 30 ml product from P.B.
	27-Mar-06		13.572	13.593	0.021	-	1077.719	nm	recovered 10 ml product from P.B.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

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ppm parts per million; 1% LEL (lower explosive limit)=110ppm

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BH725 Continued	29-Mar-06		cnm	cnm	cnm	-	cnm	nm	Iced
	31-Mar-06		cnm	cnm	cnm	-	cnm	nm	High volume traffic
	12-Apr-06		13.630	13.632	0.002	-	1077.665	nm	recovered 100 ml product from P.B.
	18-Apr-06		13.705	13.718	0.013	0.400	1077.587	nm	recovered 400 ml product from P.B.
	21-Apr-06		13.601	13.642	0.041	0.800	1077.686	nm	recovered 800 ml product from P.B.
	26-Apr-06		13.592	13.600	0.008	0.900	1077.701	nm	recovered 900 ml product from P.B.
	28-Apr-06		13.649	13.651	0.002	0.200	1077.646	nm	recovered 200 ml product from P.B.
	1-May-06		13.603	13.607	0.004	0.200	1077.691	nm	recovered 200 ml product from P.B.
	3-May-06		13.693	13.699	0.006	0.250	1077.601	nm	recovered 250 ml product from P.B.
	9-May-06		13.694	13.699	0.005	0.300	1077.626	nm	recovered 300 ml product from P.B.
	7-Jun-06		13.684	13.756	0.072	0.600	1077.597	nm	recovered 600 ml product from P.B.
	12-Jun-06		13.694	13.699	0.005	0.600	1077.600	nm	recovered 600 ml product from P.B.
	14-Jun-06		13.602	13.614	0.012	0.400	1077.691	nm	recovered 400 ml product from P.B.
	16-Jun-06		13.665	13.666	0.001	0.010	1077.630	nm	recovered 10 ml product from P.B.
	20-Jun-06		13.662	13.664	0.002	-	1077.633	nm	4" well
	22-Jun-06		13.693	13.696	0.003	0.350	1077.601	nm	recovered 350 ml product from P.B.
	23-Jun-06		13.696	13.699	0.003	0.100	1077.598	nm	recovered 100 ml product from P.B.
	26-Jun-06		13.659	13.660	0.001	0.400	1077.636	nm	recovered 400 ml product from P.B.
	28-Jun-06		13.615	13.616	0.001	0.010	1077.680	nm	recovered 10 ml product from P.B.
	4-Jul-06		13.654	13.671	0.017	0.300	1077.638	nm	recovered 300 ml product from P.B.
	7-Jul-06		13.671	13.679	0.008	0.500	1077.622	nm	recovered 500 ml product from P.B.
	12-Jul-06		13.616	13.620	0.004	0.300	1077.678	nm	recovered 300 ml product from P.B.
	19-Jul-06		13.662	13.665	0.003	0.400	1077.632	nm	recovered 400 ml product from P.B.
	21-Jul-06		13.685	13.688	0.003	0.300	1077.609	nm	recovered 300 ml product from P.B.
	24-Jul-06		-	13.611	0.000	0.150	1077.684	nm	recovered 150 ml product from P.B.
	31-Jul-06		13.613	13.619	0.006	0.400	1077.681	nm	recovered 400 ml of product from PB
	3-Aug-06		13.640	13.641	0.001	0.010	1077.655	nm	recovered 10 ml of product from PB
	9-Aug-06		13.635	13.637	0.002	0.600	1077.660	nm	recovered 600 ml of product from PB
	15-Aug-06		13.615	13.617	0.002	0.350	1077.680	nm	recovered 350 ml of product from PB
	17-Aug-06		13.633	13.636	0.003	0.300	1077.661	nm	recovered 300 ml of product from PB
	18-Aug-06		13.836	13.838	0.002	0.200	1077.459	nm	recovered 200 ml of product from PB
	21-Aug-06		13.613	13.615	0.002	0.070	1077.682	nm	recovered 70 ml of product from PB
	24-Aug-06		13.620	13.622	0.002	0.010	1077.675	nm	recovered 10 ml of product from PB
	25-Aug-06		13.643	13.645	0.002	0.300	1077.652	nm	recovered 300 ml of product from PB
	28-Aug-06		13.600	13.602	0.002	0.300	1077.695	nm	recovered 300 ml of product from PB

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cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH725 Continued	30-Aug-06		13.605	13.606	0.001	0.010	1077.690	nm	recovered 10 ml of product from PB
	18-Sep-06		13.595	13.598	0.003	0.750	1077.699	nm	recovered 750 ml product from P.B.
	20-Sep-06		13.557	13.560	0.003	0.400	1077.737	nm	recovered 400 ml product from P.B.
	22-Sep-06		13.555	13.556	0.001	0.350	1077.740	nm	recovered 350 ml product from P.B.
	25-Sep-06		13.624	13.626	0.002	0.300	1077.671	nm	recovered 300 ml product from P.B.
	3-Oct-06		13.675	13.689	0.014	0.300	1077.617	nm	recovered 300 ml product from P.B.
	5-Oct-06		-	13.566	0.000	0.550	1077.729	nm	recovered 550 ml product from P.B.
	4-Dec-06		13.523	13.576	0.053	0.450	1077.761	nm	recovered 450 ml product from P.B.
	19-Jan-07		13.560	13.562	0.002	0.300	1077.735	nm	recovered 300 ml product from passive bailer
	22-Jan-07		13.536	13.537	0.001	0.030	1077.759	nm	recovered 30 ml product from passive bailer
	15-Mar-07		13.494	13.510	0.016	0.010	1077.798	nm	recovered 10 ml product from passive bailer
	17-Apr-07		13.520	13.543	0.023	-	1077.770	nm	passive bailer full of water; reset
	24-Apr-07		13.543	13.567	0.024	0.050	1077.747	nm	recovered 50 ml product from passive bailer
	1-May-07		13.495	13.499	0.004	0.010	1077.799	nm	recovered 10 ml product from passive bailer
	4-May-07		13.509	13.511	0.002	0.300	1077.786	nm	recovered 300 ml product from P.B.
	8-May-07		13.532	13.535	0.003	0.010	1077.762	nm	recovered 10 ml product from passive bailer
	10-May-07		13.543	13.548	0.005	0.010	1077.751	nm	recovered 10 ml product from passive bailer
	8-Jun-07		13.485	13.487	0.002	-	1077.810	nm	no recovery from passive bailer - reset
	11-Jun-07		13.468	13.469	0.001	0.010	1077.827	nm	recovered 10 ml of product from PB
	13-Jun-07		13.476	13.477	0.001	-	1077.819	nm	No recovery from P.B.; reset
	3-Jul-07		13.448	13.449	0.001	0.010	1077.847	nm	recovered 10 ml of product from PB
	5-Jul-07		13.503	13.505	0.002	0.010	1077.792	nm	recovered 10 ml of product from PB
	16-Jul-07		13.406	13.408	0.002	0.010	1077.889	nm	recovered 10 ml of product from PB
	20-Jul-07		13.404	13.407	0.003	0.010	1077.890	nm	recovered 10 ml of product from PB
	26-Jul-07		13.415	13.417	0.002	0.010	1077.880	nm	recovered 10 ml of product from PB
	30-Jul-07		13.425	13.427	0.002	0.010	1077.870	nm	recovered 10 ml of product from PB
	7-Aug-07		13.362	13.363	0.001	-	1077.933	nm	No recovery from P.B.; reset
	9-Aug-07		13.354	13.355	0.001	-	1077.941	nm	No recovery from P.B.; reset
	23-Aug-07		-	13.707	0.000	-	1077.588	26	
	24-Aug-07		13.255	13.256	0.001	-	1078.040	nm	
	27-Aug-07		13.303	13.305	0.002	-	1077.992	nm	No recovery from P.B.; reset
	29-Aug-07		13.293	13.295	0.002	-	1078.002	nm	No recovery from P.B.; reset
	4-Sep-07		13.270	13.272	0.002	-	1078.025	nm	No recovery from P.B.; reset
	6-Sep-07		13.275	13.277	0.002	-	1078.020	nm	No recovery from P.B.; reset
	10-Sep-07		13.271	13.273	0.002	-	1078.024	nm	

Notes:

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2 Depth relative to top of standpipe.

3 Water elevation referenced to Geodetic. Water elevation adjusted for presence of LPHs (using LPH density of 0.8).

4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH725 Continued	12-Sep-07		13.118	13.120	0.002	-	1078.177	nm	
	14-Sep-07		13.343	13.345	0.002	-	1077.952	nm	
	17-Sep-07		13.211	13.214	0.003	-	1078.083	nm	
	19-Sep-07		13.202	13.204	0.002	-	1078.093	nm	
	21-Sep-07		13.312	13.314	0.002	-	1077.983	nm	
	24-Sep-07		13.103	13.107	0.004	-	1078.191	nm	
	26-Sep-07		13.225	13.227	0.002	-	1078.070	nm	
	28-Sep-07		13.109	13.111	0.002	-	1078.186	nm	
	1-Oct-07		13.221	13.225	0.004	-	1078.073	nm	
	3-Oct-07		13.224	13.227	0.003	-	1078.070	nm	
	9-Oct-07		13.210	13.213	0.003	-	1078.084	nm	
	12-Oct-07		13.217	13.219	0.002	-	1078.078	nm	
	16-Oct-07		13.303	13.305	0.002	-	1077.992	nm	
	20-Oct-07		13.311	13.315	0.004	-	1077.983	nm	
	29-Oct-07		13.255	13.259	0.004	-	1078.039	nm	
	1-Nov-07		13.260	13.264	0.004	-	1078.034	nm	
	2-Nov-07		13.261	13.265	0.004	-	1078.033	nm	
	5-Nov-07		13.289	13.291	0.002	-	1078.006	nm	
	13-Nov-07		13.292	13.294	0.002	-	1078.003	nm	
	19-Nov-07		13.293	13.294	0.001	-	1078.002	nm	
	23-Nov-07		13.239	13.241	0.002	-	1078.056	nm	
	26-Nov-07		13.288	13.291	0.003	-	1078.006	nm	
	28-Nov-07		13.295	13.297	0.002	-	1078.000	nm	
	30-Nov-07		13.305	13.307	0.002	-	1077.990	nm	
	3-Dec-07		13.161	13.162	0.001	-	1078.134	nm	
	5-Dec-07		13.163	13.165	0.002	-	1078.132	nm	
	7-Dec-07		13.165	13.167	0.002	-	1078.130	nm	
	10-Dec-07		13.170	13.172	0.002	-	1078.125	nm	
	14-Dec-07		13.167	13.170	0.003	-	1078.127	nm	
	17-Dec-07		13.170	13.172	0.002	-	1078.125	nm	
	19-Dec-07		13.172	13.174	0.002	-	1078.123	nm	
	21-Dec-07		13.170	13.172	0.002	-	1078.125	nm	
	2-Jan-08		13.165	13.166	0.001	-	1078.130	nm	
	4-Jan-08		13.514	13.515	0.001	-	1077.781	nm	
	23-Jan-08		13.210	13.211	0.001	-	1078.085	nm	

Notes:

1 Elevations are geodetic based on ASCM 75838 elevation 1091.349, Coordinates are 3TM NAD 83.

2 Depth relative to top of standpipe.

3 Water elevation referenced to Geodetic. Water elevation adjusted for presence of LPHs (using LPH density of 0.8).

4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 **SUMMARY OF ALL WELL MONITORING DATA 1998-2013**

Updated Site Management Plan (2014)
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Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH725 Continued	25-Jan-08		13.216	13.218	0.002	-	1078.079	nm	
	7-Feb-08		13.463	13.464	0.001	-	1077.832	nm	
	9-Feb-08		13.465	13.466	0.001	-	1077.830	nm	
	6-Mar-08		13.333	13.334	0.001	-	1077.962	nm	
	7-Apr-08		13.354	13.355	0.001	-	1077.941	nm	
	9-Apr-08		13.356	13.357	0.001	-	1077.939	nm	
	11-Apr-08		13.359	13.360	0.001	-	1077.936	nm	
	14-Apr-08		13.411	13.412	0.001	-	1077.884	nm	
	16-Apr-08		13.433	13.434	0.001	-	1077.862	nm	
	28-Apr-08		13.468	13.470	0.002	-	1077.827	nm	
	30-Apr-08		13.470	13.471	0.001	-	1077.825	nm	
	2-May-08		13.478	13.479	0.001	-	1077.817	nm	
	5-May-08		13.461	13.462	0.001	-	1077.834	nm	
	12-May-08		13.453	13.454	0.001	-	1077.842	nm	
	14-May-08		13.450	13.452	0.002	-	1077.845	nm	
	26-May-08		13.358	13.359	0.001	-	1077.937	nm	
	28-May-08		13.364	13.366	0.002	-	1077.931	nm	
	30-May-08		13.366	13.367	0.001	-	1077.929	nm	
	9-Jun-08		13.365	13.366	0.001	-	1077.930	nm	
	11-Jun-08		13.363	13.364	0.001	-	1077.932	nm	
	13-Jun-08		13.370	13.371	0.001	-	1077.925	nm	
	3-Jul-08		-	13.335	0.000	-	1077.960	90	well decommissioned on 03 July 2008
BH726	7-Oct-03	1091.178	dry	dry	0.000	-	dry	1,900	
	20-Nov-03		dry	dry	dry	-	dry	480	
	17-Dec-03		dry	dry	dry	-	dry	220	
	13-Jan-04		dry	dry	dry	-	dry	250	dry; blocked at 5.740
	8-Mar-04		dry	dry	dry	-	dry	800	dry
	6-Apr-04		dry	dry	dry	-	dry	200	
	6-May-04		dry	dry	dry	-	dry		blocked at 5.715 m
	15-Jun-04		dry	dry	dry	-	dry	42	dry
	14-Jul-04		dry	dry	dry	-	dry	60	dry
	24-Aug-04		dry	dry	dry	-	dry	72	
	14-Oct-04		dry	dry	dry	-	dry	74	dry
	2-Feb-05		dry	dry	dry	-	dry	320	
	2-Mar-05		dry	dry	dry	-	dry	240	

Notes:

1 Elevations are geodetic based on ASCM 75838 elevation 1091.349, Coordinates are 3TM NAD 83.

2 Depth relative to top of standpipe.

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LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

TABLE 2 SUMMARY OF ALL WELL MONITORING DATA 1998-2013

Updated Site Management Plan (2014)
Hounsfield Heights - Briar Hill Community
Calgary, Alberta

Monitoring Well	Date (dd-mmm-yy)	Top of Casing Elevation[1] (m)	Depth to LPH[2] (m)	Depth to Water[2] (m)	Apparent Thickness of LPH (m)	LPH Recovery Volume (L)	Water Elevation[3] (m)	Combustible Vapour Concentration[4] (ppm)	Comments
BH1104 Continued	21-Mar-12		-	9.015	0.000	-	1081.027	12	
	4-Oct-12		-	8.620	0.000	-	1081.422	360	
	30-Apr-13		-	9.180	0.000	-	1080.832	510	Top of pipe elevation w/o collar was 1090.012m.
BH1105	3-Mar-04	1091.038	-	11.392	0.000	-	1079.646	nm	
	8-Mar-04		-	11.315	0.000	-	1079.723	1,000	
	5-Apr-04		-	11.334	0.000	-	1079.704	2,800	
	21-May-04		-	11.389	0.000	-	1079.649	nm	
	15-Jun-04		-	11.457	0.000	-	1079.581	9,400	
	13-Jul-04		-	11.407	0.000	-	1079.631	>10,000	bailer checked: no product
	23-Aug-04		-	11.349	0.000	-	1079.689	>10,000	
	13-Oct-04		-	11.460	0.000	-	1079.578	>10,000	bailer checked: no product
	1-Feb-05		-	11.462	0.000	-	1079.576	>10,000	bailer checked: no product
	28-Feb-05		11.420	11.420	trace	-	1079.618	>10,000	bailer checked; no product; sheen present
	30-May-05		-	11.502	0.000	-	1079.536	>10,000	bailer checked: no product
	3-Oct-05		-	11.228	0.000	-	1079.810	1,600	
	17-Jan-06		-	11.152	0.000	-	1079.886	>10,000	
	8-May-06		-	11.185	0.000	-	1079.853	>10,000	
	24-Jul-06		-	11.145	0.000	-	1079.893	>10,000	
	24-Jan-07		-	10.205	0.000	-	1080.833	>10,000	
	22-May-07		-	11.265	0.000	-	1079.773	>10,000	
	21-Aug-07		-	11.178	0.000	-	1079.860	8,200	bailer checked - no visible product; odour, no sheen
	20-Nov-07		-	11.258	0.000	-	1079.780	8,700	
	10-Mar-08		-	11.223	0.000	-	1079.815	>10,000	
	2-Jun-08		-	11.212	0.000	-	1079.826	2,000	
	4-Jul-08		-	11.125	0.000	-	1079.913	>10,000	well decommissioned on 04 July 2008
BH1106	3-Mar-04	1090.788	-	11.180	0.000	-	1079.608	nm	
	8-Mar-04		-	11.340	0.000	-	1079.448	1,100	
	5-Apr-04		-	11.295	0.000	-	1079.493	200	
	21-May-04		-	11.308	0.000	-	1079.480	nm	
	15-Jun-04		-	11.329	0.000	-	1079.459	64	
	13-Jul-04		-	11.264	0.000	-	1079.524	320	
	23-Aug-04		-	11.218	0.000	-	1079.570	300	
	13-Oct-04		-	11.334	0.000	-	1079.454	700	
	1-Feb-05		-	11.294	0.000	-	1079.494	1,000	
	28-Feb-05		-	11.175	0.000	-	1079.613	7,200	
	30-May-05		-	11.199	0.000	-	1079.589	1,200	has bailer

Notes:

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4 Headspace combustible vapour concentrations measured in monitoring well standpipes using a Gastech TraceTector vapour analyzer or a RKI Eagle II portable gas monitor with Photo Ionization Detector.

LPH liquid petroleum hydrocarbons.

trace trace amount of LPH observed (<1 mm).

passive bailer LPH collection and recovery device.

HB hand bailed.

nm not measured.

cnm could not monitor.

cnl could not locate.

ppm parts per million; 1% LEL (lower explosive limit)=110ppm

n/s not surveyed

- no data available.

Table 2 - Summary of Well Monitoring
Liquid Petroleum Hydrocarbon Removal

Monitor Well	Monitor Date (dd-mmm-yy)	Top of PVC Pipe Elevation (masl[1])	Ground Surface Elevation (masl[2])	Total Depth to LPH bTOP (m)	Depth to Water bTOP (m)	LPH Thickness (mm)	Volume Removed (m^3)	Total Volume Removed (m^3)
BH1704	8-Sep-15	1089.46	1089.58	10.491	10.592	101	0.000203	0.000203
	17-Sep-15	1089.46	1089.58	10.511	10.575	64	0.000046	0.000248
	22-Sep-15	1089.46	1089.58	10.532	10.532	0	0.000076	0.000325
	28-Sep-15	1089.46	1089.58	10.562	10.595	33	0.000023	0.000347
	6-Oct-15	1089.46	1089.58	10.549	10.603	54	0.000034	0.000382
	13-Oct-15	1089.46	1089.58	10.615	10.673	58	0.000046	0.000427
	19-Oct-15	1089.46	1089.58	10.543	10.575	32	0.000006	0.000433
	29-Oct-15	1089.46	1089.58	10.548	10.578	30	0.000008	0.000441
	13-Nov-15	1089.46	1089.58	10.436	10.562	126	0.000133	0.000574
	19-Nov-15	N/A	N/A	N/A	N/A	50	0.000057	0.000631
	27-Nov-15	N/A	N/A	N/A	N/A	2	0.000002	0.000634
	4-Dec-15	1089.46	1089.58	10.473	10.541	68	0.000103	0.000736
	11-Dec-15	1089.46	1089.58	10.505	10.544	39	0.000067	0.000804
	17-Dec-15	1089.46	1089.58	10.475	10.539	64	0.000113	0.000916
	8-Jan-16	1089.46	1089.58	10.455	10.639	184	0.000341	0.001257
	15-Jan-16	1089.46	1089.58	10.498	10.561	63	0.000071	0.001328
	22-Jan-16	1089.46	1089.58	10.42	10.491	71	0.000068	0.001396
	28-Jan-16	1089.46	1089.58	10.36	10.482	122	0.000205	0.001602
	5-Feb-16	1089.46	1089.58	10.456	10.489	33	0.000025	0.001627
	12-Feb-16	1089.46	1089.58	10.459	10.491	32	0.000057	0.001684
	18-Feb-16	1089.46	1089.58	10.335	10.455	120	0.000285	0.001969
	26-Feb-16	1089.46	1089.58	10.335	10.525	190	0.000570	0.002539
	4-Mar-16	1089.46	1089.58	10.436	10.584	148	0.000241	0.002779
	11-Mar-16	1089.46	1089.58	10.505	10.59	85	0.000160	0.002939
	24-Mar-16	N/A	N/A	N/A	N/A	200	0.000228	0.003167
	1-Apr-16	1089.46	1089.58	10.478	10.595	117	0.000206	0.003373
	7-Apr-16	1089.46	1089.58	10.519	10.6	81	0.000084	0.003458
	15-Apr-16	1089.46	1089.58	10.56	10.65	90	0.000091	0.003549
	21-Apr-16	1089.46	1089.58	10.555	10.61	55	0.000068	0.003617
	5-May-16	N/A	N/A	N/A	N/A	175	0.000200	0.003817
	16-May-16	1089.46	1089.58	10.513	10.534	21	0.000176	0.003793
	27-May-16	1089.46	1089.58	10.517	10.604	87	0.000164	0.003981
	16-Aug-16	1089.46	1089.58	N/A	10.568	N/A	N/A	0.003981
	31-Oct-16	1089.46	1089.58	10.486	10.545	59	0.000067	0.004048
	27-Feb-17	1089.46	1089.58	N/A	10.505	N/A	N/A	0.004048
	5-May-17	1089.46	1089.58	10.47	10.61	140	0.000160	0.004208
	5-Sep-18	1089.46	1089.58	10.6	10.667	67	0.000076	0.004125
	20-Mar-18	1089.46	1089.58	10.585	10.72	135	0.000154	0.004362
	24-Oct-18	1089.46	1089.58	10.68	10.715	35	0.000040	0.004165

Notes:

bTOP Below top of pipe

LPH Liquid Petroleum Hydrocarbon

N/A Not measured

Appendix B

Clifton

QUALITY ASSURANCE/QUALITY CONTROL - LAB DATA QUALITY REVIEW

Project No.:	CG3418 phase 10	**Project Name:**	North Hill Mall and Hounsfield Heights Contaminated Site Management
Client:	Suncor	**Project Location:**	1620-14 Avenue and adjacent lands
Laboratory:	AGAT	**Lab Location:**	Calgary
Laboratory Project No.:	21C741063 (Soil) 21C746767 (GW)	**Chain of Custody No.:**	138763 to138765(soil) 138472 (GW)

Number of Samples Submitted

No. of Soil Samples in Submission (exclude blanks & duplicates):	18	No. of Soil Blanks & Duplicates:	4 and 2
No. of Water Samples in Submission (exclude blanks & duplicates):	6	No. of Water Blanks & Duplicates:	1 and 1
No. of Air Samples in Submission (exclude blanks & duplicates):	0	No. of Air Blanks & Duplicates:	0

General QA/QC Checks (within acceptance criteria)		**Comments**
SOPs followed	Yes	
CofC complete and signed	No	
Temperature at Laboratory	Yes	
Analyzed within hold times	Yes	
Volatiles Extracted within 48 hrs	Yes	
Certificate of Analysis signed	Yes	
Number of samples submitted matches number analyzed	Yes	
Detection limits are below assessment guidelines	Yes	

QUALITY ASSURANCE/QUALITY CONTROL - LAB DATA QUALITY REVIEW

QA/QC Laboratory	(within acceptance criteria)	Comments
Surrogate Recovery	N/A	not completed.
Lab Method Blank	Yes	
Blank Spike (Matrix Spike)	Yes	
Laboratory Spike	Yes	
Lab Duplicate RPD	Yes	
Sample Integrity Flags:	Yes	

QA/QC Field	(within acceptance criteria)	Comments
Field Blank	N/A	
Trip Blank	Yes	
Field Duplicate RPD	No	two parameters for soil duplicate exceeded RPD guidelines. GW met acceptance criteria.

Data Quality Waiver A data quality waiver occurrs when the consultant contacts the laboratory regarding an analytical concern.

Data Quality Waiver issued: N/A

Date Issued: _____ Date of Response: _____

Data Considered Reliable: Yes

Comments: RPD in soil duplicate likely related to heterogenity of samples submitted.

Reviewed by (Print): Stephen d'Abadie Date: 23-Jun-21

Reviewed by (Signature): 

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
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TEL (403)735-2005
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http://www.agatlabs.com

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.
2222 30 AVE NE
CALGARY, AB T2E7K9
(403) 260-3386
ATTENTION TO: Stephen d'Abadie
PROJECT: CG3418110
AGAT WORK ORDER: 21C741063
TRACE ORGANICS REVIEWED BY: Elena Gorobets, Report Writer
DATE REPORTED: May 11, 2021
PAGES (INCLUDING COVER): 23
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
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- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Petroleum Hydrocarbons (BTEX/F1) Trip Blank (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		Trip Blank #3	Trip Blank #4	Trip Blank #1	Trip Blank #2
		SAMPLE TYPE:		MeOH	MeOH	MeOH	MeOH
		DATE SAMPLED:		2021-04-29	2021-04-30	2021-04-27	2021-04-28
Parameter	Unit	G / S	RDL	2414052	2414059	2414060	2414061
Benzene	mg/kg	0.0068	0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg	0.08	0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg	0.018	0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg	2.4	0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg	VARIABLE	10	<10	<10	<10	<10
Moisture Content	%		0.10	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits					
Toluene-d8 (BTEX)	%	60-140		84	93	92	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME - Soil - Agricultural - Fine (2015)
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2414052-2414061 The C6-C10 (F1) fraction is calculated using toluene response factor.
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6006-25	6006-26	6006-29	6002-18	6002-20	6002-24	6005-14	6005-15
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-27	2021-04-27	2021-04-27	2021-04-28	2021-04-28	2021-04-28	2021-04-29	2021-04-29
Parameter	Unit	G / S	RDL	2414046	2414047	2414048	2414049	2414050	2414051	2414053	2414054
Benzene	mg/kg		0.005	0.022	0.011	0.034	<0.005	0.022	0.065	1.78	16.6
Toluene	mg/kg		0.05	0.14	0.06	<0.05	<0.05	0.10	<0.05	42.1	631
Ethylbenzene	mg/kg		0.01	3.13	0.01	<0.01	0.01	0.27	0.05	10.2	179
Xylenes	mg/kg		0.05	21.5	0.08	<0.05	0.07	2.45	<0.05	55.3	1010
C6 - C10 (F1)	mg/kg		10	1170	10	<10	<10	<10	<10	800	13900
C6 - C10 (F1 minus BTEX)	mg/kg		10	1140	10	<10	<10	<10	<10	690	12100
C10 - C16 (F2)	mg/kg		10	240	<10	<10	35	<10	<10	56	829
C16 - C34 (F3)	mg/kg		10	18	<10	10	63	<10	<10	<10	44
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1.00	19	21	25	20	18	22	19	20
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	60-140		99	91	86	83	82	83	77	89
o-Terphenyl (F2-F4)	%	60-140		101	106	100	102	100	102	103	102

Certified By: Elena Gorobets

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AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6005-22	6005-92	6004-9	6004-18	6004-23	6003-18	6003-98	6003-19
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-28	2021-04-28	2021-04-28
Parameter	Unit	G / S	RDL	2414055	2414056	2414057	2414058	2414062	2414063	2414064	2414065
Benzene	mg/kg		0.005	0.178	0.138	0.460	0.011	<0.005	0.012	0.055	0.022
Toluene	mg/kg		0.05	0.10	0.07	0.07	<0.05	<0.05	0.38	1.00	0.15
Ethylbenzene	mg/kg		0.01	0.26	0.18	1.97	0.01	<0.01	0.03	0.11	0.06
Xylenes	mg/kg		0.05	0.55	0.42	0.90	<0.05	<0.05	3.28	10.8	4.27
C6 - C10 (F1)	mg/kg		10	<10	<10	20	<10	<10	20	60	30
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	20	<10	<10	20	40	30
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	224
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	19
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1.00	20	19	20	18	23	15	15	20
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	60-140		88	76	86	89	84	90	97	87
o-Terphenyl (F2-F4)	%	60-140		105	102	102	100	99	102	100	103

Certified By: Elena Gorobets

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AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6003-25	6001-17	6001-18	6001-24
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-28	2021-04-28	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2423485	2423486	2423487	2423488
Benzene	mg/kg		0.005	0.019	0.031	0.078	0.021
Toluene	mg/kg		0.05	<0.05	0.07	0.14	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	0.57	0.71	0.01
Xylenes	mg/kg		0.05	0.06	3.06	5.89	<0.05
C6 - C10 (F1)	mg/kg		10	<10	20	20	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	10	20	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	10	<10	10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A
Moisture Content	%		1.00	16	17	20	18
Surrogate	Unit	Acceptable Limits					
Toluene-d8 (BTEX)	%	60-140		80	81	84	74
o-Terphenyl (F2-F4)	%	60-140		105	103	96	97

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CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2414046-2423488 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
C>10 – C16 (F2- Napthalene) is a calculated parameter. The calculated value is F2 - Napthalene (if requested). The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (if requested). The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6006-25	6006-26	6006-29	6002-18	6002-20	6002-24	6005-14	6005-15
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-27	2021-04-27	2021-04-27	2021-04-28	2021-04-28	2021-04-28	2021-04-29	2021-04-29
Parameter	Unit	G / S	RDL	2414046	2414047	2414048	2414049	2414050	2414051	2414053	2414054
Chloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vinyl Chloride	mg/kg		0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Bromomethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichlorofluoromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acetone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methylene Chloride	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl tert-Butyl Ether	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Ethyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
trans-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroform	mg/kg		0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/kg		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Carbon Tetrachloride	mg/kg		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzene	mg/kg		0.005	0.022	0.011	0.034	<0.005	0.017	0.055	1.45	13.2
1,2-Dichloropropane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bromodichloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Isobutyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
cis-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.01	0.12	0.06	0.03	0.02	0.10	0.03	36.2	535
2-Hexanone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibromochloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylene Dibromide	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tetrachloroethene	mg/kg		0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6006-25	6006-26	6006-29	6002-18	6002-20	6002-24	6005-14	6005-15
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-27	2021-04-27	2021-04-27	2021-04-28	2021-04-28	2021-04-28	2021-04-29	2021-04-29
Parameter	Unit	G / S	RDL	2414046	2414047	2414048	2414049	2414050	2414051	2414053	2414054
1,1,1,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	mg/kg		0.01	3.08	0.01	<0.01	0.01	0.24	0.03	8.57	148
m,p-Xylenes	mg/kg		0.01	22.1	0.06	0.02	0.04	1.96	0.03	40.9	723
Bromoform	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Styrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o-Xylene	mg/kg		0.01	2.95	0.01	<0.01	0.02	0.56	0.02	11.6	216
1,3-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,4-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	mg/kg		0.01	25.1	0.07	0.02	0.07	2.53	0.05	52.5	939
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		130	84	81	79	76	79	66	74

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6005-22	6005-92	6004-9	6004-18	6004-23	6003-18	6003-98	6003-19
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-28	2021-04-28	2021-04-28
Parameter	Unit	G / S	RDL	2414055	2414056	2414057	2414058	2414062	2414063	2414064	2414065
Chloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vinyl Chloride	mg/kg		0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Bromomethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichlorofluoromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acetone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methylene Chloride	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl tert-Butyl Ether	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Ethyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
trans-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroform	mg/kg		0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/kg		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Carbon Tetrachloride	mg/kg		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzene	mg/kg		0.005	0.158	0.117	0.407	0.011	<0.005	0.012	0.044	0.016
1,2-Dichloropropane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bromodichloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Isobutyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
cis-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.01	0.10	0.06	0.07	0.03	0.02	0.37	0.91	0.15
2-Hexanone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dibromochloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylene Dibromide	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tetrachloroethene	mg/kg		0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6005-22	6005-92	6004-9	6004-18	6004-23	6003-18	6003-98	6003-19
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-29	2021-04-28	2021-04-28	2021-04-28
Parameter	Unit	G / S	RDL	2414055	2414056	2414057	2414058	2414062	2414063	2414064	2414065
1,1,1,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	mg/kg		0.01	0.24	0.17	1.77	0.01	<0.01	0.03	0.11	0.05
m,p-Xylenes	mg/kg		0.01	0.26	0.20	0.92	0.02	0.02	2.53	8.04	3.96
Bromoform	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Styrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o-Xylene	mg/kg		0.01	0.36	0.25	0.02	0.01	0.02	0.85	2.80	0.35
1,3-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,4-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	mg/kg		0.01	0.61	0.46	0.94	0.03	0.04	3.38	10.8	4.30
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		82	70	78	84	80	82	88	80

Certified By: Elena Gorobets

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AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6003-25	6001-17	6001-18	6001-24
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-28	2021-04-28	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2423485	2423486	2423487	2423488
Chloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Vinyl Chloride	mg/kg		0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Bromomethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Trichlorofluoromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Acetone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methylene Chloride	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl tert-Butyl Ether	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl Ethyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
trans-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
cis-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chloroform	mg/kg		0.0010	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/kg		0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Carbon Tetrachloride	mg/kg		0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzene	mg/kg		0.005	0.019	0.031	0.067	0.016
1,2-Dichloropropane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Trichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Bromodichloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl Isobutyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
cis-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.01	0.02	0.06	0.13	0.01
2-Hexanone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
Dibromochloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Ethylene Dibromide	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Tetrachloroethene	mg/kg		0.010	<0.01	<0.01	<0.01	<0.01

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		6003-25	6001-17	6001-18	6001-24
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-04-28	2021-04-28	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2423485	2423486	2423487	2423488
1,1,1,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	mg/kg		0.01	<0.01	0.52	0.64	0.01
m,p-Xylenes	mg/kg		0.01	0.04	3.02	5.03	0.02
Bromoform	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Styrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
o-Xylene	mg/kg		0.01	0.02	0.03	0.89	0.01
1,3-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,4-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,2-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	mg/kg		0.01	0.06	3.05	5.92	0.03
Surrogate	Unit	Acceptable Limits					
Toluene-d8	%	50-140		76	74	78	68

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2414046-2423488 Results were obtained based on the dry weight of the sample.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Trip Blank (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

SAMPLE DESCRIPTION:				Trip Blank #3	Trip Blank #4	Trip Blank #1	Trip Blank #2
SAMPLE TYPE:				MeOH	MeOH	MeOH	MeOH
DATE SAMPLED:				2021-04-29	2021-04-30	2021-04-27	2021-04-28
Parameter	Unit	G / S	RDL	2414052	2414059	2414060	2414061
Chloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Vinyl Chloride	mg/kg		0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Bromomethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Trichlorofluoromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Acetone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methylene Chloride	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl tert-Butyl Ether	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl Ethyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
trans-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
cis-1,2-Dichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chloroform	mg/kg		0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloroethane	mg/kg		0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Carbon Tetrachloride	mg/kg		0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Trichloroethylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Bromodichloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Methyl Isobutyl Ketone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
cis-1,3-Dichloropropene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1,2-Trichloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
2-Hexanone	mg/kg		0.2	<0.2	<0.2	<0.2	<0.2
Dibromochloromethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Ethylene Dibromide	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Tetrachloroethene	mg/kg		0.010	<0.010	<0.010	<0.010	<0.010

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Volatile Organic Compounds in Trip Blank (Methanol Field Stabilized)

DATE RECEIVED: 2021-04-30

DATE REPORTED: 2021-05-11

		SAMPLE DESCRIPTION:		Trip Blank #3	Trip Blank #4	Trip Blank #1	Trip Blank #2
		SAMPLE TYPE:		MeOH	MeOH	MeOH	MeOH
		DATE SAMPLED:		2021-04-29	2021-04-30	2021-04-27	2021-04-28
Parameter	Unit	G / S	RDL	2414052	2414059	2414060	2414061
1,1,1,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
m,p-Xylenes	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Bromoform	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Styrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,1,2,2-Tetrachloroethane	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
o-Xylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,3-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,4-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,2-Dichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits					
Toluene-d8	%	50-140		74	86	86	82

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2414052-2414061 Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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Quality Assurance

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.
AGAT WORK ORDER: 21C741063
PROJECT: CG3418110
ATTENTION TO: Stephen d'Abadie
SAMPLING SITE:
SAMPLED BY:Bryn G. / Austin M.

Trace Organics Analysis

RPT Date: May 11, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)															
Benzene	3876	2425265	<0.005	<0.005	NA	< 0.005	98%	60%	140%	84%	60%	140%	88%	60%	140%
Toluene	3876	2425265	<0.05	<0.05	NA	< 0.05	100%	60%	140%	88%	60%	140%	87%	60%	140%
Ethylbenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	100%	60%	140%	104%	60%	140%	103%	60%	140%
Xylenes	3876	2425265	<0.05	<0.05	NA	< 0.05	99%	60%	140%	83%	60%	140%	81%	60%	140%
C6 - C10 (F1)	3876	2425265	<10	<10	NA	< 10	93%	60%	140%	104%	60%	140%	109%	60%	140%
C10 - C16 (F2)	6202	2414047	<10	<10	NA	< 10	98%	60%	140%	95%	60%	140%	124%	60%	140%
C16 - C34 (F3)	6202	2414047	<10	<10	NA	< 10	100%	60%	140%	94%	60%	140%	98%	60%	140%
C34 - C50 (F4)	6202	2414047	<10	<10	NA	< 10	97%	60%	140%	89%	60%	140%	94%	60%	140%
Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated. The sample spikes and dups are not from the same sample ID.															
Volatile Organic Compounds in Soil (Methanol Field Stabilized)															
Chloromethane	3876	2425265	<0.01	<0.01	NA	< 0.01	86%	50%	140%	94%	50%	140%	84%	50%	140%
Vinyl Chloride	3876	2425265	<0.0002	<0.0002	NA	< 0.0002	83%	50%	140%	91%	50%	140%	82%	50%	140%
Bromomethane	3876	2425265	<0.01	<0.01	NA	< 0.01	76%	50%	140%	81%	50%	140%	81%	50%	140%
Chloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	88%	50%	140%	100%	50%	140%	91%	50%	140%
Trichlorofluoromethane	3876	2425265	<0.01	<0.01	NA	< 0.01	77%	50%	140%	92%	60%	130%	84%	50%	140%
Acetone	3876	2425265	<0.2	<0.2	NA	< 0.2	96%	50%	140%	104%	50%	140%	114%	50%	140%
1,1-Dichloroethylene	3876	2425265	<0.01	<0.01	NA	< 0.01	83%	50%	140%	96%	60%	130%	87%	50%	140%
Methylene Chloride	3876	2425265	<0.01	<0.01	NA	< 0.01	87%	50%	140%	103%	60%	130%	93%	50%	140%
Methyl tert-Butyl Ether	3876	2425265	<0.01	<0.01	NA	< 0.01	89%	50%	140%	106%	60%	130%	99%	50%	140%
Methyl Ethyl Ketone	3876	2425265	<0.2	<0.2	NA	< 0.2	83%	50%	140%	109%	50%	140%	120%	50%	140%
trans-1,2-Dichloroethylene	3876	2425265	<0.01	<0.01	NA	< 0.01	86%	50%	140%	99%	60%	130%	91%	50%	140%
1,1-Dichloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	88%	50%	140%	100%	60%	130%	94%	50%	140%
cis-1,2-Dichloroethylene	3876	2425265	<0.01	<0.01	NA	< 0.01	91%	50%	140%	105%	60%	130%	98%	50%	140%
Chloroform	3876	2425265	<0.001	<0.001	NA	< 0.0010	87%	50%	140%	100%	60%	130%	95%	50%	140%
1,2-Dichloroethane	3876	2425265	<0.002	<0.002	NA	< 0.002	90%	50%	140%	103%	60%	130%	97%	50%	140%
1,1,1-Trichloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	80%	50%	140%	95%	60%	130%	88%	50%	140%
Carbon Tetrachloride	3876	2425265	<0.0005	<0.0005	NA	< 0.0005	75%	50%	140%	92%	60%	130%	85%	50%	140%
Benzene	3876	2425265	<0.005	<0.005	NA	< 0.005	89%	50%	140%	85%	60%	130%	83%	50%	140%
1,2-Dichloropropane	3876	2425265	<0.01	<0.01	NA	< 0.01	92%	50%	140%	86%	60%	130%	86%	50%	140%
Trichloroethylene	3876	2425265	<0.01	<0.01	NA	< 0.01	87%	50%	140%	88%	60%	130%	80%	50%	140%
Bromodichloromethane	3876	2425265	<0.01	<0.01	NA	< 0.01	83%	50%	140%	79%	60%	130%	82%	50%	140%
trans-1,3-Dichloropropene	3876	2425265	<0.01	<0.01	NA	< 0.01	75%	50%	140%	75%	60%	130%	81%	50%	140%
Methyl Isobutyl Ketone	3876	2425265	<0.2	<0.2	NA	< 0.2	70%	50%	140%	95%	50%	140%	108%	50%	140%
cis-1,3-Dichloropropene	3876	2425265	<0.01	<0.01	NA	< 0.01	87%	50%	140%	83%	60%	130%	86%	50%	140%
1,1,2-Trichloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	94%	50%	140%	86%	60%	130%	94%	50%	140%
Toluene	3876	2425265	<0.01	<0.01	NA	< 0.01	85%	50%	140%	82%	60%	130%	76%	50%	140%
2-Hexanone	3876	2425265	<0.2	<0.2	NA	< 0.2	72%	50%	140%	90%	50%	140%	107%	50%	140%
Dibromochloromethane	3876	2425265	<0.01	<0.01	NA	< 0.01	84%	50%	140%	80%	60%	130%	85%	50%	140%

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Quality Assurance

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.
AGAT WORK ORDER: 21C741063
PROJECT: CG3418110
ATTENTION TO: Stephen d'Abadie
SAMPLING SITE:
SAMPLED BY:Bryn G. / Austin M.

Trace Organics Analysis (Continued)

RPT Date: May 11, 2021

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Ethylene Dibromide	3876	2425265	<0.01	<0.01	NA	< 0.01	92%	50%	140%	87%	60%	130%	92%	50%	140%
Tetrachloroethene	3876	2425265	<0.01	<0.01	NA	< 0.010	87%	50%	140%	84%	60%	130%	84%	50%	140%
1,1,1,2-Tetrachloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	89%	50%	140%	85%	60%	130%	91%	50%	140%
Chlorobenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	91%	50%	140%	88%	60%	130%	91%	50%	140%
Ethylbenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	67%	50%	140%	71%	60%	130%	75%	50%	140%
m,p-Xylenes	3876	2425265	<0.01	<0.01	NA	< 0.01	75%	50%	140%	77%	60%	130%	80%	50%	140%
Bromoform	3876	2425265	<0.01	<0.01	NA	< 0.01	72%	50%	140%	88%	60%	130%	97%	50%	140%
Styrene	3876	2425265	<0.01	<0.01	NA	< 0.01	108%	50%	140%	106%	60%	130%	116%	50%	140%
1,1,2,2-Tetrachloroethane	3876	2425265	<0.01	<0.01	NA	< 0.01	65%	50%	140%	67%	60%	130%	119%	50%	140%
o-Xylene	3876	2425265	<0.01	<0.01	NA	< 0.01	78%	50%	140%	77%	60%	130%	83%	50%	140%
1,3-Dichlorobenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	74%	50%	140%	91%	60%	130%	96%	50%	140%
1,4-Dichlorobenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	73%	50%	140%	92%	60%	130%	116%	50%	140%
1,2-Dichlorobenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	99%	50%	140%	120%	60%	130%	124%	50%	140%
1,2,4-Trichlorobenzene	3876	2425265	<0.01	<0.01	NA	< 0.01	79%	50%	140%	122%	60%	130%	135%	50%	140%
Total Xylenes	3876	2425265	<0.01	<0.01	NA	< 0.01	77%	50%	140%	77%	60%	130%	81%	50%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS) (Methanol Field Stabilized)

Benzene	3877	2414063	0.012	0.012	NA	< 0.005	92%	60%	140%	81%	60%	140%	102%	60%	140%
Toluene	3877	2414063	0.38	0.41	7.6%	< 0.05	92%	60%	140%	88%	60%	140%	100%	60%	140%
Ethylbenzene	3877	2414063	0.03	0.03	NA	< 0.01	86%	60%	140%	104%	60%	140%	113%	60%	140%
Xylenes	3877	2414063	3.28	3.75	13.4%	< 0.05	81%	60%	140%	83%	60%	140%	88%	60%	140%
C6 - C10 (F1)	3877	2414063	20	20	NA	< 10	96%	60%	140%	100%	60%	140%	119%	60%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Volatile Organic Compounds in Soil (Methanol Field Stabilized)

Chloromethane	3877	2414063	<0.01	<0.01	NA	< 0.01	96%	50%	140%	85%	50%	140%	87%	50%	140%
Vinyl Chloride	3877	2414063	<0.0002	<0.0002	NA	< 0.0002	85%	50%	140%	84%	50%	140%	79%	50%	140%
Bromomethane	3877	2414063	<0.01	<0.01	NA	< 0.01	52%	50%	140%	69%	50%	140%	54%	50%	140%
Chloroethane	3877	2414063	<0.01	<0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	88%	50%	140%
Trichlorofluoromethane	3877	2414063	<0.01	<0.01	NA	< 0.01	87%	50%	140%	84%	60%	130%	80%	50%	140%
Acetone	3877	2414063	<0.2	<0.2	NA	< 0.2	86%	50%	140%	95%	50%	140%	131%	50%	140%
1,1-Dichloroethylene	3877	2414063	<0.01	<0.01	NA	< 0.01	90%	50%	140%	85%	60%	130%	82%	50%	140%
Methylene Chloride	3877	2414063	<0.01	<0.01	NA	< 0.01	104%	50%	140%	95%	60%	130%	97%	50%	140%
Methyl tert-Butyl Ether	3877	2414063	<0.01	<0.01	NA	< 0.01	110%	50%	140%	99%	60%	130%	102%	50%	140%
Methyl Ethyl Ketone	3877	2414063	<0.2	<0.2	NA	< 0.2	108%	50%	140%	86%	50%	140%	137%	50%	140%
trans-1,2-Dichloroethylene	3877	2414063	<0.01	<0.01	NA	< 0.01	94%	50%	140%	89%	60%	130%	88%	50%	140%
1,1-Dichloroethane	3877	2414063	<0.01	<0.01	NA	< 0.01	101%	50%	140%	93%	60%	130%	93%	50%	140%
cis-1,2-Dichloroethylene	3877	2414063	<0.01	<0.01	NA	< 0.01	105%	50%	140%	96%	60%	130%	98%	50%	140%

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Quality Assurance

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

Trace Organics Analysis (Continued)

RPT Date: May 11, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Chloroform	3877	2414063	<0.001	<0.001	NA	< 0.0010	103%	50%	140%	95%	60%	130%	97%	50%	140%
1,2-Dichloroethane	3877	2414063	<0.002	<0.002	NA	< 0.002	105%	50%	140%	97%	60%	130%	103%	50%	140%
1,1,1-Trichloroethane	3877	2414063	<0.01	<0.01	NA	< 0.01	94%	50%	140%	89%	60%	130%	87%	50%	140%
Carbon Tetrachloride	3877	2414063	<0.0005	<0.0005	NA	< 0.0005	89%	50%	140%	86%	60%	130%	83%	50%	140%
Benzene	3877	2414063	0.012	0.012	NA	< 0.005	86%	50%	140%	87%	60%	130%	88%	50%	140%
1,2-Dichloropropane	3877	2414063	<0.01	<0.01	NA	< 0.01	90%	50%	140%	89%	60%	130%	93%	50%	140%
Trichloroethylene	3877	2414063	<0.01	<0.01	NA	< 0.01	91%	50%	140%	93%	60%	130%	90%	50%	140%
Bromodichloromethane	3877	2414063	<0.01	<0.01	NA	< 0.01	85%	50%	140%	86%	60%	130%	90%	50%	140%
trans-1,3-Dichloropropene	3877	2414063	<0.01	<0.01	NA	< 0.01	74%	50%	140%	77%	60%	130%	85%	50%	140%
Methyl Isobutyl Ketone	3877	2414063	<0.2	<0.2	NA	< 0.2	107%	50%	140%	79%	50%	140%	93%	50%	140%
cis-1,3-Dichloropropene	3877	2414063	<0.01	<0.01	NA	< 0.01	83%	50%	140%	87%	60%	130%	90%	50%	140%
1,1,2-Trichloroethane	3877	2414063	<0.01	<0.01	NA	< 0.01	94%	50%	140%	93%	60%	130%	96%	50%	140%
Toluene	3877	2414063	0.37	0.39	5.3%	< 0.01	83%	50%	140%	85%	60%	130%	87%	50%	140%
2-Hexanone	3877	2414063	<0.2	<0.2	NA	< 0.2	113%	50%	140%	92%	50%	140%	128%	50%	140%
Dibromochloromethane	3877	2414063	<0.01	<0.01	NA	< 0.01	86%	50%	140%	86%	60%	130%	90%	50%	140%
Ethylene Dibromide	3877	2414063	<0.01	<0.01	NA	< 0.01	95%	50%	140%	91%	60%	130%	96%	50%	140%
Tetrachloroethene	3877	2414063	<0.01	<0.01	NA	< 0.010	79%	50%	140%	87%	60%	130%	85%	50%	140%
1,1,1,2-Tetrachloroethane	3877	2414063	<0.01	<0.01	NA	< 0.01	94%	50%	140%	89%	60%	130%	94%	50%	140%
Chlorobenzene	3877	2414063	<0.01	<0.01	NA	< 0.01	86%	50%	140%	89%	60%	130%	96%	50%	140%
Ethylbenzene	3877	2414063	0.03	0.03	NA	< 0.01	66%	50%	140%	72%	60%	130%	75%	50%	140%
m,p-Xylenes	3877	2414063	2.53	2.93	14.7%	< 0.01	71%	50%	140%	78%	60%	130%	79%	50%	140%
Bromoform	3877	2414063	<0.01	<0.01	NA	< 0.01	99%	50%	140%	85%	60%	130%	85%	50%	140%
Styrene	3877	2414063	<0.01	<0.01	NA	< 0.01	105%	50%	140%	109%	60%	130%	110%	50%	140%
o-Xylene	3877	2414063	0.85	0.95	11.1%	< 0.01	75%	50%	140%	80%	60%	130%	82%	50%	140%
1,3-Dichlorobenzene	3877	2414063	<0.01	<0.01	NA	< 0.01	76%	50%	140%	78%	60%	130%	78%	50%	140%
1,4-Dichlorobenzene	3877	2414063	<0.01	<0.01	NA	< 0.01	122%	50%	140%	117%	60%	130%	120%	50%	140%
1,2-Dichlorobenzene	3877	2414063	<0.01	<0.01	NA	< 0.01	116%	50%	140%	123%	60%	130%	101%	50%	140%
1,2,4-Trichlorobenzene	3877	2414063	<0.01	<0.01	NA	< 0.01	100%	50%	140%	90%	60%	130%	98%	50%	140%
Total Xylenes	3877	2414063	3.38	3.88	13.8%	< 0.01	73%	50%	140%	79%	60%	130%	80%	50%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Certified By: Elena Gorobets

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Method Summary

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	TO-0543	EPA SW-846 5021 & 8260	GC/MS
Toluene	TO-0543	EPA SW-846 5021 & 8260	GC/MS
Ethylbenzene	TO-0543	EPA SW-846 5021 & 8260	GC/MS
Xylenes	TO-0543	EPA SW-846 5021 & 8260	GC/MS
C6 - C10 (F1)	TO-0543	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO-0543	CCME Tier 1 Method	GC/FID
Moisture Content	TO-0543	CCME Tier 1 Method	GC/FID
Toluene-d8 (BTEX)	TO-0543	EPA SW-846 5021 & 8260	GC/MS
C10 - C16 (F2)	TO-0560	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	TO-0560	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	TO-0560	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	TO-0560	CCME Tier 1 Method	GC/FID
Moisture Content	TO-0560	CCME Tier 1 Method	GC/FID
o-Terphenyl (F2-F4)	TO 0560	CCME Tier 1 Method	GC/FID
Chloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Vinyl Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromomethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichlorofluoromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Acetone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methylene Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl tert-Butyl Ether	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl Ethyl Ketone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,2-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,2-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Carbon Tetrachloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Benzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloropropane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromodichloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl Isobutyl Ketone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
2-Hexanone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Dibromochloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylene Dibromide	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Tetrachloroethene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylbenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
m,p-Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromoform	TO-0330	EPA SW-846 5030 & 8260	GC/MS

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Method Summary

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C741063

PROJECT: CG3418110

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:Bryn G. / Austin M.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Styrene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
o-Xylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,3-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,4-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2,4-Trichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Total Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene-d8	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloromethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Vinyl Chloride	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Bromomethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Chloroethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Trichlorofluoromethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Acetone	TO-0340	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethylene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Methylene Chloride	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Methyl tert-Butyl Ether	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Methyl Ethyl Ketone	TO-0340	EPA SW-846 5030 & 8260	GC/MS
trans-1,2-Dichloroethylene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
cis-1,2-Dichloroethylene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Chloroform	TO-0340	EPA SW-846 5030 & 8260	GC/MS
1,1,1-Trichloroethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Carbon Tetrachloride	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Benzene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Trichloroethylene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Bromodichloromethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
trans-1,3-Dichloropropene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Methyl Isobutyl Ketone	TO-0340	EPA SW-846 5030 & 8260	GC/MS
cis-1,3-Dichloropropene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Toluene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Dibromochloromethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Ethylene Dibromide	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Tetrachloroethene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Chlorobenzene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Ethylbenzene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
m,p-Xylenes	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Bromoform	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Styrene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
1,1,2,2-Tetrachloroethane	TO-0340	EPA SW-846 5030 & 8260	GC/MS
o-Xylene	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Total Xylenes	TO-0340	EPA SW-846 5030 & 8260	GC/MS
Toluene-d8	TO-0340	EPA SW-846 5030 & 8260	GC/MS

AGAT Laboratories

2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403-735-2005 • F: 403-735-2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 1.0°C
AGAT Job Number: 21C741063
Date and Time: 30-APR-21 PM 5:35

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information
Company: Clifton
Contact: Stephen d'Abadie
Address: 2222-30 Ave NE
Calgary AB, T2E 7K9
Phone: ____ Fax: ____
LSD: ____
Client Project #: CG3418/10
Sampled By: Bryn G. / Austin. M

Report Information
1. Name: Stephen d'Abadie
Email: Stephen-dabadie@clifton.ca
2. Name: ____
Email: ____
3. Name: ____
Email: ____

Turnaround Time Required (TAT)
Regular TAT ☒ 5 to 7 Business Days
Rush TAT
☐ <24 Hours (200%)
☐ Two Day / Next Day (100%)
☐ Three Day (50%)
☐ Four Day (25%)
Date Required: ____

Report Format
☐ Single sample per page
☒ Multiple samples per page
☐ Export

Invoice To Same Yes ☒ / No ☐
Company: ____
Contact: ____
Address: ____
Phone: ____ Fax: ____
PO/AFE#: ____
AGAT ID/Quote #: ____

Requirements *(Selection may impact detection limits)*
☐ CCME ☐ AB Tier 1 ☐ Alberta Surface Water
☐ Agricultural ☐ Agricultural ☐ Chronic
☐ Industrial ☐ Industrial ☐ Acute
☐ Residential/Park ☐ Residential/Park ☐ SK Notice of Site Condition
☐ Commercial ☐ Commercial ☐ Drinking Water
☐ FWAL ☐ Natural Area ☐ Other: ____
Is this part of the Alberta SRP program? ☐ YES ☐ NO (If yes, please fill below)
Application Number: ____
Grant Amount: ____
Well/Facility/Location ID: ____
UWI: ____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS (FILTERED, PRESERVED, HAZARDOUS*) *ADDITIONAL FEE	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES	Detailed Salinity: ☐AB ☐SK ☐BC ☐D50	☒CCME/AB : BTEX/F1-F4 ☐CCME/AB : BTEX/F1-F2	☐BC: BTEX/VPH/EPH ☐BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-C60	Soil Metals: ☐HWS-B ☐SP-B ☐Hg ☐Cr6+	Water Metals: ☐Dissolved ☐Total ☐Hg ☐Cr6+	Routine Water Chemistry	Landfill: ☐AB Class 2 ☐BC ☐SK	Coliforms: ☐Total ☐Fecal ☐E.coli	Particle Size: ☐Sieve (75µm) ☐Texture	VOC	HOLD FOR 30-DAYS NO ANALYSIS (Additional Fee)	HOLD FOR 30 DAYS AFTER ANALYSIS (Additional Fee)
1	2414046	6006-25		27/04/2021	Soil			3		X									X		
2	047	6006-26		27/04/2021	Soil			3		X									X		
3	048	6006-29		27/04/2021	Soil			3		X									X		
4	049	6002-18		28/04/2021	Soil			3		X									X		
5	050	6002-20		28/04/2021	Soil			3		X									X		
6	051	6002-24		28/04/2021	Soil			3		X									X		
7	052	Trip ~~Solvent~~ Blank #3		29/04/2021	Soil			1		X									~~X~~		
8	053	6005-14		29/04/2021	Soil			3		X									X		
9	054	6005-15		29/04/2021	Soil			3		X									X		
10	055	6005-22		29/04/2021	Soil			3		X									X		

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Bryn Grelowitz	30/04/21 17:30		APR 30 2021
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 3

N°: AB 138765

Document ID: DIV-50-1507.007.

Date Revised: May 14, 2020

AGAT Laboratories

2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403-735-2005 • F: 403-735-2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature:
AGAT Job Number: 21CT41063
Date and Time: 30-APR '21 PM 5:35

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information
Company: Clifton
Contact: Stephen d'Abadie
Address: 2222-30 Ave NE
Calgary AB, T2E 7K9
Phone: _____ Fax: _____
LSD: _____
Client Project #: CG3418/10
Sampled By: Bryn G. / Austin. M

Report Information
1. Name: Stephen d'Abadie
Email: Stephen_dabadie@clifton.ca
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Turnaround Time Required (TAT)
Regular TAT ☒ 5 to 7 Business Days
Rush TAT
☐ <24 Hours (200%)
☐ Two Day / Next Day (100%)
☐ Three Day (50%)
☐ Four Day (25%)
Date Required: _____

Report Format
☐ Single sample per page
☒ Multiple samples per page
☐ Export

Invoice To Same Yes ☒ No ☐
Company: _____
Contact: _____
Address: _____
Phone: _____ Fax: _____
PO/AFE#: _____
AGAT ID/Quote #: _____

Requirements *(Selection may impact detection limits)*
☐ CCME ☐ AB Tier 1 ☐ Alberta Surface Water
☐ Agricultural ☐ Agricultural ☐ Chronic
☐ Industrial ☐ Industrial ☐ Acute
☐ Residential/Park ☐ Residential/Park ☐ SK Notice of Site Condition
☐ Commercial ☐ Commercial ☐ Drinking Water
☐ FWAL ☐ Natural Area ☐ Other: _____
Is this part of the Alberta SRP program? ☐ YES ☐ NO (If yes, please fill below)
Application Number: _____
Grant Amount: _____
Well/Facility/Location ID: _____
UWI: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS (FILTERED, PRESERVED, HAZARDOUS*) *ADDITIONAL FEE	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES	Detailed Salinity: ☐ AB ☐ SK ☐ BC ☐ D50	☒ CCME/AB : BTEX/F1-F4 ☐ CCME/AB : BTEX/F1-F2	☐ BC: BTEXS/VPH/EPH ☐ BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-C60	Soil Metals: ☐ HWS-B ☐ SP-B ☐ Hg ☐ Cr6+	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr6+	Routine Water Chemistry	Landfill: ☐ AB Class 2 ☐ BC ☐ SK	Coliforms: ☐ Total ☐ Fecal ☐ E.coli	Particle Size: ☐ Sieve (75µm) ☐ Texture	VOC						HOLD FOR 30 DAYS NO ANALYSIS (Additional Fee)	HOLD FOR 30 DAYS AFTER ANALYSIS (Additional Fee)
1	ZA14056	6005-92		29/04/2021	Soil					X											X							
2	057	6004-9		29/04/2021						X											X							
3	058	6004-18		29/04/2021						X											X							
4	059	Trip Blank #4		30/04/2021						X											X							
5	060	Trip Blank #1		27/04/2021						X											X							
6	061	Trip Blank #2		28/04/2021						X											X							
7	062	6004-23		29/04/2021						X											X							
8	063	6003-18		28/04/2021						X											X							
9	064	6003-98		28/04/2021						X											X							
10	065	6003-19		28/04/2021						X											X							

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Bryn Gelowitz	30/04/21 17:30		APR 30 2021
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 2 of 3

N°: AB 138764

Document ID: DIV-50-1507.007.

Date Revised: May 14, 2020

AGAT Laboratories

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Calgary, Alberta T2E 7P7
P: 403-735-2005 • F: 403-735-2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature:
AGAT Job Number: 24741063
Date and Time: 30-APR-21 PM 5:35

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information
Company: Clifton
Contact: Stephen d'Abadie
Address: 2222-30 Ave NE
Calgary AB, T2E 7K9
Phone: _____ Fax: _____
LSD: _____
Client Project #: CG 3418/10
Sampled By: Bryn G / Austin M

Report Information
1. Name: Stephen d'Abadie
Email: Stephen-dabadie@clifton.ca
2. Name: _____
Email: _____
3. Name: _____
Email: _____

Turnaround Time Required (TAT)
Regular TAT ☒ 5 to 7 Business Days
Rush TAT ☐ <24 Hours (200%) ☐ Two Day / Next Day (100%) ☐ Three Day (50%) ☐ Four Day (25%)
Date Required: _____

Report Format
☐ Single sample per page
☒ Multiple samples per page
☐ Export

Invoice To Same Yes ☒ / No ☐
Company: _____
Contact: _____
Address: _____
Phone: _____ Fax: _____
PO/AFE#: _____
AGAT ID/Quote #: _____

Requirements *(Selection may impact detection limits)*
☐ CCME ☐ Agricultural ☐ Industrial ☐ Residential/Park ☐ Commercial ☐ FWAL
☐ AB Tier 1 ☐ Agricultural ☐ Industrial ☐ Residential/Park ☐ Commercial ☐ Natural Area
☐ Alberta Surface Water ☐ Chronic ☐ Acute ☐ SK Notice of Site Condition ☐ Drinking Water ☐ Other: _____
Is this part of the Alberta SRP program? ☐ YES ☐ NO (If yes, please fill below)
Application Number: _____
Grant Amount: _____
Well/Facility/Location ID: _____
UWI: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS (FILTERED, PRESERVED, HAZARDOUS*) *ADDITIONAL FEE	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES	Detailed Salinity: ☐ AB ☐ SK ☐ BC ☐ D50	☒ CCME/AB : BTEX/F1-F4 ☐ CCME/AB : BTEX/F1-F2	☐ BC: BTEXS/VPH/EPH ☐ BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-C60	Soil Metals: ☐ HWS-B ☐ SP-B ☐ Hg ☐ Cr^{6+}	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Chemistry	Landfill: ☐ AB Class 2 ☐ BC ☐ SK	Coliforms: ☐ Total ☐ Fecal ☐ E.coli	Particle Size: ☐ Sieve (75µm) ☐ Texture	VOC	HOLD FOR 30 DAYS NO ANALYSIS (Additional Fee)	HOLD FOR 30 DAYS AFTER ANALYSIS (Additional Fee)
1	2423485	6003-25		28/04/2021	Soil		3			X									X		
2	486	6001-17		30/04/2021			3			X									X		
3	487	6001-18		30/04/2021			3			X									X		
4	488	6001-24		30/04/2021			3			X									X		
5																					
6																					
7																					
8																					
9																					
10																					

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Bryn Gelawitz	30/04/21 17:30		APR 30 2021

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Nº: AB 138763

Document ID: DIV-50-1507.007.

Date Revised: May 14, 2020

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: CLIPTON

Courier: D.O Prepaid Collect

Waybill#: nr

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other

If multiple sites were submitted at once: Yes ~~No~~

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr ~~Reg~~ Other

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: nr

Hydrocarbons: Earliest Expiry w/ moist / any 14

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken:

Legal Samples: Yes ~~No~~

International Samples: Yes No

Tape Sealed: Yes ~~No~~

Coolant Used: Icepack Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 1.0 + 1.0 + ___ = 1.0 °C 2(Bottle/Jar)___+___+___=____ °C

3 (Bottle/Jar)___+___+___=____ °C 4 (Bottle/Jar)___+___+___=____ °C

5 (Bottle/Jar)___+___+___=____ °C 6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C 8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C 10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 21074106 3

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments:

* Subcontracted Analysis (See CPM)

Date issued: March 11, 2020
Document ID: SR-9505.004

Appendix C

Clifton

QUALITY ASSURANCE/QUALITY CONTROL - LAB DATA QUALITY REVIEW

Project No.:	CG3418 phase 10	**Project Name:**	North Hill Mall and Hounsfield Heights Contaminated Site Management
Client:	Suncor	**Project Location:**	1620-14 Avenue and adjacent lands
Laboratory:	AGAT	**Lab Location:**	Calgary
Laboratory Project No.:	21C741063 (Soil) 21C746767 (GW)	**Chain of Custody No.:**	138763 to138765(soil) 138472 (GW)

Number of Samples Submitted

No. of Soil Samples in Submission (exclude blanks & duplicates):	18	No. of Soil Blanks & Duplicates:	4 and 2
No. of Water Samples in Submission (exclude blanks & duplicates):	6	No. of Water Blanks & Duplicates:	1 and 1
No. of Air Samples in Submission (exclude blanks & duplicates):	0	No. of Air Blanks & Duplicates:	0

General QA/QC Checks (within acceptance criteria)		**Comments**
SOPs followed	Yes	
CofC complete and signed	No	
Temperature at Laboratory	Yes	
Analyzed within hold times	Yes	
Volatiles Extracted within 48 hrs	Yes	
Certificate of Analysis signed	Yes	
Number of samples submitted matches number analyzed	Yes	
Detection limits are below assessment guidelines	Yes	

QUALITY ASSURANCE/QUALITY CONTROL - LAB DATA QUALITY REVIEW

QA/QC Laboratory	(within acceptance criteria)	Comments
Surrogate Recovery	N/A	not completed.
Lab Method Blank	Yes	
Blank Spike (Matrix Spike)	Yes	
Laboratory Spike	Yes	
Lab Duplicate RPD	Yes	
Sample Integrity Flags:	Yes	

QA/QC Field	(within acceptance criteria)	Comments
Field Blank	N/A	
Trip Blank	Yes	
Field Duplicate RPD	No	two parameters for soil duplicate exceeded RPD guidelines. GW met acceptance criteria.

Data Quality Waiver A data quality waiver occurrs when the consultant contacts the laboratory regarding an analytical concern.

Data Quality Waiver issued: N/A

Date Issued: _____ Date of Response: _____

Data Considered Reliable: Yes

Comments: RPD in soil duplicate likely related to heterogenity of samples submitted.

Reviewed by (Print): Stephen d'Abadie Date: 23-Jun-21

Reviewed by (Signature): 

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.
2222 30 AVE NE
CALGARY, AB T2E7K9
(403) 260-3386
ATTENTION TO: Stephen d'Abadie
PROJECT: CG3418/010
AGAT WORK ORDER: 21C746767
TRACE ORGANICS REVIEWED BY: Elena Gorobets, Report Writer
DATE REPORTED: May 20, 2021
PAGES (INCLUDING COVER): 10
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

AGAT Laboratories
2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

Petroleum Hydrocarbons (BTEX/F1-F2) in Water

DATE RECEIVED: 2021-05-12

DATE REPORTED: 2021-05-20

				SAMPLE DESCRIPTION:	MW6001	MW6002	MW6003	MW6004	MW6005	MW6006	MW6009
				SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water
				DATE SAMPLED:	2021-05-12 15:00	2021-05-12 14:40	2021-05-12 14:20	2021-05-12 13:50	2021-05-12 13:30	2021-05-12 15:30	2021-05-12 13:35
Parameter	Unit	G / S	RDL		2464938	2464939	2464940	2464941	2464942	2464943	2464944
Benzene	mg/L		0.0005		0.0042	0.0294	0.0052	0.0019	1.03	0.0008	1.09
Toluene	mg/L		0.0003		0.0018	0.130	0.152	0.0008	12.3	0.0004	12.0
Ethylbenzene	mg/L		0.0005		0.0065	0.264	0.0244	0.0056	0.509	0.0005	0.365
Xylenes	mg/L		0.0005		0.0292	1.30	4.07	0.0134	6.37	0.0297	6.41
C6 - C10 (F1)	mg/L		0.1		<0.1	2.0	6.6	0.5	23.8	1.4	24.0
C6 - C10 (F1 minus BTEX)	mg/L		0.1		<0.1	0.3	2.3	0.4	3.6	1.4	4.2
C10 - C16 (F2)	mg/L		0.1		<0.1	0.4	2.7	0.4	0.9	0.8	0.9
Sediment					Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	60-140			100	102	116	104	102	106	107
o-Terphenyl (F2)	%	60-140			99	100	101	99	100	101	98

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2464938-2464944 The F1 (C6 - C10) fraction is determined by integrating the FID chromatogram from the beginning of the nC6 peak to the apex of the last nC10 peak.
The C6 - C10 fraction is calculated from the FID toluene response factor.
The F2 (C10 - C16) fraction is determined by integrating the FID chromatogram from the apex of the nC10 peak to the apex of the nC16 peak.
The F2 (C10 - C16) fraction is calculated using the average response factor for nC10, nC16, and nC34.
Quality control for the calibration follows the guidelines set out in the CCME Contaminated Sites Method for Soils.
C6 –C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
C>10 – C16 (F2- Napthalene) is a calculated parameter. The calculated value is F2 - Napthalene (if requested). The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Extraction and holding times were met for this sample.

Analysis perfomed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-05-12

DATE REPORTED: 2021-05-20

SAMPLE DESCRIPTION:				MW6001	MW6002	MW6003	MW6004	MW6005	MW6006	MW6009	Trip Blank
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2021-05-12 15:00	2021-05-12 14:40	2021-05-12 14:20	2021-05-12 13:50	2021-05-12 13:30	2021-05-12 15:30	2021-05-12 13:35	2021-05-12
Parameter	Unit	G / S	RDL	2464938	2464939	2464940	2464941	2464942	2464943	2464944	2464945
Chloromethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vinyl Chloride	mg/L		0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Bromomethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichlorofluoromethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Acetone	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,1-Dichloroethylene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylene Chloride	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methyl tert-Butyl Ether	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methyl Ethyl Ketone	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,2-Dichloroethylene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-Dichloroethylene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/L		0.001	<0.001	<0.001	0.004	0.012	0.015	<0.001	0.016	<0.001
1,1,1-Trichloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Carbon Tetrachloride	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzene	mg/L		0.0005	0.0044	0.0314	0.0056	0.0023	1.10	0.0015	1.11	<0.0005
1,2-Dichloropropane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichloroethylene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromodichloromethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,3-Dichloropropene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methyl Isobutyl Ketone	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,3-Dichloropropene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.0003	0.0019	0.125	0.147	0.0008	11.9	0.0004	11.1	<0.0003
2-Hexanone	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibromochloromethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylene Dibromide	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Certified By: Elena Gorobets

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Certificate of Analysis

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2021-05-12

DATE REPORTED: 2021-05-20

		SAMPLE DESCRIPTION:		MW6001	MW6002	MW6003	MW6004	MW6005	MW6006	MW6009	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2021-05-12 15:00	2021-05-12 14:40	2021-05-12 14:20	2021-05-12 13:50	2021-05-12 13:30	2021-05-12 15:30	2021-05-12 13:35	2021-05-12
Parameter	Unit	G / S	RDL	2464938	2464939	2464940	2464941	2464942	2464943	2464944	2464945
Tetrachloroethene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,1,2-Tetrachloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorobenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.0005	0.007	0.258	0.0244	0.0057	0.552	0.0006	0.350	<0.0005
m,p-Xylenes	mg/L		0.0005	0.0239	1.23	4.17	0.0039	5.46	0.0066	5.42	<0.0005
Bromoform	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Styrene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethane	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
o-Xylene	mg/L		0.0005	0.0103	0.317	0.306	0.0113	1.57	0.0278	1.61	<0.0005
1,3-Dichlorobenzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,4-Dichlorobenzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichlorobenzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,4-Trichlorobenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes	mg/L		0.0005	0.0342	1.54	4.48	0.0152	7.04	0.0344	7.03	<0.0005
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		92	89	101	87	102	90	107	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2464938-2464945 1,1,2,2-Tetrachloroethane reported only for samples matrices which can be purged. Otherwise N/A.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis perfomed at AGAT Calgary (unless marked by *)

Certified By: Elena Gorobets

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Quality Assurance

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: May 20, 2021

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Volatile Organic Compounds in Water															
Chloromethane	3886	2464939	<0.001	<0.001	NA	< 0.001	114%	50%	140%	106%	50%	140%	134%	50%	140%
Vinyl Chloride	3886	2464939	<0.0008	<0.0008	NA	< 0.0008	106%	50%	140%	97%	50%	140%	118%	50%	140%
Bromomethane	3886	2464939	<0.001	<0.001	NA	< 0.001	113%	50%	140%	105%	50%	140%	120%	50%	140%
Chloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	102%	50%	140%	94%	50%	140%	112%	50%	140%
Trichlorofluoromethane	3886	2464939	<0.001	<0.001	NA	< 0.001	110%	50%	140%	101%	60%	130%	129%	50%	140%
Acetone	3886	2464939	<0.01	<0.01	NA	< 0.01	90%	50%	140%	97%	50%	140%	118%	50%	140%
1,1-Dichloroethylene	3886	2464939	<0.001	<0.001	NA	< 0.001	86%	50%	140%	83%	60%	130%	103%	50%	140%
Methylene Chloride	3886	2464939	<0.001	<0.001	NA	< 0.001	107%	50%	140%	101%	60%	130%	108%	50%	140%
Methyl tert-Butyl Ether	3886	2464939	<0.001	<0.001	NA	< 0.001	88%	50%	140%	96%	60%	130%	87%	50%	140%
Methyl Ethyl Ketone	3886	2464939	<0.01	<0.01	NA	< 0.01	125%	50%	140%	84%	50%	140%	73%	50%	140%
trans-1,2-Dichloroethylene	3886	2464939	<0.001	<0.001	NA	< 0.001	88%	50%	140%	87%	60%	130%	101%	50%	140%
1,1-Dichloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	97%	50%	140%	92%	60%	130%	106%	50%	140%
cis-1,2-Dichloroethylene	3886	2464939	<0.001	<0.001	NA	< 0.001	83%	50%	140%	86%	60%	130%	92%	50%	140%
Chloroform	3886	2464939	<0.001	<0.001	NA	< 0.001	102%	50%	140%	97%	60%	130%	110%	50%	140%
1,2-Dichloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	110%	50%	140%	107%	60%	130%	125%	50%	140%
1,1,1-Trichloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	96%	50%	140%	91%	60%	130%	113%	50%	140%
Carbon Tetrachloride	3886	2464939	<0.0005	<0.0005	NA	< 0.0005	96%	50%	140%	92%	60%	130%	117%	50%	140%
Benzene	3886	2464939	0.0314	0.0307	2.3%	< 0.0005	114%	50%	140%	107%	60%	130%	107%	50%	140%
1,2-Dichloropropane	3886	2464939	<0.001	<0.001	NA	< 0.001	112%	50%	140%	106%	60%	130%	100%	50%	140%
Trichloroethylene	3886	2464939	<0.001	<0.001	NA	< 0.001	129%	50%	140%	125%	60%	130%	85%	50%	140%
Bromodichloromethane	3886	2464939	<0.001	<0.001	NA	< 0.001	122%	50%	140%	116%	60%	130%	106%	50%	140%
trans-1,3-Dichloropropene	3886	2464939	<0.001	<0.001	NA	< 0.001	100%	50%	140%	111%	60%	130%	77%	50%	140%
Methyl Isobutyl Ketone	3886	2464939	<0.01	<0.01	NA	< 0.01	118%	50%	140%	125%	50%	140%	85%	50%	140%
cis-1,3-Dichloropropene	3886	2464939	<0.001	<0.001	NA	< 0.001	96%	50%	140%	99%	60%	130%	84%	50%	140%
1,1,2-Trichloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	128%	50%	140%	120%	60%	130%	104%	50%	140%
Toluene	3886	2464939	0.125	0.115	8.3%	< 0.0003	102%	50%	140%	101%	60%	130%	101%	50%	140%
2-Hexanone	3886	2464939	<0.02	<0.02	NA	< 0.02	82%	50%	140%	105%	50%	140%	78%	50%	140%
Dibromochloromethane	3886	2464939	<0.001	<0.001	NA	< 0.001	116%	50%	140%	116%	60%	130%	100%	50%	140%
Ethylene Dibromide	3886	2464939	<0.001	<0.001	NA	< 0.001	118%	50%	140%	120%	60%	130%	98%	50%	140%
Tetrachloroethene	3886	2464939	<0.001	<0.001	NA	< 0.001	116%	50%	140%	108%	60%	130%	122%	50%	140%
1,1,1,2-Tetrachloroethane	3886	2464939	<0.001	<0.001	NA	< 0.001	118%	50%	140%	110%	60%	130%	111%	50%	140%
Chlorobenzene	3886	2464939	<0.001	<0.001	NA	< 0.001	103%	50%	140%	102%	60%	130%	104%	50%	140%
Ethylbenzene	3886	2464939	0.258	0.240	7.2%	< 0.0005	86%	50%	140%	93%	60%	130%	102%	50%	140%
m,p-Xylenes	3886	2464939	1.23	1.19	3.3%	< 0.0005	103%	50%	140%	103%	60%	130%	122%	50%	140%
Bromoform	3886	2464939	<0.001	<0.001	NA	< 0.001	116%	50%	140%	118%	60%	130%	100%	50%	140%
Styrene	3886	2464939	<0.001	<0.001	NA	< 0.001	83%	50%	140%	96%	60%	130%	90%	50%	140%
o-Xylene	3886	2464939	0.317	0.296	6.9%	< 0.0005	106%	50%	140%	105%	60%	130%	121%	50%	140%
1,3-Dichlorobenzene	3886	2464939	<0.0005	<0.0005	NA	< 0.0005	77%	50%	140%	85%	60%	130%	99%	50%	140%
1,4-Dichlorobenzene	3886	2464939	<0.0005	<0.0005	NA	< 0.0005	104%	50%	140%	97%	60%	130%	117%	50%	140%

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Quality Assurance

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: May 20, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,2-Dichlorobenzene	3886	2464939	<0.0005	<0.0005	NA	< 0.0005	91%	50%	140%	94%	60%	130%	122%	50%	140%
1,2,4-Trichlorobenzene	3886	2464939	<0.001	<0.001	NA	< 0.001	78%	50%	140%	74%	60%	130%	120%	50%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Petroleum Hydrocarbons (BTEX/F1-F2) in Water															
Benzene	3886	2464939	0.0294	0.0273	7.4%	< 0.0005	86%	60%	140%	89%	60%	140%	88%	60%	140%
Toluene	3886	2464939	0.130	0.116	11.4%	< 0.0003	100%	60%	140%	93%	60%	140%	92%	60%	140%
Ethylbenzene	3886	2464939	0.264	0.238	10.4%	< 0.0005	102%	60%	140%	88%	60%	140%	91%	60%	140%
Xylenes	3886	2464939	1.30	1.20	8.0%	< 0.0005	88%	60%	140%	85%	60%	140%	96%	60%	140%
C6 - C10 (F1)	3886	2464939	2.0	1.9	5.1%	< 0.1	86%	60%	140%	101%	60%	140%	100%	60%	140%
C10 - C16 (F2)	321	2461102	0.6	0.6	0.0%	< 0.1	112%	60%	140%	105%	60%	140%	108%	60%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Certified By: Elena Gorobets

AGAT Laboratories

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Method Summary

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	TO 0332	EPA SW-846 5021 & 8260	GC/MS
Toluene	TO 0332	EPA SW-846 5021 & 8260	GC/MS
Ethylbenzene	TO 0332	EPA SW-846 5021 & 8260	GC/MS
Xylenes	TO 0332	EPA SW-846 5021 & 8260	GC/MS
C6 - C10 (F1)	TO 0542	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0542	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	TO 0511	CCME Tier 1 Method	GC/FID
Toluene-d8 (BTEX)	TO-0543	EPA SW-846 5021 & 8260	GC/MS
o-Terphenyl (F2)	TO 0511	CCME Tier 1 Method	GC/FID
Sediment	TO-0511	CCME Tier 1 Method	GC/FID
Chloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Vinyl Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromomethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichlorofluoromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Acetone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methylene Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl tert-Butyl Ether	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl Ethyl Ketone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,2-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,2-Dichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Carbon Tetrachloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Benzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloropropane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromodichloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Methyl Isobutyl Ketone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
2-Hexanone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Dibromochloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylene Dibromide	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Tetrachloroethene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylbenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
m,p-Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromoform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Styrene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
o-Xylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,3-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Method Summary

CLIENT NAME: CLIFTON ENGINEERING GROUP INC.

AGAT WORK ORDER: 21C746767

PROJECT: CG3418/010

ATTENTION TO: Stephen d'Abadie

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,4-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2,4-Trichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Total Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene-d8	TO-0330	EPA SW-846 5030 & 8260	GC/MS

AGAT Laboratories

2910 12 Street NE
Calgary, Alberta T2E 7P7
P: 403-735-2005 • F: 403-735-2771
webearth.agatlabs.com

Laboratory Use Only
Arrival Temperature: 12C
AGAT Job Number: 21C746767
Date and Time: 12-MAY-21 PM 4:07

Chain of Custody Record

Emergency Support Services Hotline 1-855-AGAT 245 (1-855-242-8245)

Report Information
Company: Clifton
Contact: Stephen d'Abadie
Address: 2222 – 30 Ave. NE
Calgary. AB
Phone: 403-701-8226 Fax:
LSD:
Client Project #: CG3418 / 010
Sampled By: Austin

Invoice To Same Yes ☑ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/AFE#:
AGAT ID/Quote #:

Report Information
1. Name: Stephen d'Abadie
Email: Stephen_dabadie@clifton.ca
2. Name: Austin Mei
Email: austin_mei@clifton.ca
3. Name:
Email:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 Business Days
Rush TAT ☐ <24 Hours (200%) ☐ Two Day / Next Day (100%) ☐ Three Day (50%) ☐ Four Day (25%)
Date Required:

Report Format
☐ Single sample per page
☑ Multiple samples per page
☐ Export

Requirements *(Selection may impact detection limits)*
☑ CCME ☐ Agricultural ☐ Industrial ☐ Residential/Park ☐ Commercial ☐ FWAL
☐ AB Tier 1 ☐ Agricultural ☐ Industrial ☐ Residential/Park ☐ Commercial ☐ Natural Area
☐ Alberta Surface Water ☐ Chronic ☐ Acute ☐ SK Notice of Site Condition ☐ Drinking Water ☐ Other:
Is this part of the Alberta SRP program? ☐ YES ☐ NO (If yes, please fill below)
Application Number:
Grant Amount:
Well/Facility/Location ID:
UWI:

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS (FILTERED, PRESERVED, HAZARDOUS*) *ADDITIONAL FEE	# OF CONTAINERS: VIALS / JARS	BAGS	BOTTLES	Detailed Salinity: ☐ AB ☐ SK ☐ BC ☐ D50	☐ CCME/AB : BTEX/F1-F4	☑ CCME/AB : BTEX/F1-F2	☐ BC: BTEX/VPH/EPH	☐ BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-C60	Soil Metals: ☐ HWS-B ☐ SP-B ☐ Hg ☐ Cr^{6+}	Water Metals: ☐ Dissolved ☐ Total ☐ Hg ☐ Cr^{6+}	Routine Water Chemistry	Landfill: ☐ AB Class 2 ☐ BC ☐ SK	Coliforms: ☐ Total ☐ Fecal ☐ E.coli	Particle Size: ☐ Sieve (75µm) ☐ Texture	VOCs					HOLD FOR 30 DAYS NO ANALYSIS (Additional Fee)	HOLD FOR 30 DAYS AFTER ANALYSIS (Additional Fee)
1	24[illegible]938	MW 6001		2021.5.12 15:00	GW		4		2		✓											✓						
2	939	MW 6002		14:40			4		2		✓											✓						
3	940	MW 6003		14:20			4		2		✓											✓						
4	941	MW 6004		13:50			4		2		✓											✓						
5	942	MW 6005		13:30			4		2		✓											✓						
6	943	MW 6006		15:30			4		2		✓											✓						
7	944	MW 6009		2021.5.12 13:35	GW		4		2		✓											✓						
8	945	Trip Blank		2021.5.12	W		2															✓						
9																												
10																												

Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Austin Mei	2021.5.12 16:00	BZ FORONS	12-May-21 4:07

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

N°: AB 138472

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: Clifton

Courier: D/O Prepaid Collect

Waybill#

Branch: EDM GP FN FM RD VAN LYD FSJ EST SASK Other: C

If multiple sites were submitted at once: Yes (No)

Custody Seal Intact: Yes No (NA)

TAT: <24hr 24-48hr 48-72hr (Reg) Other

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: ✓

Hydrocarbons: Earliest Expiry ✓

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 12+12+12=12 °C 2(Bottle/Jar)___+___+___=___ °C

3 (Bottle/Jar)___+___+___=___ °C 4 (Bottle/Jar)___+___+___=___ °C

5 (Bottle/Jar)___+___+___=___ °C 6 (Bottle/Jar)___+___+___=___ °C

7 (Bottle/Jar)___+___+___=___ °C 8 (Bottle/Jar)___+___+___=___ °C

9 (Bottle/Jar)___+___+___=___ °C 10 (Bottle/Jar)___+___+___=___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 21C746767

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other:

Account Project Manager: have they been notified of the above issues: Yes No

Whom spoken to: Date/Time:

CPM Initial

General Comments:

* Subcontracted Analysis (See CPM)

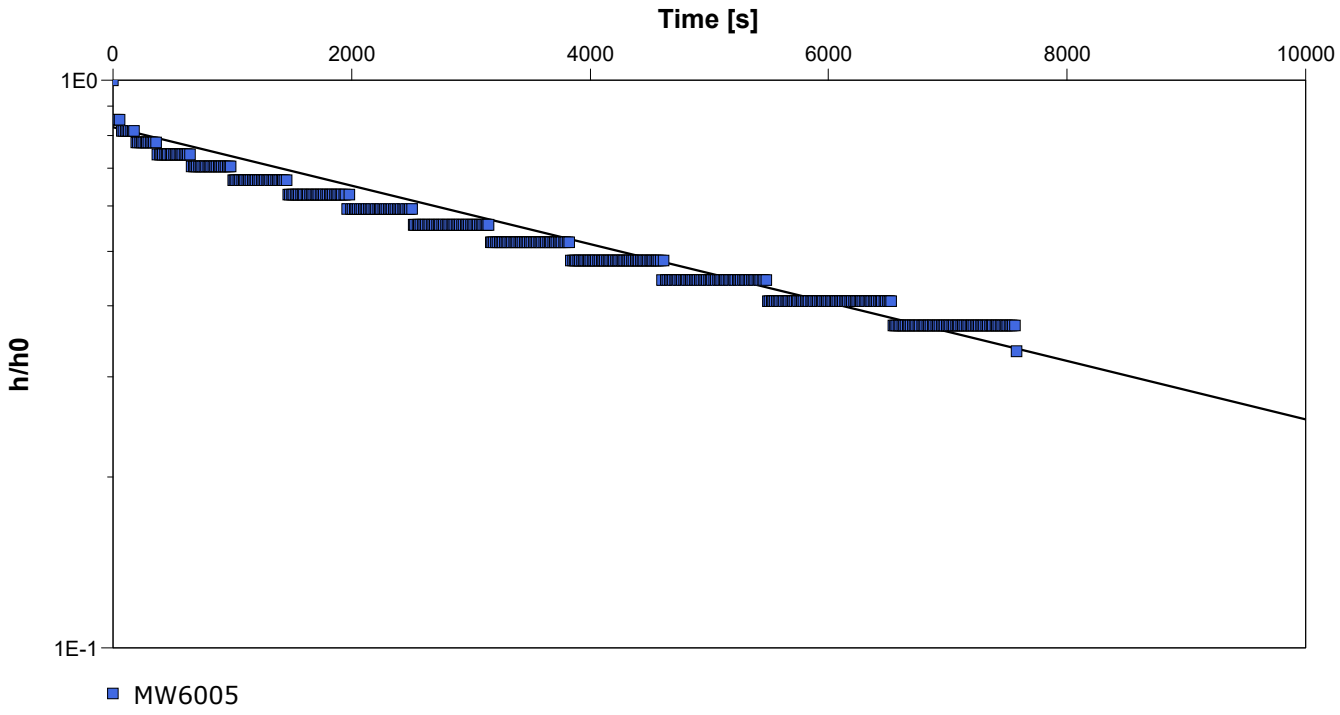
Date issued: March 11, 2020
Document ID: SR-9505.004

Appendix D

Clifton

Clifton	**Slug Test Analysis Report**
	Project: LPH Assessment
	Number: CG3418 0101
	Client: Suncor Energy Product Partnership

Location: Houndsfield Heights Area	Slug Test: MW6005 - Falling Head	Test Well: MW6005
Test Conducted by: AM		Test Date: 5/13/2021
Analysis Performed by: MPF	Slug test analysis - Falling head	Analysis Date: 6/9/2021
Aquifer Thickness: 3.10 m		

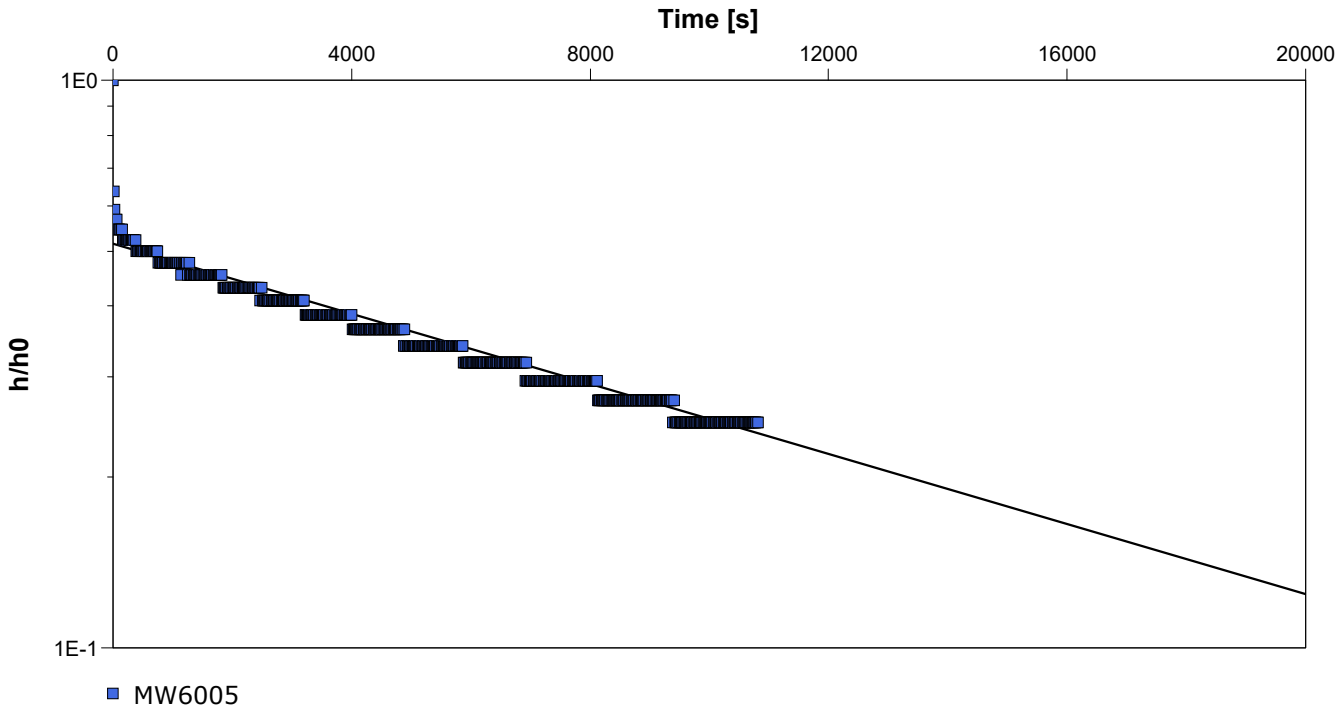


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW6005	1.20×10^{-7}	

Clifton	**Slug Test Analysis Report**
	Project: LPH Assessment
	Number: CG3418 0101
	Client: Suncor Energy Product Partnership

Location: Houndsfield Heights Area	Slug Test: MW6005 - Rising Head	Test Well: MW6005
Test Conducted by:		Test Date: 5/13/2021
Analysis Performed by: MPF	Slug test analysis - Rising head	Analysis Date: 6/9/2021
Aquifer Thickness: 3.10 m		

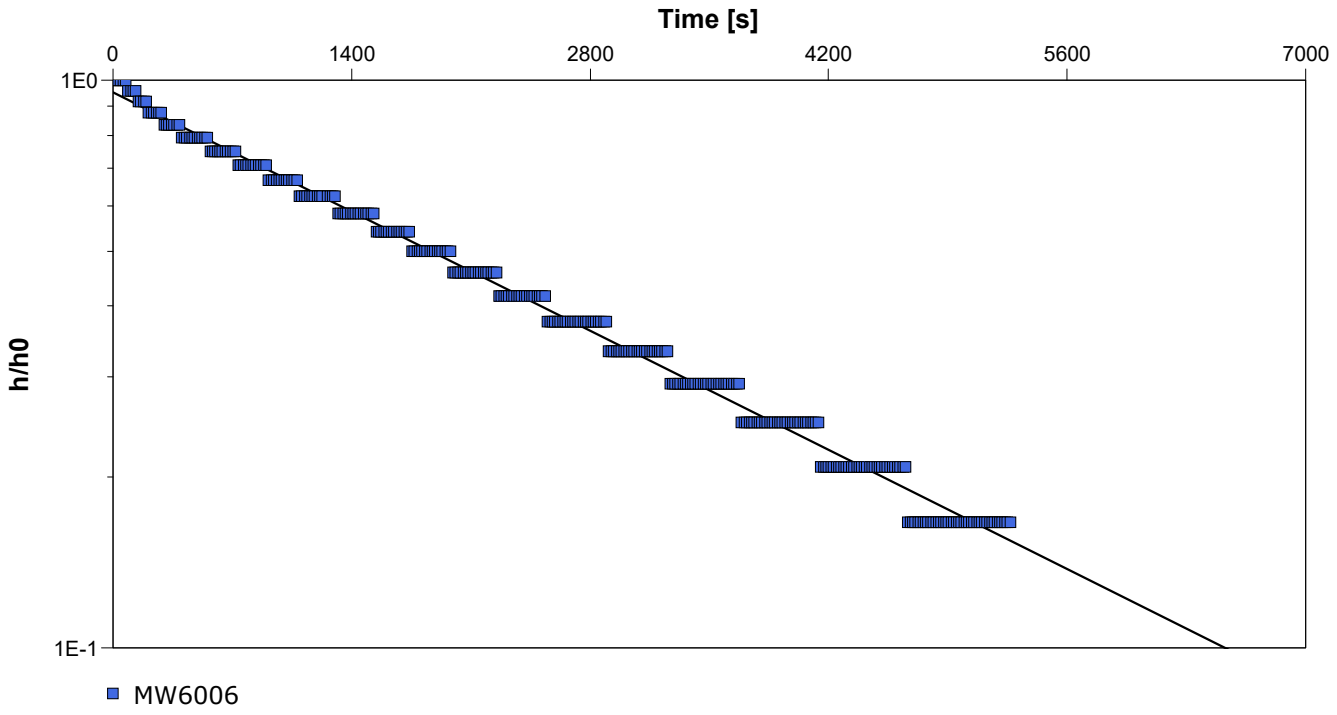


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW6005	7.20×10^{-8}	

Clifton	**Slug Test Analysis Report**
	Project: LPH Assessment
	Number: CG3418 010
	Client: Suncor Energy Product Partnership

Location: Houndsfield Heights	Slug Test: MW6006 - Falling Head	Test Well: MW6006
Test Conducted by: AM		Test Date: 5/13/2021
Analysis Performed by: MPF	Slug test analysis - Fallling Head	Analysis Date: 6/9/2021
Aquifer Thickness: 4.00 m		

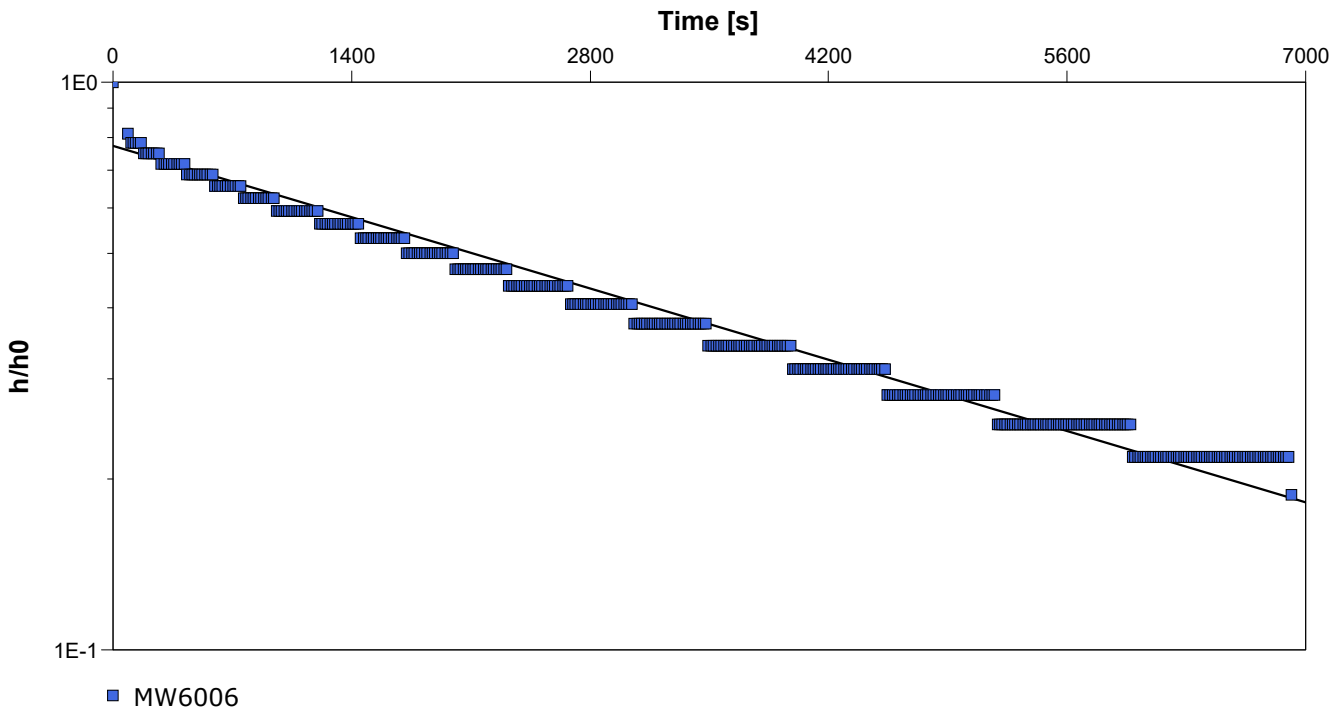


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW6006	4.00×10^{-7}	

Clifton	**Slug Test Analysis Report**
	Project: LPH Assessment
	Number: CG3418 010
	Client: Suncor Energy Product Partnership

Location: Houndsfield Heights	Slug Test: MW6006 - Rising Head	Test Well: MW6006
Test Conducted by: AM		Test Date: 5/13/2021
Analysis Performed by: MPF	Slug test analysis - Rising head	Analysis Date: 6/9/2021
Aquifer Thickness: 4.00 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW6006	2.40×10^{-7}	

Appendix E

Clifton

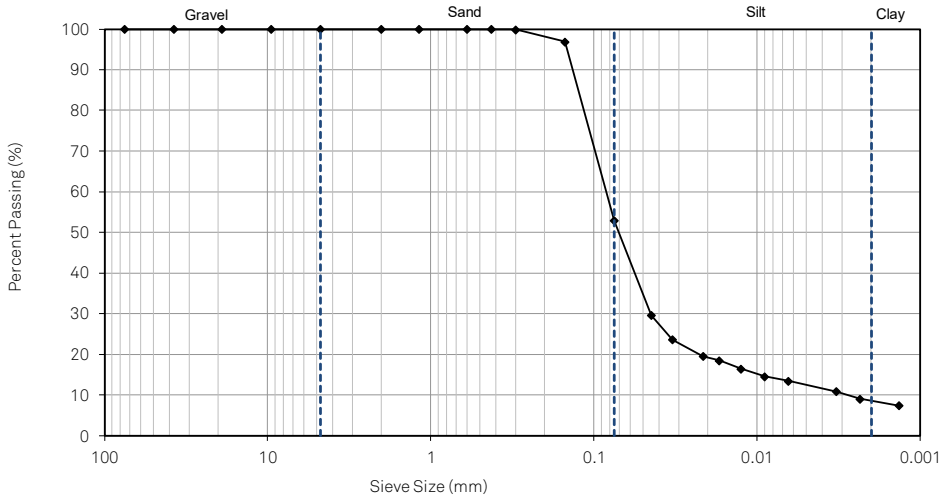
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	1-17	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Sand, silt, trace clay		
Sample Location	-		

Gravel	0.0	%	Clay	8.6	%
Sand	47.1	%	Hydro Sample Moisture Content	0.5	%
Silt	44.3	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	100.0			
0.6000	100.0			
0.4250	100.0			
0.3000	99.9			
0.1500	96.9			
0.0750	52.9			
0.0444	29.6			
0.0329	23.6			
0.0214	19.6			
0.0170	18.6			
0.0126	16.5			
0.0090	14.6			
0.0064	13.5			
0.0033	10.9			
0.0023	9.1			
0.0014	7.5			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

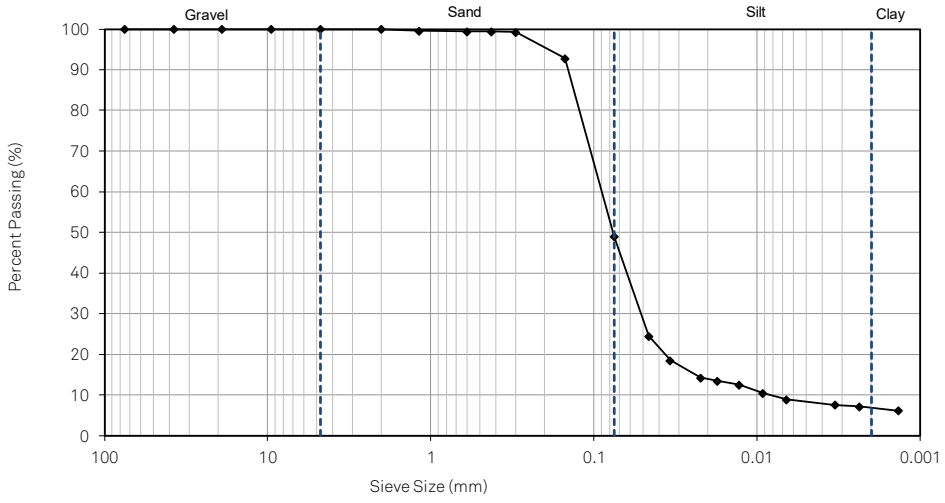
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	1-20	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Sand, silt, trace clay		
Sample Location	-		

Gravel	0.0	%	Clay	6.8	%
Sand	51.0	%	Hydro Sample Moisture Content	0.5	%
Silt	42.2	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	99.6			
0.6000	99.5			
0.4250	99.4			
0.3000	99.3			
0.1500	92.8			
0.0750	49.0			
0.0461	24.5			
0.0340	18.5			
0.0221	14.3			
0.0176	13.5			
0.0129	12.6			
0.0092	10.5			
0.0066	9.0			
0.0033	7.6			
0.0024	7.2			
0.0014	6.2			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

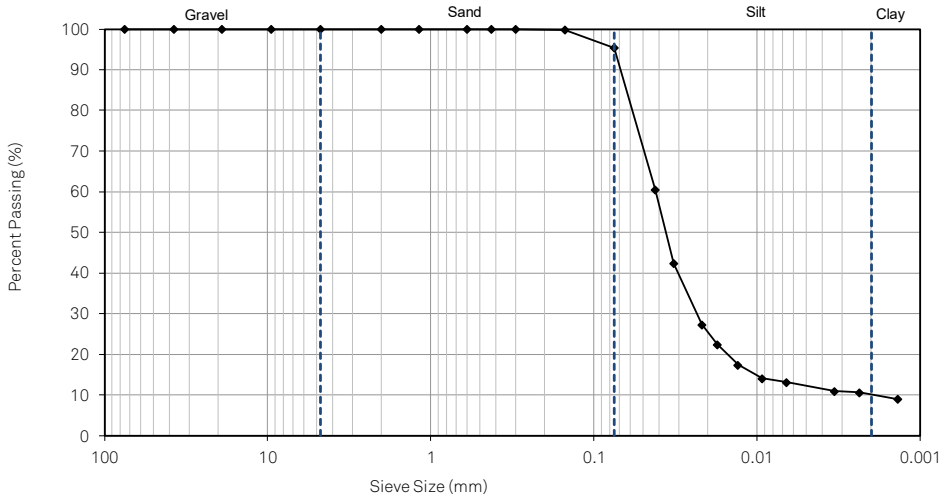
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	1-25	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Silt, trace sand/clay		
Sample Location	-		

Gravel	0.0	%	Clay	10.0	%
Sand	4.6	%	Hydro Sample Moisture Content	0.5	%
Silt	85.4	%			

Sieve Size	Percent	Specification		
(mm)	Passing	Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	100.0			
0.6000	100.0			
0.4250	100.0			
0.3000	100.0			
0.1500	99.8			
0.0750	95.4			
0.0419	60.6			
0.0324	42.4			
0.0218	27.4			
0.0176	22.4			
0.0131	17.5			
0.0093	14.2			
0.0066	13.2			
0.0033	11.0			
0.0024	10.6			
0.0014	9.0			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

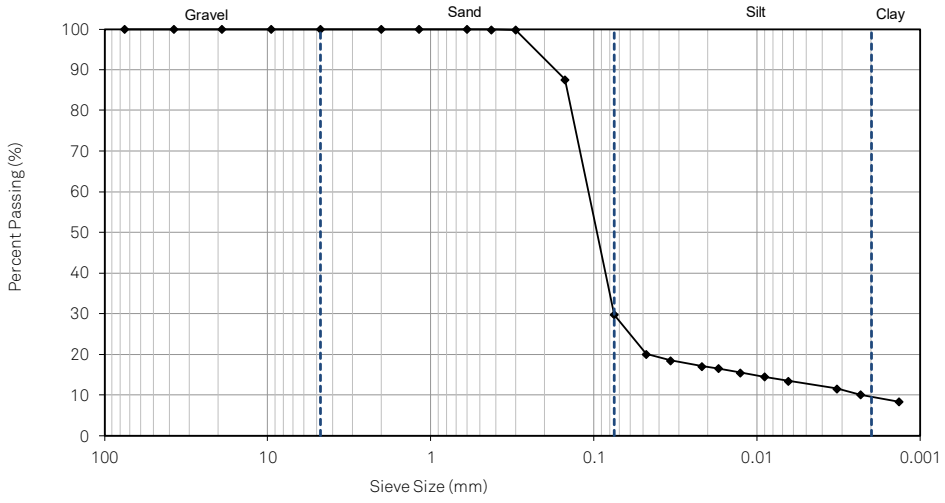
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	3-19	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Silty sand, trace clay		
Sample Location	-		

Gravel	0.0	%	Clay	9.6	%
Sand	70.2	%	Hydro Sample Moisture Content	0.5	%
Silt	20.2	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	100.0			
0.6000	100.0			
0.4250	99.9			
0.3000	99.8			
0.1500	87.6			
0.0750	29.8			
0.0476	20.1			
0.0340	18.6			
0.0217	17.1			
0.0172	16.6			
0.0127	15.5			
0.0090	14.5			
0.0064	13.5			
0.0032	11.6			
0.0023	10.1			
0.0013	8.4			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

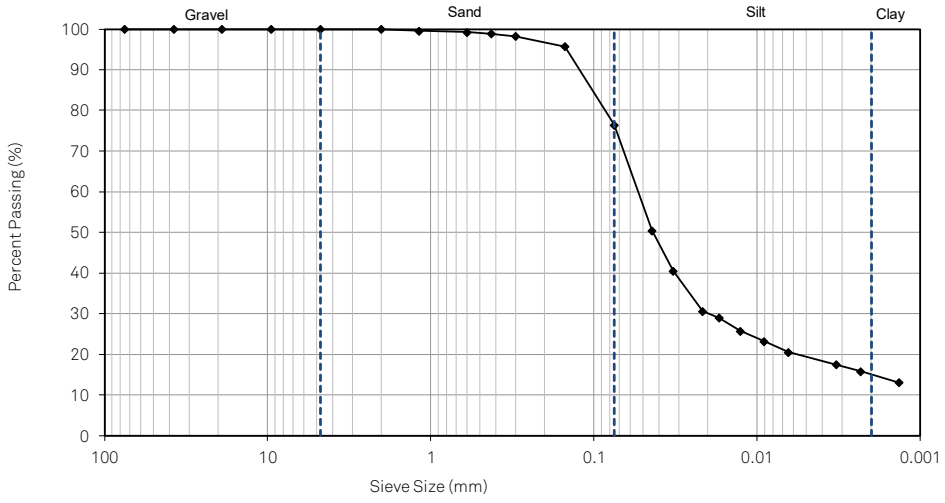
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	3-24	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Sandy silt, some clay		
Sample Location	-		

Gravel	0.0	%	Clay	15.0	%
Sand	23.6	%	Hydro Sample Moisture Content	0.5	%
Silt	61.4	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	99.5			
0.6000	99.2			
0.4250	98.9			
0.3000	98.2			
0.1500	95.7			
0.0750	76.4			
0.0441	50.5			
0.0326	40.6			
0.0215	30.6			
0.0171	29.0			
0.0127	25.8			
0.0090	23.2			
0.0065	20.6			
0.0033	17.5			
0.0023	15.9			
0.0013	13.1			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

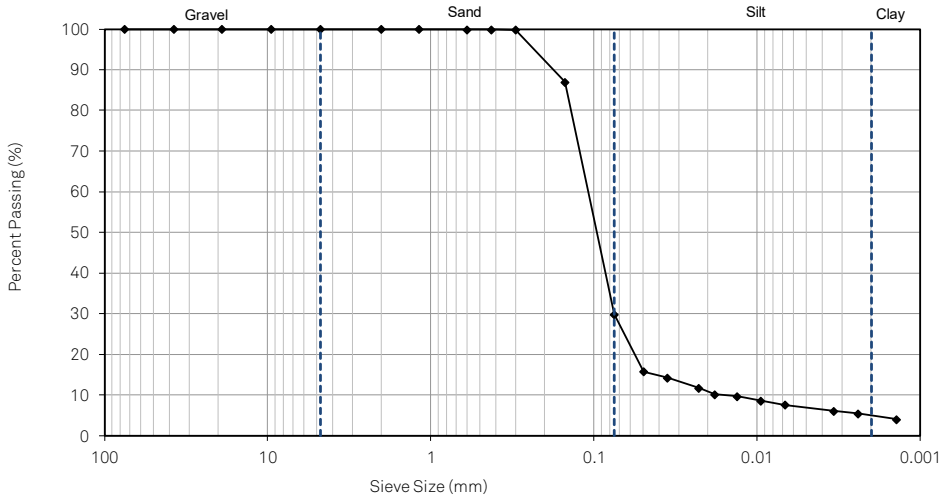
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	5-15	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Silty sand, trace clay		
Sample Location	-		

Gravel	0.0	%	Clay	4.9	%
Sand	70.2	%	Hydro Sample Moisture Content	0.4	%
Silt	24.9	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	100.0			
0.6000	99.9			
0.4250	99.9			
0.3000	99.8			
0.1500	87.0			
0.0750	29.8			
0.0497	15.8			
0.0354	14.3			
0.0228	11.8			
0.0181	10.2			
0.0133	9.7			
0.0095	8.6			
0.0067	7.6			
0.0034	6.1			
0.0024	5.5			
0.0014	4.1			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

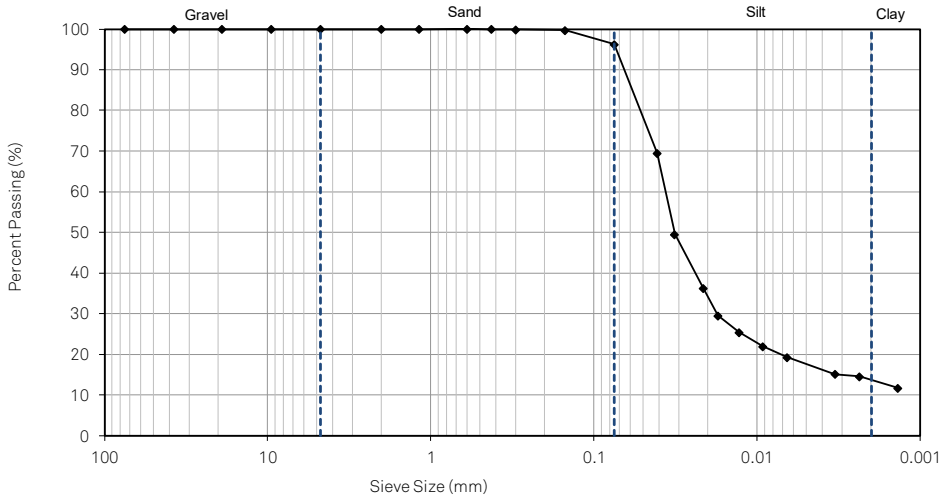
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	5-19	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Silt, some clay, trace sand		
Sample Location	-		

Gravel	0.0	%	Clay	13.6	%
Sand	3.7	%	Hydro Sample Moisture Content	0.6	%
Silt	82.7	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	100.0			
0.6000	100.0			
0.4250	100.0			
0.3000	99.9			
0.1500	99.7			
0.0750	96.3			
0.0409	69.6			
0.0319	49.6			
0.0214	36.3			
0.0173	29.6			
0.0129	25.4			
0.0092	22.0			
0.0066	19.4			
0.0033	15.1			
0.0024	14.6			
0.0014	11.8			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

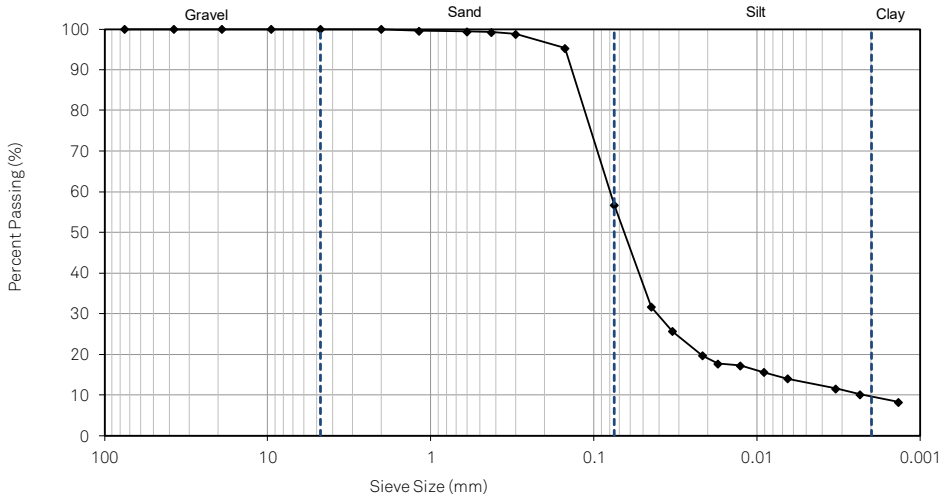
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	6-25	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Sand, silt, trace clay		
Sample Location	-		

Gravel	0.0	%	Clay	9.6	%
Sand	43.2	%	Hydro Sample Moisture Content	0.5	%
Silt	47.2	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	99.5			
0.6000	99.5			
0.4250	99.2			
0.3000	98.8			
0.1500	95.3			
0.0750	56.8			
0.0444	31.7			
0.0328	25.7			
0.0216	19.7			
0.0173	17.7			
0.0127	17.2			
0.0091	15.6			
0.0065	14.1			
0.0033	11.6			
0.0023	10.2			
0.0014	8.3			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

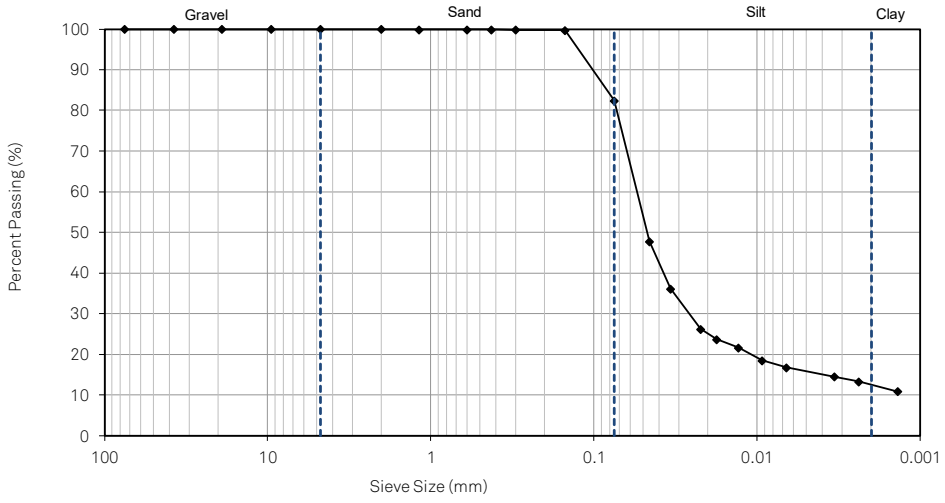
Hydrometer Particle Size Analysis

ASTM D-7928

Sample No.	6-28	Date Received	5-May-21
Sample Date	5-May-21	Date Tested	10-May-21
Time Sampled	-	Supplied by	Client
Sampled by	Client	Tested by	FG/GOM
Sample Description	Silt, some sand/clay		
Sample Location	-		

Gravel	0.0	%	Clay	12.4	%
Sand	17.5	%	Hydro Sample Moisture Content	0.8	%
Silt	70.0	%			

Sieve Size (mm)	Percent Passing	Specification		
		Sieve Size (mm)	Minimum	Maximum
75.0000	100.0			
37.5000	100.0			
19.0000	100.0			
9.5000	100.0			
4.7500	100.0			
2.0000	100.0			
1.1800	99.9			
0.6000	99.9			
0.4250	99.8			
0.3000	99.8			
0.1500	99.7			
0.0750	82.5			
0.0455	47.8			
0.0338	36.2			
0.0222	26.2			
0.0177	23.7			
0.0130	21.6			
0.0093	18.6			
0.0066	16.8			
0.0033	14.5			
0.0024	13.3			
0.0014	10.9			



Approved by	Rocky Cho

Clifton

Project No	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	1-17

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	47.1
Silt/Clay	52.9
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	1-20

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	51.0
Silt/Clay	49.0
USC	
SM	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	1-25

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	4.6
Silt/Clay	95.4
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	3-19

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	70.2
Silt/Clay	29.8
USC	
SM	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	3-24

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	23.6
Silt/Clay	76.4
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	5-15

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	70.2
Silt/Clay	29.8
USC	
SM	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	5-19

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	3.7
Silt/Clay	96.3
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	6-25

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	43.2
Silt/Clay	56.8
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Unified Soil Classification

Location	-
Depth	-
Date Sampled	May 5, 2021
Sample No.	6-28

	PL	LL1	LL2
Tare No.	Non-plastic		
Tare Wt.			
Wet Soil & Tare			
Dry Soil & Tare			
Wt of Water	0.000	0.000	0.000
Dry Soil	0.000	0.000	0.000
Water %		0.00	0.00
	Blow Count		
	Corrected Limit	-	-

Results	
PL	
LL	
PI	

Tare	
Tare + Dirty Dry	
Tare + Clean Dry	
Dry weight of sample	0.00
Weight after wash	0.00
Decant	0.00

Sieve Size (mm)	Weight Retained (g)	Total Weight Passing (g)	Percent Passing
19.000		0.00	
9.500		0.00	
4.750		0.00	
2.000		0.00	
0.425		0.00	
0.075		0.00	
Pan			

Gradation	
Gravel	0.0
Sand	17.5
Silt/Clay	92.5
USC	
ML	

Approved By: Rocky Cho

Clifton

Project No.	CG3418
Client	Suncor Energy Products Partnership
Project	Hounsfield Heights and North Hill Mall
Location	Calgary, AB

Appendix F

Clifton

APPENDIX D: Shake Test Results

Borehole	Sample ID	Date Sample Obtained	Date of Shake Test Analysis	Visual (LPH or Sheen)	PHC Odour (YES/NO)	Postive Kolor Kut Guaging Paste Test (YES/NO)
6001	13	4/30/2021	5/5/2021	NO	NO	NO
	14	4/30/2021	5/5/2021	NO	NO	NO
	15	4/30/2021	5/5/2021	NO	NO	NO
	16	4/30/2021	5/5/2021	NO	NO	NO
	17	4/30/2021	5/5/2021	NO	NO	NO
	18	4/30/2021	5/5/2021	NO	YES	NO
	19	4/30/2021	5/5/2021	NO	YES	NO
	20	4/30/2021	5/5/2021	NO	NO	NO
	21	4/30/2021	5/5/2021	NO	NO	NO
	22	4/30/2021	5/5/2021	NO	NO	NO
6002	17	4/28/2021	5/5/2021	NO	NO	NO
	18	4/28/2021	5/5/2021	NO	NO	NO
	19	4/28/2021	5/5/2021	NO	NO	NO
	20	4/28/2021	5/5/2021	NO	NO	NO
	21	4/28/2021	5/5/2021	NO	NO	NO
	22	4/28/2021	5/5/2021	NO	NO	NO
6003	18	4/28/2021	5/5/2021	NO	YES	NO
	19	4/28/2021	5/5/2021	NO	YES	NO
	20	4/28/2021	5/5/2021	NO	NO	NO
	21	4/28/2021	5/5/2021	NO	NO	NO
	22	4/28/2021	5/5/2021	NO	YES	NO
	23	4/28/2021	5/5/2021	NO	NO	NO
6004	9	4/29/2021	5/5/2021	NO	NO	NO
	10	4/29/2021	5/5/2021	NO	NO	NO
	11	4/29/2021	5/5/2021	NO	NO	NO
	12	4/29/2021	5/5/2021	NO	NO	NO
	13	4/29/2021	5/5/2021	NO	NO	NO
	19	4/29/2021	5/5/2021	NO	NO	NO
	20	4/29/2021	5/5/2021	NO	NO	NO
	21	4/29/2021	5/5/2021	NO	NO	NO
	22	4/29/2021	5/5/2021	NO	NO	NO
6005	13	4/29/2021	5/5/2021	NO	YES	NO
	14	4/29/2021	5/5/2021	NO	YES	NO
	15	4/29/2021	5/5/2021	YES; Colourless emulsion at surface	YES	YES
	16	4/29/2021	5/5/2021	NO	YES	NO
	17	4/29/2021	5/5/2021	NO	NO	NO
	18	4/29/2021	5/5/2021	NO	NO	NO
	19	4/29/2021	5/5/2021	NO	NO	NO
6006	25	4/27/2021	5/5/2021	YES; sheen	YES	NO
	26	4/27/2021	5/5/2021	NO	NO	NO

Appendix G

Clifton

SEQUOIA ENVIRONMENTAL REMEDIATION INC.
3611 – 48th Avenue SE
Calgary, Alberta
T2B 3N8

March 21, 2020

Clifton Associates Ltd
2222 – 30th Avenue NE
Calgary, Alberta T3E 7K9

Attention: Stephen d'Abadie, P. Eng

RE: **Extraction System Testing**
Hounsfield Heights-Briar Hill Multiphase Extraction System
Calgary, AB

Dear Sir:

Sequoia Environmental Remediation Inc. (Sequoia) is pleased to provide you with this report summarizing the extraction header and extraction well testing activities that were conducted at the Hounsfield Heights-Briar Hill Multiphase Extraction System during spring 2020.

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Sincerely,

Sequoia Environmental Remediation Inc. (APEGGA Permit No. P07241).

E. Jorgenson, P.Eng

B. Nevokshonoff, P.Geol

1.0 INTRODUCTION

Between February 25th and March 7th, Sequoia performed various testing on the existing extraction header and extraction wells at the Hounsfield Heights-Briar Hill Multiphase Extraction System.

2.0 OBJECTIVE

The objective of this testing was twofold. First, the integrity of the underground vapour and liquid collection headers was to be determined. If they were found to be suitable for use, the second stage was to determine experimentally a radius of vacuum influence of select extraction wells.

Anecdotally, there had been trouble in the past with the buried header between the system and EX-3, which was repaired, but did not fully solve the problem of low vacuum and high flows, indicating a pipe break. Additionally, recent frost freeze/thaw cycles in the gravel alley had been coinciding with fluctuations in vacuum in other header lines. The intent of the first stage of testing was to attempt to identify and quantify damage to each buried header.

As a performance evaluation tool, the second objective was to determine the effectiveness of the existing extraction wells. As the subsurface geology in the area appears to be relatively homogenous, representative wells were deemed adequate and were selected by Clifton and Sequoia.

3.0 HEADER INTEGRITY TESTING

Header integrity testing was performed on each of the four individual headers. The extraction system was used as a vacuum source.

The following protocol was used for these trials:

- All headers except the tested header were isolated from the system.
- The tested header was isolated from all wells and capped.
- A vacuum gauge was installed on the capped header at the location of the furthest well.
- A single extraction blower was activated in the system.
- Peak vacuum achieved was recorded.
- The header was isolated from the vacuum source.
- The vacuum source was deactivated.
- The time was recorded from the moment of isolation until the header reached zero vacuum, or a return to atmospheric pressure.

- This test was repeated at the second well in cases where more than one well was connected to the same header.
- This was repeated for each header.

It was found that all the headers tested likely are compromised, but that communication was sufficient to perform well testing with the existing system components for all wells but EX-2. A summary of testing results can be found in the table below.

Well #	Header ID	System Vac ("Hg)	Well Vac ("Hg)	System TTZ (Min:Sec)	Well TTZ (Min:Sec)	Depth from grade (inches)
EX-1	1307	-17	-16	1:10	1:50	51
EX-2	1305	-13.5	-1	<5sec	<5sec	65
EX-3	1305	-14	-12	0:05	0:05	47
EX-4	1303	-21	-19	1:00	0:50	53
EX-5	1303	-22	-21.5	1:00	1:15	40
EX-6	1301	-23	-22	3:00	3:00	38
EX-7	1301	-23	-22	3:40	3:40	44

Header Integrity Testing Results. TTZ = time to zero, or time to lose 100% of vacuum.

Generally, header 1303 was found to be in slightly worse condition than 1301, but both are in sufficient condition to continue to operate satisfactorily. Header 1303 took longer than expected to create maximum vacuum. This indicates a possible rupture in the pipe but not significant enough to prevent communication with the wells.

Header 1307 was in slightly worse shape, but still provided adequate communication to EX-1. The data indicates that header 1305 is the most compromised. We achieved some communication with Ex-3, but virtually zero communication with Ex-2. Time to zero vacuum after system shutdown was extremely short. This indicates a serious break and possibly a partial blockage between Ex-2 and Ex-3.

In the past, Sequoia had performed an excavation just north of Ex-2. A leaking pipe could be heard from the well box, and the alley was excavated to the break, about 5-10ft from the well box. A large section of splintered pipe reminiscent of freezing while full of water was found and repaired. As much header pipe as possible was scoped and no further obvious damage was found. Upon restarting the system, the communication was only marginally better than before the attempted repair.

Improper winterization is also suggested by the pipe burial depth, measured by inserting a measuring tape into the vacuum pipe at each well box until it hit a 90 degree elbow to horizontal. It was found burial depth is approximately 47” or 4ft at EX-3 and 65” at EX-2. Typically, under a gravel laneway we would suggest 2.5-3m depth or 8-10ft below grade. If a less intrusive option is desired, the header can be heat traced and insulated before backfilling, in which case 3-5ft below grade is generally acceptable for mechanical protection given proper bedding material selection.

4.0 WELL PERFORMANCE TESTING

Extraction well testing was performed with the assumption that the wells selected would be representative of performance. The onsite extraction system was used as a vacuum source.

The following protocol was used for these trials:

- All headers except the tested header were isolated from the system.
- All wells except the well being tested were isolated from the header.
- Well headspace vapours and depth to groundwater were measured and recorded from all monitoring and extraction wells and BHs likely to be utilized during the test. Note that the system was not to be active for a minimum 12h prior to this measurement in order to allow the subsurface to stabilize.
- All monitoring wells deemed likely to be used during test were capped with well caps with valved ports for monitoring device connection.
- Extraction testing was started on the target extraction well. System inlet vacuum, discharge temperature, discharge velocity, and discharge vapours were monitored at the system and subsurface vapours and vacuum was monitored in all nearby monitoring wells.
- If a vacuum reading of > 1 mm H_2O was measured in an observation well, the network of monitored wells was expanded to a further well. This was done to fully delineate vacuum influence.
- Each well was extracted on and operated for 2-5 hours or until an approximate steady state was achieved.
- The extraction system was deactivated at the end of each evening between trials.
- The process was repeated for each tested well.

The data acquired during the testing is presented in Appendix 1. Original field notes can be made available.

Upon initial testing and subsequent discussion with Clifton, it was decided to test the following wells: Ex-3, Ex-4, Ex-7.

5.0 RESULTS

Specific details of the recorded data can be found in Appendix 1. Table 1 contains a summary of all baseline data recorded during testing. Table 2 contains observation data recorded from observation wells during testing. Table 3 contains data obtained from the extraction system during operation.

Ex-7:

- Substantial vacuum influence was observed in BH1921, Ex-6, and Ex-5, located 17 m, 32 m, and 42 m respectively from Ex-7.
- A weaker response was observed in EX-2 and BH510a, located 57 m and 58 m respectively from Ex-7.
- Ex-3 was the closest well with both a similar screened interval and no observed pneumatic influence. Ex-3 is located approximately 60 m from Ex-7.

Ex-4:

- Substantial vacuum influence was observed in Ex5, BH1704, and BH1932, located 34.5 m, 15 m, and 18 m respectively from Ex-4.
- A weaker response was observed in BH1970 and BH1923, located 15.5 m and 18.5 m respectively from Ex-4.
- It should be noted that a trench containing an extraction header runs from Ex-4 to Ex-5 (and past BH1704). However, we do not believe it is likely that the pneumatic influence observed in these locations was related to the presence of the trench, due to soil logs and completion details from the installation of these wells.
- Ex-3 was the closest well with both a similar screened interval and no observed pneumatic influence. Ex-3 is located approximately 34m from Ex-4. Conversely Ex-5 is 34.5m from Ex-4 in a different direction, and pneumatic influence was observed. This indicates relatively good confidence in this radius result and suggests mild subsurface soil heterogeneity.

Ex-3:

- Substantial vacuum influence was observed in Ex-4, BH1704, BH1932, BH1923, BH1931, EX2, 510a, BH1907, and Ex-1. These wells are located 34 m, 45 m, 27 m, 25 m, 23 m, 16.5 m, 18.5 m, 70 m, and 50 m respectively from Ex-3.
- Fluctuating influence was observed in BH1925 and BH1102, located 23 m and 44 m respectively from Ex-3. This may be due to an upwelling of the groundwater table typically observed during high vacuum testing.
- A weaker response was observed in BH1970 as indicated by dropping headspace vapours and a low but repeated observation of 1mm of water column vacuum.
- Conversely Ex-7 had a repeated observed vacuum of 1mm of water column late in the test, but this result was not bolstered by vapour removal, as Ex-7’s baseline

vapour concentration was low. Therefore, we cannot say with confidence whether Ex-7 was influenced or not.

- BH1950A was the closest well with both a similar screened interval and no observed pneumatic influence. BH1950A is located approximately 20m from Ex-3, which contradicts other results found during this test. This may be due to effects from localized heterogeneity observed in drill logs from Ex-2 and BH510A. The well screen is in the vicinity of some clay/sand lensed zones as indicated by drill logs from Ex-2 and BH510A.
- BH1908 was the next closest well meeting the above criteria and is located approximately 48m from EX-3: however, this well is screened significantly deeper than the water table. Additionally, a significant reduction in headspace vapours was observed.
- Next closest is Ex-7 at 61m, however as noted previously, it cannot be said with confidence whether it was influenced
- As influence was observed in BH1907 at a distance of 70m, and this is the furthest well monitored, it is possible that the maximum extent of pneumatic influence was not determined during this trial.

6.0 CONCLUSIONS

Based on the high vacuum extraction trials completed at the site, we can make the following conclusions:

- In general, pneumatic influence appeared to be affected by the low permeability zone located above the target zone. This low permeability zone is estimated to be at a depth of approximately 5.5 to 7 m below grade.
- Well performance was relatively variable between the three wells tested, which may be attributed to either lithologic heterogeneity or well effects.
- Radius of pneumatic influence was found to be approximately 42m for Ex-7, 34m for Ex-4, and 60m for Ex-3

7.0 LIMITATIONS

The described testing was designed to provide information about a radius of influence of the multi-phase extraction system on the surrounding subsurface. Influence was generally classified as a pneumatic response greater than 2mm of water column vacuum in surrounding monitoring wells. When completing trials in lithologies like this site and where the nearest observation wells are sometimes 20 m or more away from the extraction wells and there is no change in pneumatic pressure or groundwater elevation, we often review the subsurface vapour concentrations measured in the borehole headspace to provide clues of influence. A reduction of subsurface vapour concentrations over time can be loosely tied to system influence. It must be understood that in many cases an estimate of radius of influence is different from capture zone. To determine a capture zone, a full groundwater flow modelling exercise should be completed.

The information presented herein is for the exclusive use of Clifton Associates LTD and their client where it directly pertains to the site at the Hounsfield Heights-Briar Hill Multiphase Extraction System.

The information presented herein is believed to best represent the data collected from the subject site over the period of time the data was collected. The data collected during the pilot test was collected over a short period of time. Longer periods of extraction may change the data substantially. The data was collected at site-specific locations; existing conditions in other areas of the site may differ.
If you have any questions or require additional information please contact the undersigned.

Respectively,

Sequoia Environmental Remediation Inc (APEGGA Permit No. P-7241)

E. Jorgenson, P.Eng

B. Nevokshonoff, P.Geol

APPENDIX 1

Recorded Data

Table 1
Hounsfield Heights-Briar Hill Multiphase Extraction System
Extraction well testing field data - Baseline data
Transcribed May 21st, 2020

Time	Well ID	Depth to GW (m)	Well headspace vapours (ppm)	Comments
April 21, 2020				Note: System was operating immediately before testing. Baseline readings likely invalid
12:00	EX-7	11.19	0	
12:00	EX-6	10.83	120	TD: 12.1 m
12:00	1921	11.53	15	TD:19.11m
12:00	1925	13.62	0	TD: 18.97m
17:50	510A		15	Eagle requiring multiple zero airs
17:55	1950A		10	
April 22, 2020				
13:02	1925	13.63	45	
13:08	1950A	10	670	
13:12	510A	13.47	35	
13:16	EX-2			Locked in ice
15:13	EX-6	10.83	45	
15:19	EX-5		25	nm, well frozen
15:24	17-04	10.45	2150	
15:31	EX-4		50	nm, well frozen
15:37	1970	dry	880	TD: 8.55m
April 29, 2020	Well ID	Depth to GW (m)	Well headspace vapours (ppm)	Comments
7:45	1923	10.211	5	
8:00	EX-4	9.77	25	Due to freezing, GW recorded to top of strain relief
8:15	1704	10.52	230	Fixed broken road box
8:25	1908	10.792	7350	
8:30	EX-5	10.463	370	
8:45	EX-6	10.911	60	
9:00	EX-7	11.251	5	
9:15	1970		8800	Dry to TD 8.502
9:30	1969		150	Dry to TD 7.460
9:45	1932		45	Dry to TD 7.009
9:50	1931		120	Dry to TD 7.305
10:20	EX-2	12.805	0	GW measured from top of broken cap
10:30	510a	13.549	0	
10:40	1950a	10.055	65	Could not install monitoring cap as it would
10:45	1925	13.7	0	completely block resident's driveway.
11:00	EX-3	11.26	0	
11:15	EX-1	13.56	10	
	1969		0	Re-do with recalibrated eagle
	1932		20	Re-do with recalibrated eagle
	1923		25	Re-do with recalibrated eagle
	1931		10	Re-do with recalibrated eagle
April 30, 2020	Well ID	Depth to GW (m)	Well headspace vapours (ppm)	Comments
7:35	1970	Dry	2700	
7:40	1908	10.723	1050	
7:45	1969	Dry	0	
7:55	1704	10.475	>12500	
8:05	1923	10.165	170	
8:15	1932	Dry	15	
8:25	1931	Dry	35	
8:45	EX-3	11.207	50	
9:30	510a	13.491	10	
9:40	1950a	9.983	10	
9:45	1925	13.643	0	
10:56	EX-2	12.65	60	Had to steam
9:15	EX-1	13.252	0	
11:10	EX-4	9.925	100	Had to steam
11:20	EX-5	10.396	90	
11:30	EX-6	10.96	15	
11:40	EX-7	11.172	0	
May 5, 2020	Well ID	Depth to GW (m)	Well headspace vapours (ppm)	Comments
11:07	1921	11.481	0	
11:15	EX-6	10.922	5	
11:24	EX-7	11.264	15	
11:50	EX-2	12.77	25	
11:55	510a	13.585	0	
11:57	1950a	10.085	470	
11:59	1925	13.723	5	

Table 2
Hounsfield Heights-Briar Hill Multiphase Extraction System
Extraction well testing field data - Observation Well Data
Transcribed May 21st, 2020

April 21, 2020
Extraction Well: EX-7

Well ID:	1921		EX6		EX2		510a		1950a		1925		EX5		EX3		EX1	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
13:22	40	nm	25	nm														
13:46	10	nm	60	nm							30	nm						
14:28	0	nm	40	nm							0	nm						
14:58	10	9	80	0							5	1						
15:15	15	11	110	0							15	0						
15:56	20	14	60	0							15	0						
16:13	15	14	70	0							15	0						
16:36	5	14	75	0														

May 5, 2020
Extraction Well: EX-7

Well ID:	1921		EX6		EX2		510a		1950a		1925		EX5		EX3		EX1	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
12:26	5	12	10	15	0	8	5	8	300	0	10	0						
12:40	0	14	0	15														
13:00		16		15		6		6		2		0						
13:20	5	20	0	18	15	6	15	6	380	0	25	0						
14:12	0	26	0	27	5	4	5	4	400	0	25	0	300	18	20	0	25	0

April 29, 2020
Extraction Well: EX-4

Well ID:	EX5		1704		1908		1970		1969		1923		1932	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
13:12	75	0	20	11	410	0	1150	1	0	0	20	0	30	11
13:46	70	0	15	25	240	0	1700	2	0	0	20	0	15	12
14:45		0		33		0		4		0		3		12
15:25	70	0	5	34	300	0	1300	3	0	0	10	6	15	12
15:55	70	15		35		0		4		0		5		11
16:50	75	11		36		0		4		0		5		10

April 29, 2020
Extraction Well: EX-4

Well ID:	EX3		1102		1968		1967		1907		EX6	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
14:45		0		0								
15:25	70	0	290	0								
15:50		0		0								
16:50		0		0	0	0	0	0	0	0	0	0

April 30, 2020
Extraction Well: EX-3

Well ID:	EX4		1704		1932		1923		1931		EX2		510a		EX7		1907	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
12:20	10	0	>12,500	0	0	8	190	4	35	1	35	55	20	31				
13:00	55	11	>12,500	6	0	8	0	26	35	3	30	101	5	56				
13:45		24		14		8		36		5		136		108				
14:20	90	30	>12,500	18	10	8	10	40	30	6	40	158	15	134				
15:24																		
15:30		27		26		8				7						0		0
16:00		41		29		8				7						0		0
16:30	95	45	>12,500	32		9			25	8					0	1	>12,500	5
17:15					0											1		8

April 30, 2020
Extraction Well: EX-3

Well ID:	1950a		1925		EX1		1970		1908		1969		EX5		1102	
Time	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)	Vapour (ppm)	Vacuum (mm h2o)
13:00	35	0	50	0	35	0										
13:45		0		16		0		0		0		0				
14:20	40	0	10	4	35	0	1350	0	370	0	80	0	15	0	100	2
15:30		0		12		3		0		0		0		1		4
16:00		0		7		7		1		0		0		0		3
16:30	30	0	0	9	45	21	620	1	320	0	0	2	30	1	190	5
17:15														0		

Table 3
Hounsfield Heights-Briar Hill Multiphase Extraction System
Extraction well testing field data - Extraction System Data
Transcribed May 21st, 2020

Pipe diameter = 4.5"						
Time	**System Vac ("Hg)**	**Wellhead Vac ("Hg)**	**Temp (C)**	**Velocity (m/s)**	**Vapours (ppm)**	**Comments**
April 21, 2020						
12:58	21.5	20	80	0.7	100	1 Blower no dilution - producing liquid
13:39	23	22	80	0.9	90	
14:13	23.2	22	80	0.8	120	
14:35	23.2	22	82.6	0.8	110	
15:03	23.2	22	82.3	0.8	150	
15:42	23.3	22	81.9	0.8	170	
16:02	22.7	22	83.4	0.8	170	
16:22	22.3	22	85.3	0.8	150	
16:44	22.1	22	86.8	0.9	140	
April 29, 2020	**Discharge Temp (deg C)**	**System Vac ("Hg)**	**Blower Vac ("Hg)**	**Velocity (m/s)**	**Vapours (ppm)**	**Comments**
12:55	61.9	21.6	22.9	ND	75	1 Blower no dilution - producing liquid
13:37	93.4	21.2	21.8	ND	110	
14:06	98.7	21.2	21.8	ND	140	
15:05	101.9	21.2	21.8	ND	170	PLC vaps 220
15:50	104.8	21.1	21.8	ND	250	PLC vaps 320 lowered drop tube to 2' from bottom
16:42	106.2	21.0	21.8	ND	300	plc vaps 390
April 30, 2020	**Discharge Temp (deg C)**	**System Vac ("Hg)**	**Blower Vac ("Hg)**	**Velocity (m/s)**	**Vapours (ppm)**	**Comments**
12:03	57.6	17.9	18.5	13.0	45	2 blowers no dilution - producing liquid
12:50	96.7	17.6	18.6	3.7	40	
13:40	101.8	17.4	18.6	3.7	40	
14:10	104	17.2	18.5	4.4	25	
16:18	108.5	16.7	18.5	3.5	45	PLC CFMs and Vapours reading all over the place.
May 5, 2020	**Discharge Temp (deg C)**	**System Vac ("Hg)**	**Blower Vac ("Hg)**	**Velocity (m/s)**	**Vapours (ppm)**	**Comments**
12:49	73.4	21.9	22.5	0	6700	1 Blower no dilution - producing liquid
13:34	81	22.2	22.5	0	4950	PLC vapours 464-1100ppm

Appendix H

Clifton

CG3418/12 - Suncor DPVE Performance Monitoring

Header Test	1301, 1303
Comments	Discharge valve adjusted daily to ~17-18 in Hg.
Technician	B. Gelowitz

DPVE Vacuum Pressure		Time	Date		Pressure Before Test (in Hg)	Pressure After Test (in Hg)
Initial DPVE startup		13:05	10-Dec-20		0	18.5
0.5 hr Test		13:45	10-Dec-20		18.5	20.5
12 hr Test		8:00	11-Dec-20		15.5	17.25
24hr test		15:15	11-Dec-20		17.25	14.5

Date	10-Dec-20				10-Dec-20				11-Dec-20				11-Dec-20						
Well	Time	Before turning on DPVE (in H2O):		(mm H2O)	Time	0.5 hr after turning on DPVE (in H2O):		(mm H2O)	Time	12 Hours Later (in H2O)		(mm H2O)	Time	24 Hours Later (in H2O):		(mm H2O)	Vapour (OVA/PID):		Comment
1923	13:40	Magnehelic	0.00	0.00	15:35	Magnehelic	-0.15	-3.81	8:15	Magnehelic	-0.20	-5.08	15:15	Magnehelic	0.00	0.00	Before	45/6	well frozen full of H20
EX-2	14:00	Magnehelic	-0.05	-1.27	15:40	Magnehelic	-0.05	-1.27	8:20	Magnehelic	-0.15	-3.81	15:30	Magnehelic	0.00	0.00	Before	0/4	
1921	14:26	Magnehelic	-0.70	-17.78	15:55	Magnehelic	-1.50	-38.10	8:40	Magnehelic	-1.65	-41.91	15:40	Magnehelic	-0.55	-13.97	Before	0/2	
1910	14:55	Magnehelic	0.00	0.00	16:30	Magnehelic	0.00	0.00	9:10	Magnehelic	0.00	0.00	16"30	Magnehelic	0.00	0.00	Before	0/5	Positive magnehelic
1906	15:00	Magnehelic	-0.15	-3.81	16:40	Magnehelic	-0.15	-3.81	9:15	Magnehelic	-0.05	-1.27	16:40	Magnehelic	0.00	0.00	Before	0/50	cracked hose on vacuum cap
1907	15:01	Magnehelic	-0.10	-2.54	16:45	Magnehelic	-0.30	-7.62	9:25	Magnehelic	-0.20	-5.08	16:50	Magnehelic	0.00	0.00	Before	>11,110/838	
1102	14:42	Magnehelic	-0.03	-0.64	16:50	Magnehelic	0.00	0.00	9:35	Magnehelic	0.00	0.00	17:00	Magnehelic	0.00	0.00	Before	0/2	
EX6	14:40	Magnehelic	-0.35	-8.89	17:05	Magnehelic	-70.0	-1778.00	9:00	Magnehelic	-74.0	-1879.60	16:05	Magnehelic	-64.0	-1625.60	Before	0/6	
EX5	14:45	Magnehelic	0.00	0.00	16:10	Magnehelic	> -100	-2540.00	8:55	Magnehelic	-46.0	-1168.40	16:10	Magnehelic	-55.0	-1397.00	Before	0/2	After 24 hr test, broke ball valve off well cap
EX4	14:50	Magnehelic	-0.05	-1.27	16:20	Magnehelic	-0.25	-6.35	9:05	Magnehelic	-0.60	-15.24	16:20	Magnehelic	-0.15	-3.81	Before	0/2	
EX1	14:10	Magnehelic	0.00	0.00	15:45	Magnehelic	-0.15	-3.81	8:30	Magnehelic	0.00	0.00	15:45	Magnehelic	0.00	0.00	Before	0/3	
EX7	14:30	Magnehelic	-0.10	-2.54	16:55	Magnehelic	> -100	-	8:50	Magnehelic	-7.00	-177.80	16:00	Magnehelic	-8.0	-203.20	Before	0/8	

Date	Time	Barometric Pressure
10-Dec-20	13:00	102.4
11-Dec-20	7:00	102.5

CG3418/12 - Suncor DPVE Performance Monitoring

Header Test	1305 (EX2/EX3)
Comments	
Technician	B. Gelowitz

DPVE Vacuum Pressure			Time	Date		Pressure Before Test (in Hg)	Pressure After Test (in Hg)
Initial DPVE startup			8:00	17-Dec-20		0	-13.5
0.5 hr Test			8:30	17-Dec-20		-13.5	-13.5
12 hr Test			16:00	17-Dec-20		-13.5	-13.25
24hr test			16:50	18-Dec-20		-13.00	-13.0

Date																			
Well	Time	Before turning on DPVE (in H2O):		(mm H2O)	Time	30 minutes after turning on DPVE (in		(mm H2O)	Time	12 Hours Later (in H2O)		(mm H2O)	Time	24 Hours Later (in H2O):		(mm H2O)	Vapour (OVA/PID):		Comment
1923	7:05	Magnehelic	0.00	0.00	9:00	Magnehelic	-0.10	-2.54	16:05	Magnehelic	-0.95	-24.13	15:00	Magnehelic	0.00	0.00	Before	0/0	
EX-2	7:25	Magnehelic	0.00	0.00	9:15	Magnehelic	0.00	0.00	16:20	Magnehelic	-0.80	-20.32	15:20	Magnehelic	0.00	0.00	Before	0/1	
1921	7:40	Magnehelic	0.00	0.00	9:20	Magnehelic	0.00	0.00	16:30	Magnehelic	-0.75	-19.05	15:35	Magnehelic	0.00	0.00	Before	0/0	
1910	8:20	Magnehelic	0.00	0.00	9:40	Magnehelic	0.00	0.00	16:45	Magnehelic	-0.35	-8.89	15:40	Magnehelic	0.00	0.00	Before	0/7	
1906	8:25	Magnehelic	0.00	0.00	9:45	Magnehelic	0.00	0.00	16:55	Magnehelic	-0.10	-2.54	15:45	Magnehelic	0.00	0.00	Before	0/10	
1907	8:30	Magnehelic	0.00	0.00	9:50	Magnehelic	0.00	0.00	17:05	Magnehelic	-1.15	-29.21	16:10	Magnehelic	0.00	0.00	Before	>11,100/840	
1102	8:40	Magnehelic	-0.05	-1.27	9:55	Magnehelic	-0.20	-5.08	17:15	Magnehelic	-0.30	-7.62	16:15	Magnehelic	0.00	0.00	Before	0/1	
EX6	8:00	Magnehelic	-0.15	-3.81	9:30	Magnehelic	-5.00	-127.00	16:40	Magnehelic	-0.30	-7.62	15:50	Magnehelic	-0.10	-2.54	Before	0/17	
EX5	8:05	Magnehelic	0.00	0.00	9:35	Magnehelic	-1.00	-25.40	16:45	Magnehelic	-2.40	-60.96	15:55	Magnehelic	-2.70	-68.58	Before	0/12	
EX4	8:15	Magnehelic	0.00	0.00	9:38	Magnehelic	0.00	0.00	16:43	Magnehelic	-0.90	-22.86	16:00	Magnehelic	0.00	0.00	Before	0/19	
EX3	7:15	Magnehelic	0.00	0.00	9:05	Magnehelic	-0.80	-20.32	16:15	Magnehelic	-1.50	-38.10	15:15	Magnehelic	0.00	0.00	Before	0/1	
EX1	7:40	Magnehelic	0.00	0.00	9:10	Magnehelic	0.00	0.00	16:25	Magnehelic	0.00	0.00	15:25	Magnehelic	0.00	0.00	Before	0/1	Vacuum observed after troubleshooting- not high
EX7	7:50	Magnehelic	0.00	0.00	9:20	Magnehelic	0.00	0.00	16:35	Magnehelic	-1.10	-27.94	15:45	Magnehelic	0.00	0.00	Before	105/84	

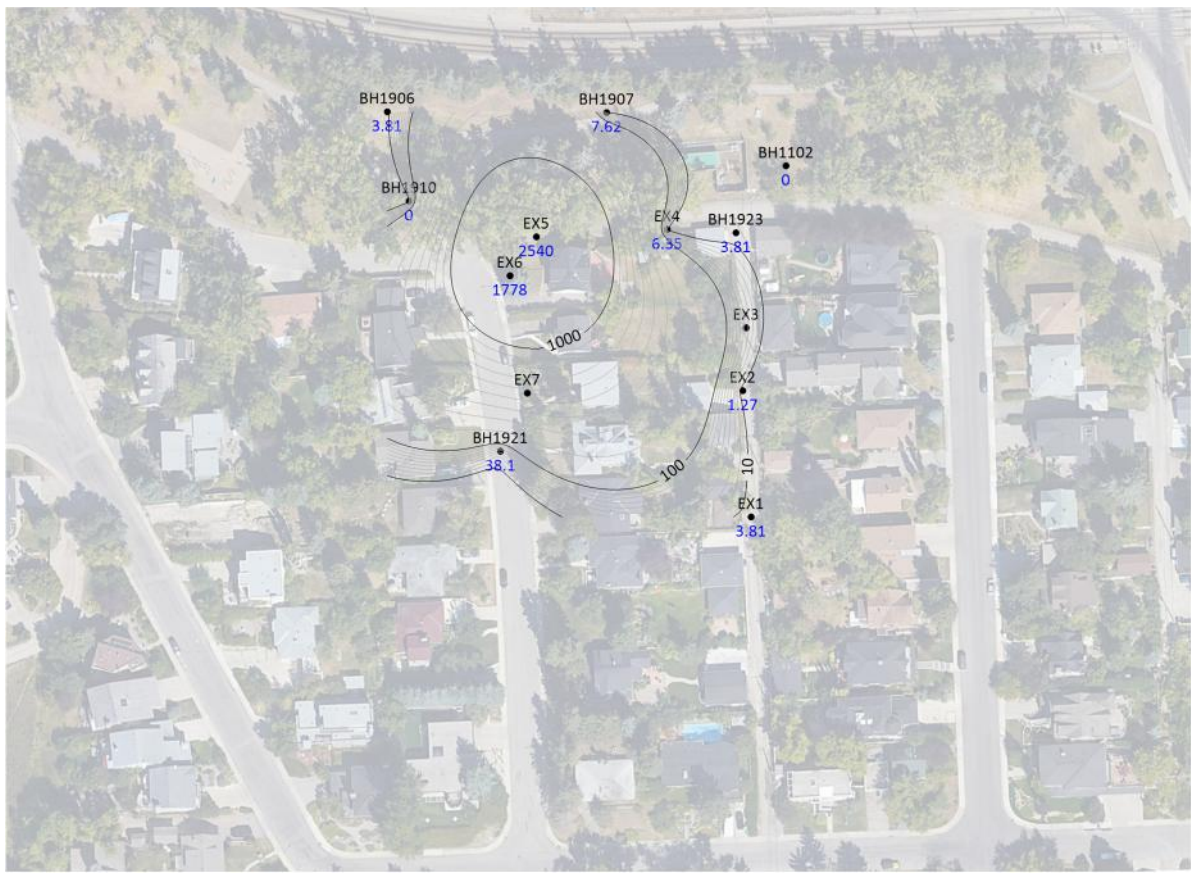
CG3418/12 - Suncor DPVE Performance Monitoring

Header Test	1305, 1307
Comments	EX1, EX2, EX3 running w/ vacuum, no draw of water observed
Technician	B. Gelowitz

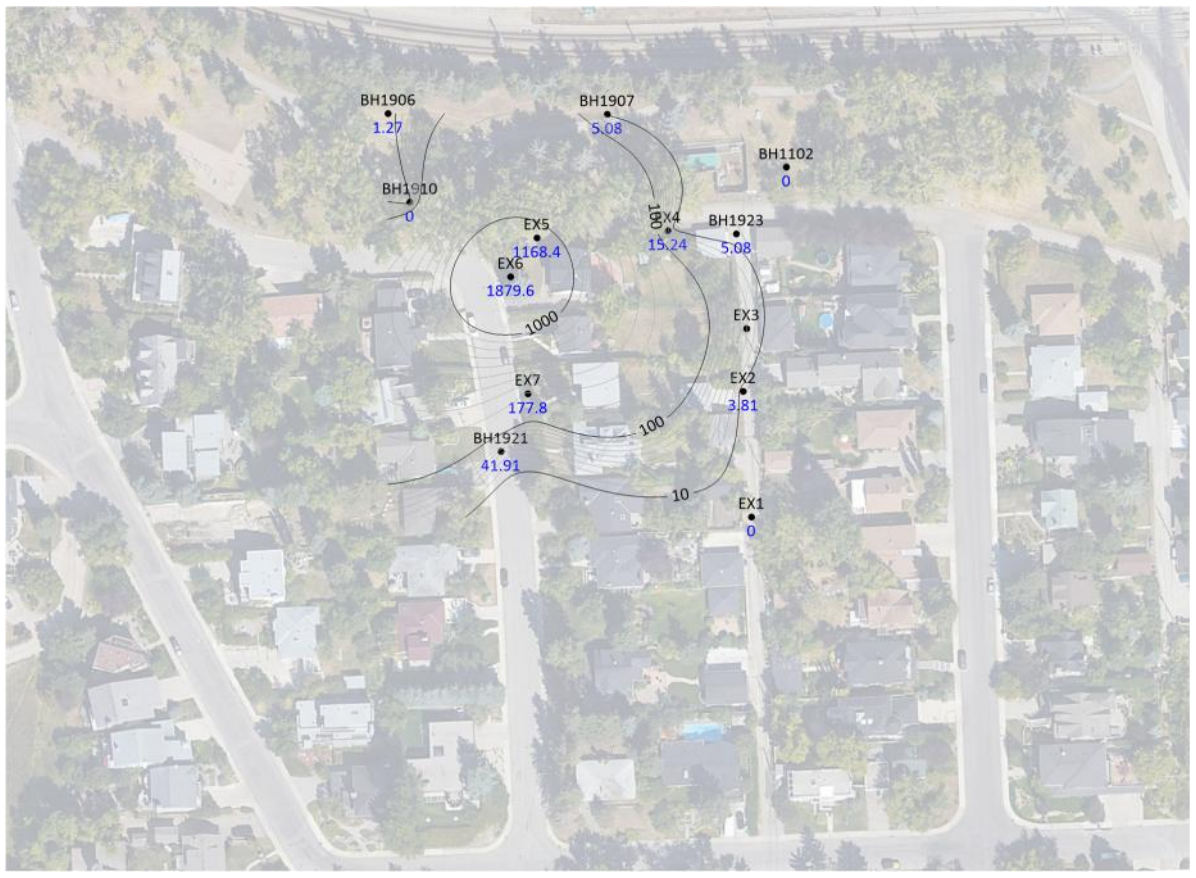
DPVE Vacuum Pressure	Time	Date	Pressure Before Test (in Hg)	Pressure After Test
Initial DPVE startup	9:00	15-Jan-21	0	0
0.5 hr Test	11:30	15-Jan-21	14.5	14.5
12 hr Test				
After 24hr test	10:45	16-Jan-21	14.0	14.0

Date	15-Jan-21				15-Jan-21							16-Jan-21				
Well	Time	Before turning on DPVE (in H2O):		(mm H2O)	Time	30 minutes after turning on DPVE (in		(mm H2O)	Time	24 Hours Later (in		(mm H2O)	Vapour (OVA/PID):		Comment	
				(mm H2O)		30 minutes after turning on DPVE (in		(mm H2O)		24 Hours Later (in H2O):		(mm H2O)				
1923	9:40	Magnehelic	-0.10	-2.54	12:15	Magnehelic	-0.30	-7.62	10:50	Magnehelic	-4.50	-114.30	Before	0/0		
EX-2	10:10	Magnehelic	0.00	0.00	12:40	Magnehelic	-30.00	-762.00	11:00	Magnehelic	-9.50	-241.30	Before	0/1	Adjusted hose (~12") uphole above	
1921	10:25	Magnehelic	0.00	0.00	12:55	Magnehelic	0.00	0.00	11:10	Magnehelic	-5.50	-139.70	Before	0/0		
1910	10:55	Magnehelic	0.00	0.00	13:00	Magnehelic	0.00	0.00	11:32	Magnehelic	0.00	0.00	Before	0/4	No influence	
1907	11:10	Magnehelic	0.00	0.00	13:05	Magnehelic	0.00	0.00	11:40	Magnehelic	-0.65	-16.51	Before	>11,100/840		
1102	11:15	Magnehelic	0.00	0.00	13:10	Magnehelic	0.00	0.00	11:45	Magnehelic	-0.35	-8.89	Before	0/1		
EX6	11:25	Magnehelic	0.00	0.00	12:12	Magnehelic	-49.0	-1244.60	11:20	Magnehelic	-52.0	-1320.80	Before	0/10		
EX5	10:40	Magnehelic	0.00	0.00	12:08	Magnehelic	0.00	0.00	11:25	Magnehelic	0.00	0.00	Before	0/5	No influence	
EX4	10:46	Magnehelic	-0.05	-1.27	12:10	Magnehelic	0.00	0.00	11:30	Magnehelic	-3.00	-76.20	Before	0/10		
EX3	9:55	Magnehelic	0.00	0.00	12:25	Magnehelic	-100.0	-2540.00	10:55	Magnehelic	-5.00	-127.00	Before	0/1	Adjusted hose (~8") uphole above	
EX1	10:20	Magnehelic	0.00	0.00	12:05	Magnehelic	-42.00	-1066.80	11:05	Magnehelic	-19.00	-482.60	Before	0/1	Adjusted hose (~6") uphole above	
EX7	10:34	Magnehelic	0.00	0.00	12:50	Magnehelic	-4.50	-114.30	11:15	Magnehelic	-10.0	-254.00	Before	75/50		

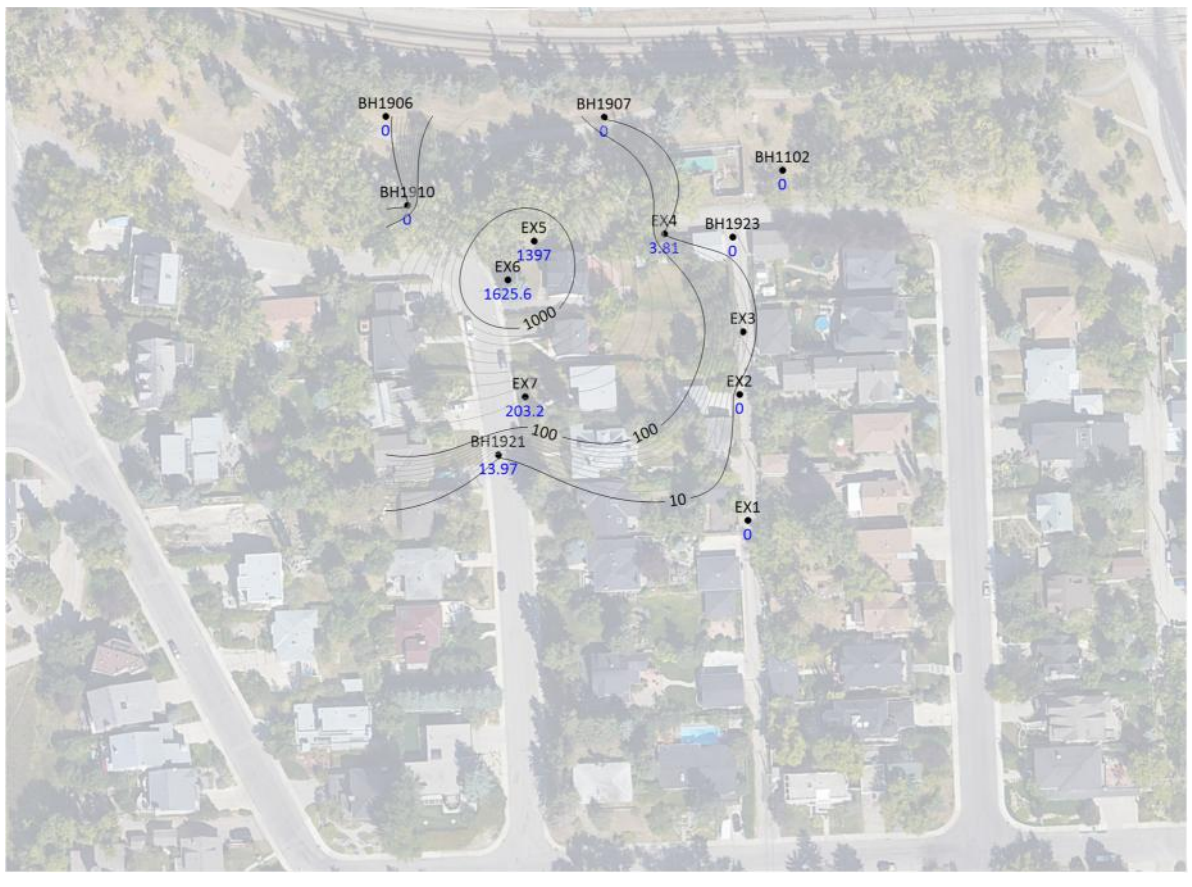
Date	Time	Barometric Pressure (kPa)
15-Jan-21	9:00	101.8
16-Jan-21	10:00	102.5



Headers 1301 (EX6, EX7) and 1303 (EX4, EX5) On, 30 Minutes Units of Vacuum in mm of Water



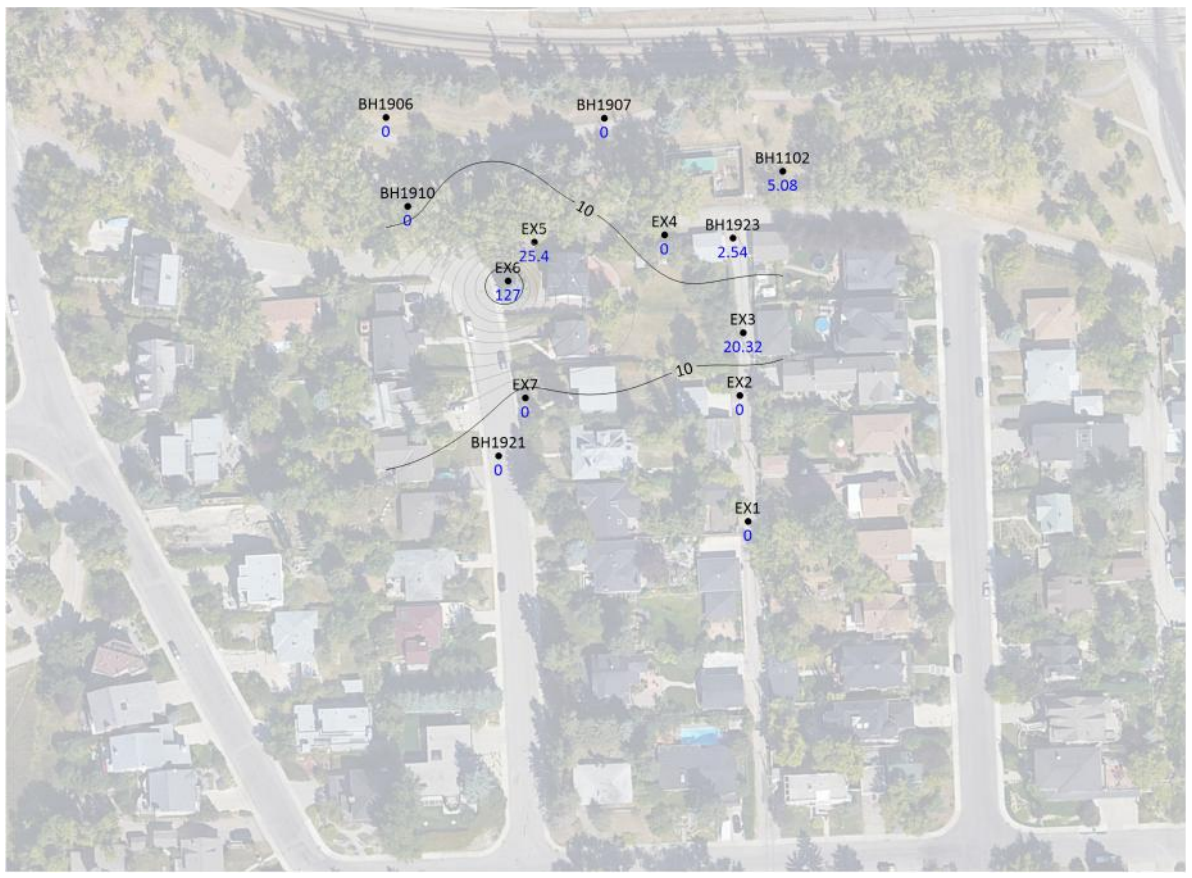
Headers 1301 (EX6, EX7) and 1303 (EX4, EX5) On, 12 Hours, Units of Vacuum in mm of Water



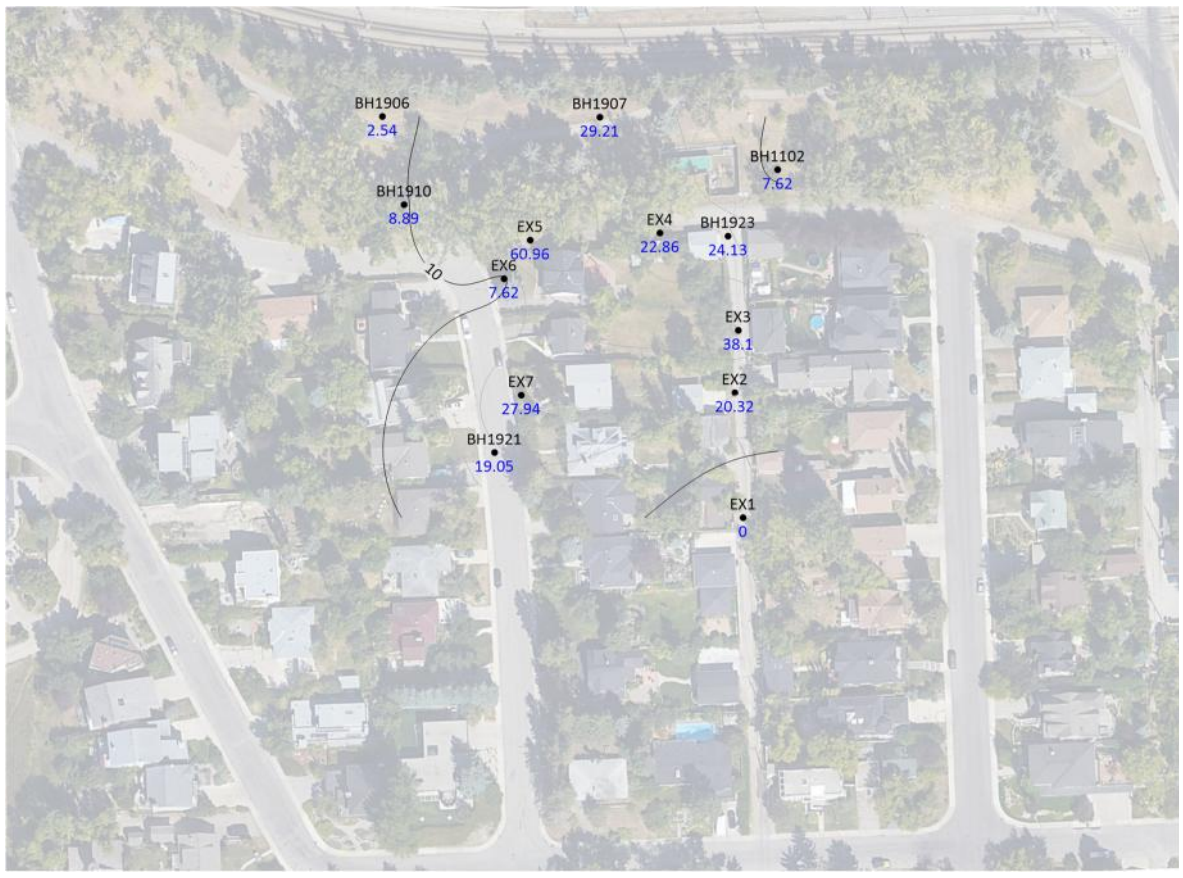
Headers 1301 (EX6, EX7) and 1303 (EX4, EX5) On, 24 Hours, Units of Vacuum in mm of Water

Headers 1305 (EX2, EX3) and 1307 (EX1) On, 30 Minutes, Units of Vacuum in mm of Water

Headers 1305 (EX2, EX3) and 1307 (EX1) On, 24 Hours, Units of Vacuum in mm of Water



Header 1305 (EX2, EX3) On, 30 Minutes, Units of Vacuum in mm of Water



Header 1305 (EX2, EX3) On, 12 Hours, Units of Vacuum in mm of Water

Header 1305 (EX2, EX3) On, 24 Hours, Units of Vacuum in mm of Water

Appendix I

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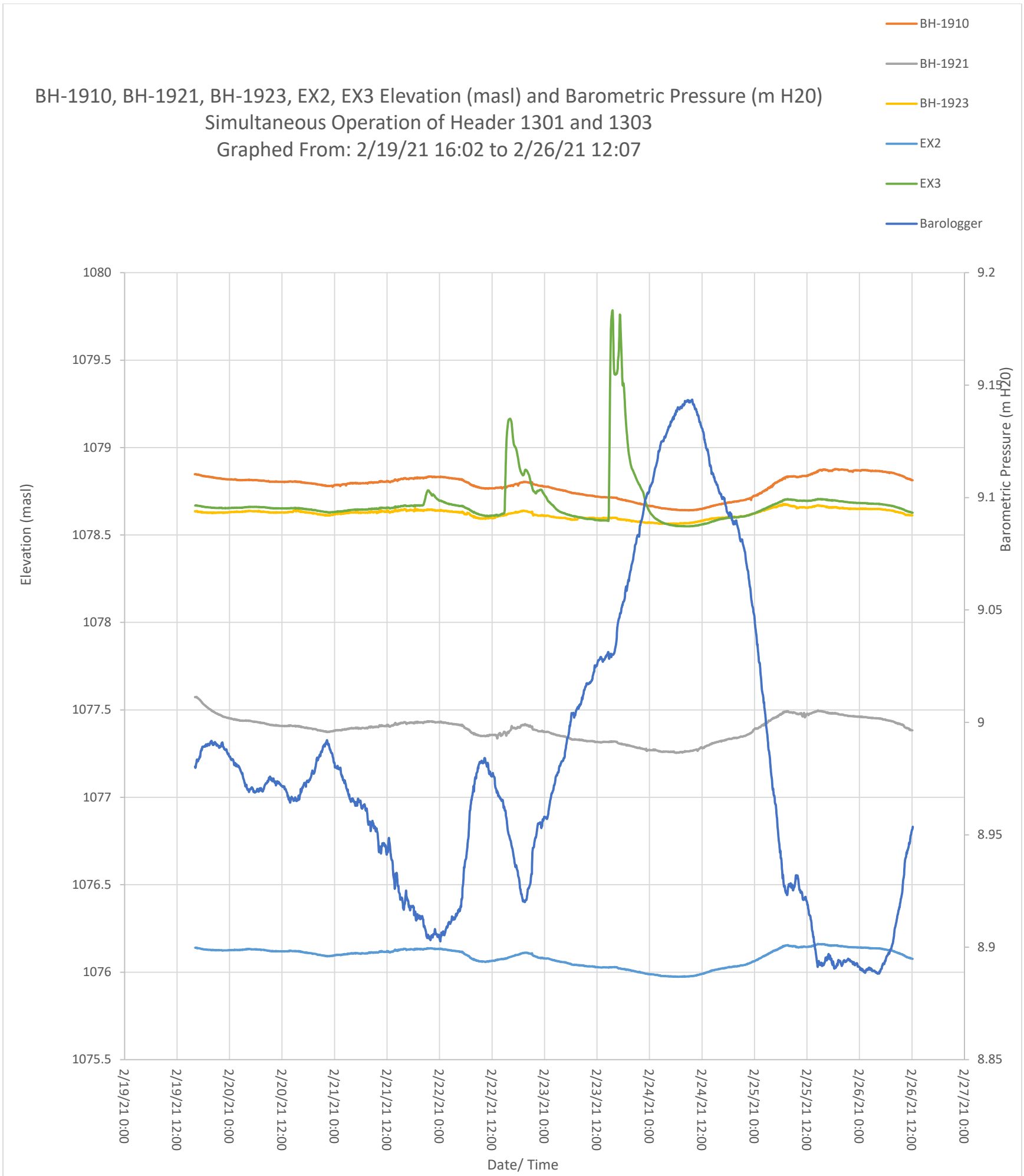
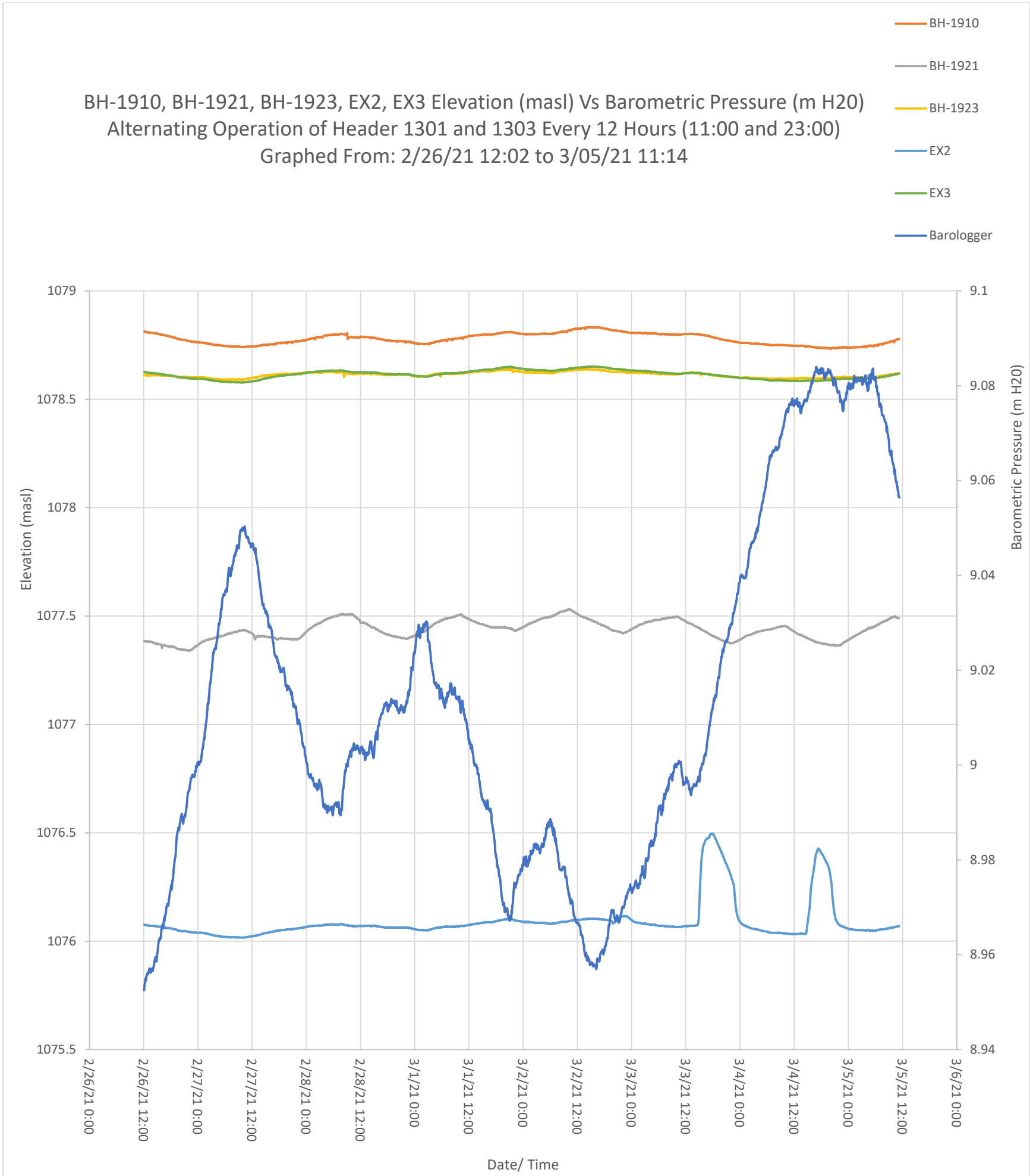

BH-1910, BH-1921, BH-1923, EX2, EX3 Elevation (masl) and Barometric Pressure (m H20)
Simultaneous Operation of Header 1301 and 1303
Graphed From: 2/19/21 16:02 to 2/26/21 12:07
BH-1910
BH-1921
BH-1923
EX2
EX3
Barologger
Elevation (masl)
Barometric Pressure (m H20)
1080
1079.5
1079
1078.5
1078
1077.5
1077
1076.5
1076
1075.5
9.2
9.15
9.1
9.05
9
8.95
8.9
8.85
2/19/21 0:00
2/19/21 12:00
2/20/21 0:00
2/20/21 12:00
2/21/21 0:00
2/21/21 12:00
2/22/21 0:00
2/22/21 12:00
2/23/21 0:00
2/23/21 12:00
2/24/21 0:00
2/24/21 12:00
2/25/21 0:00
2/25/21 12:00
2/26/21 0:00
2/26/21 12:00
2/27/21 0:00
Date/ Time


BH-1910, BH-1921, BH-1923, EX2, EX3 Elevation (masl) Vs Barometric Pressure (m H20)
Alternating Operation of Header 1301 and 1303 Every 12 Hours (11:00 and 23:00)
Graphed From: 2/26/21 12:02 to 3/05/21 11:14
BH-1910
BH-1921
BH-1923
EX2
EX3
Barologger
Elevation (masl)
Barometric Pressure (m H20)
1079
1078.5
1078
1077.5
1077
1076.5
1076
1075.5
9.1
9.08
9.06
9.04
9.02
9
8.98
8.96
8.94
2/26/21 0:00
2/26/21 12:00
2/27/21 0:00
2/27/21 12:00
2/28/21 0:00
2/28/21 12:00
3/1/21 0:00
3/1/21 12:00
3/2/21 0:00
3/2/21 12:00
3/3/21 0:00
3/3/21 12:00
3/4/21 0:00
3/4/21 12:00
3/5/21 0:00
3/5/21 12:00
3/6/21 0:00
Date/ Time

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