File CG2430.1 E06

Sears Canada Inc.
Soil Vapour Monitoring Report
Spring 2016

Hounsfield Heights and North Hill Mall
Calgary, Alberta

Clifton Associates

9 December 2016 CG2430.1E06

Sears Canada Inc.
Soil Vapour Monitoring Report
Spring 2016

Hounsfield Heights and North Hill Mall

Calgary, Alberta

Table of Contents

List of Tables (in Text)

Appendices

1.0 Introduction

Clifton Associates Ltd. (Clifton) is pleased to present this Soil Vapour Monitoring Report-Spring 2016 (Report) prepared for the account of Sears Canada Inc. to the stakeholders. The Report describes in detail methodology of soil vapour samples collection, Quality Assurance/Quality Control (QA/QC) implementation and interpretation of soil vapour sampling results in the Hounsfield Heights community and North Hill Mall area within the City of Calgary (hereinafter referred to as the Site) conducted by Clifton in the spring 2016.

The presented document is partially based on the previous environmental work completed for Sears in both the Mall area and the Hounsfield Heights area by Clifton and by Intrinsik Environmental Sciences Inc. (Intrinsik). Therefore, the presented document should be read and understood in conjunction with the following reports:

- Clifton Associates Ltd.: *Sears Canada Inc., Revised Soil Vapour Monitoring Program (Update Fall 2016), Hounsfield Heights and North Hill Mall, Calgary, Alberta,* 20 October 2016 (Revised SVMP);
- Clifton Associates Ltd.: *Sears Canada Inc., Soil Vapour Monitoring Points Installation Report, Hounsfield Heights and North Hill Mall, Calgary, Alberta,* 20 October 2016 (Installation Report);
- Clifton Associates Ltd.: *Subsurface Investigation-Mall Area and Hounsfield Heights,* 22 January 2016 (2016 SI);
- Clifton Associates Ltd.: *Updated Site Management Plan (2014), Hounsfield Heights-Briar Hill Community, Calgary, Alberta,* April 2014 (2014 Updated SMP);
- Intrinsik Environmental Sciences Inc.: *Draft Report-Human Health and Ecological Risk Assessment for the Hounsfield Heights Community and North Hill Mall Areas, Calgary, Alberta,* December 2015 (2015 HHERA); and,
- Intrinsik Environmental Sciences Inc.: *Final Report-Development of Soil Vapour Quality Guidelines*, 31 August 2016.

The presented Report follows guidance, protocols, scientific rationale and best practices as outlined in the following, but not limited to, documents:

- Alberta Environment and Parks: *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, 2016 (2016 AEP Tier 1 Guidelines);
- Alberta Environment and Parks: *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, 2016 (2016 AEP Tier 2 Guidelines);
- Canadian Council of Ministers of the Environment: *A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapors*, 2014 (2014 CCME Protocol);
- British Columbia Ministry of Environment: *Technical Guidance on Contaminated Sites 4,* version 1, September 2010 (BC TG-4);
- Golder Associates Ltd.: *Guidance on Site Characterization for Evaluation of Soil Vapour Intrusion into Buildings,* Submitted to the British Columbia Ministry of Environment by Science Advisory Board for Contaminated Sites in British Columbia, May 2011 (2011 Golder Guidance);
- Health Canada: *Federal Contaminated Site Risk Assessment in Canada, Part VII: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites*, September 2010 (2010 HC); and,
- Johnson, P.C., & R. Ettinger: *Heuristic Model for predicting the Intrusion Rate of Contaminant Vapours into Buildings*, 1991(J&E Model).

2.0 Project Background

Since 1998, site investigations have revealed the presence of PHCs in the subsurface soils and groundwater beneath City of Calgary properties in the Hounsfield Heights community in Calgary, Alberta. The source of the PHCs is suspected to be a former gasoline station on the property owned by Sears located at the North Hill Shopping Centre as stipulated in the 2014 Updated SMP. Evidence suggests that gasoline may have leaked from underground fuel storage tanks prior to their removal in the mid-1990s when the gasoline station was decommissioned.

In 2006, Intrinsik (operating as Cantox Environmental at the time of the report) completed a risk assessment of the Hounsfield Heights community (Cantox 2006). The purpose of the assessment was to identify the potential health risks to people residing in the Hounsfield Heights community, as well as to ecological receptors that frequent the area, from the PHC-impacted subsurface soils and groundwater. Concentrations of various petroleum hydrocarbon constituents (*e.g.,* benzene, toluene, ethyl benzene, xylenes-BTEX) and PHCs fractions (*e.g.,* F1 and F2) measured in the soils and groundwater beneath the City-owned properties (e.g. parks, roads, and alleyways) were compared to the corresponding generic (Tier 1) guidelines from Alberta Environment and Sustainable Resource Development (Alberta ESRD, formerly Alberta Environment) for the protection of human health, safety, and the environment. In addition, site-specific (Tier 3) risk management guidelines were developed for selected petroleum hydrocarbons (*i.e.*, benzene and the F1 PHC fraction). Overall, assessment results indicated that the potential for adverse effects to human health and ecological receptors was low. However, some uncertainties were identified surrounding the on-site impacts (i.e., Mall Area), presence of free-product off-site (Hounsfield Heights area), and an expanding dissolved phase plume off-site. These uncertainties were addressed through the implementation of remediation and monitoring programs.

Since 2006, a summary of the remediation and monitoring programs is as follows (2014 Updated SMP):

- Between 2006 and 2007, remedial excavation of the impacted soils in the Mall area was completed;
- Groundwater monitoring has continued within the Hounsfield Heights and Mall area at specific monitoring wells through a groundwater sampling program on an approximate bi-annual basis; and,
- A dual-phase vapour extraction (DPVE) system was installed in 2008 to remove Liquid Petroleum Hydrocarbons (LPH) in the Hounsfield Heights area. The system began running full time in 2011.

On 20 July 2012, Alberta ESRD requested that Sears update its site management plan for the Mall and Hounsfield Heights area and address the following points:

- Fully delineate the dissolved plume south of 11th Avenue NW;
- Sample the groundwater adjacent to where it discharges to the surface in the southern portion of Zone 3 (south of 11th Avenue NW) and evaluate it for risk to ecological receptors;
- Delineate the soil gas/vapour plume at the Site;

- Assess potential risks from indoor air infiltration of petroleum hydrocarbon vapours in areas where the vapour inhalation pathway exceeds guidelines, and in areas where it has been determined that elevated soil gas/vapours are present;
- Establish a soil gas monitoring program on properties that may be at risk from indoor air infiltration. Compare current needs with those previously identified in the Clifton April 5, 2007 response to Alberta Environment regarding the soil vapour monitoring;
- Implement additional remediation techniques to deal with the expanding dissolved phase plume. As previously discussed, this could include enhanced bioremediation. Monitored natural attenuation is not appropriate while liquid petroleum hydrocarbon (LPH) is being removed and the dissolved plume is not stable. Multiple remediation approaches are needed to address the petroleum hydrocarbon impacts;
- Review the groundwater monitoring and sampling program to ensure adequate coverage based on current conditions and trends; and,
- Apply the 2014 AEP Tier 1 Guidelines to monitoring well locations along 11th Avenue NW and include these wells in the groundwater monitoring and sampling program.

In order to address these requirements, Clifton abandoned groundwater monitoring wells not meeting requirements in 2014, in preparation for a future environmental monitoring program. The next step (fall 2014-spring 2015) included the installation of 70 new groundwater monitoring wells coupled with a soil sampling program focused on better understanding of the soil stratigraphy south of 11th Avenue NW. In addition, the 2015 Subsurface Investigation included four rounds of the groundwater sampling in the Mall and Hounsfield Heights areas, as well as limited (five residences) indoor air quality monitoring.

Indoor air sampling locations were determined based on historically (i.e. before 2015 Site Investigation) measured benzene concentrations in groundwater monitoring wells that were above guidelines for the protection of the vapour inhalation exposure pathway as defined by the 2014 AEP Tier 1 Guidelines. One round of the indoor air sampling was conducted at the following residential properties in 2015:

- 1601 11th Avenue NW;
- 1604 11th Avenue NW;
- 1605 11th Avenue NW;
- 1609 11th Avenue NW; and,
- 1301 15th Street NW.

In addition, the indoor air sampling also included one sub-slab soil gas sample from the residence located at 1609 11th Avenue NW. For collected data and description of the sampling methodology refer to 2015 HHREA, Table D-1. These data were not included as part of the identification of Chemicals of Potential Concern (CoPCs), but were used as part of additional lines of evidence in Risk Characterization for 2015 HHREA completed by Intrinsik.

The 2015 HHREA included detailed investigation of the vapour inhalation pathway for human receptors present at the Site for both soil and groundwater and compared the results against the Residential/Parkland Land Use Guidelines (Hounsfield Heights area) and Commercial Land Use Guidelines (North Hill Mall area) as defined by AEP Tier 1 and 2 Guidelines. The following CoPCs in soil at the Site were identified for vapour inhalation pathway:

Table 2.1 – Constituents identified as CoPCs by 2015 HHREA in soil for vapour inhalation pathway and human receptors at the Site[1]

Constituent in Soil	Hounsfield Heights Area (Residential/Parkland Land Use)	North Hill Mall Area (Commercial Land Use)
Petroleum Hydrocarbons		
Benzene	YES	YES
Toluene	NO	NO
Ethylbenzene	NO	NO
Xylenes	YES	NO
F1-BTEX (C_6—C_{10})	YES	NO
F2 (C_{10}-C_{16})	YES	NO
Polycyclic Aromatic Hydrocarbons (PAHs)		
Naphthalene	YES	NO
Volatile Organic Compounds (VOCs)		
1,2 Dichloroethane (1,2-DCA)	YES	YES

The following COPCs in groundwater at the Site were identified for vapour inhalation pathway:

[1] Please note that other constituents in soils may be present at the Site in concentrations exceeding different exposure pathways for human and ecological receptors as defined by the 2016 AEP Tier 1 Guidelines, and are not part of the objectives of this SVMP.

Table 2.2 – Constituents identified as CoPCs by 2015 HHREA in groundwater for vapour inhalation pathway and human receptors at the Site[2]

Constituent in Groundwater	Hounsfield Heights Area (Residential/Parkland Land Use)	North Hill Mall Area (Commercial Land Use)
Petroleum Hydrocarbons		
Benzene	YES	NO
Toluene	NO	NO
Ethylbenzene	NO	NO
Xylenes	YES	NO
F1-BTEX (C_6—C_{10})	YES	NO
F2 (C_{10}-C_{16})	NO	NO
Polycyclic Aromatic Hydrocarbons (PAHs)		
Naphthalene	NO	NO
Volatile Organic Compounds (VOCs)		
1,2 Dichloroethane (1,2-DCA)	YES	NO

Based upon the results of 2015 Subsurface Investigation, Intrinsik prepared and submitted to the regulator an updated HHREA for the Site in December 2015. The 2015 HHREA recommended implementing a soil vapour monitoring program for assessing vapour inhalation and possible infiltration into indoor air, which should meet the following guiding principles:

- The program should provide broader spatial measurement of soil-gas concentrations in the Hounsfield Heights Area. Soil vapour monitoring locations should take into consideration the PHC levels present in groundwater throughout the community and the Site-specific geology;

[2] Please note that other constituents in groundwater may be present at the Site in concentrations exceeding different exposure pathways for human and ecological receptors as defined by the 2016 AEP Tier 1 Guidelines, and are not part of the objectives of this SVMP.

- The program should include the installation of vapour monitoring points that collect soil-gas at multiple depth intervals. Ideally, three collection intervals would be installed with the lowest interval located above the groundwater and the upper interval located 2 to 3 metres below ground surface. The middle interval would be evenly spaced between the upper and lower interval. This would allow calculation of site-specific attenuation coefficients, which includes natural diffusion and biodegradation; and,
- The vapour monitoring points should be located in areas that would not restrict access (e.g., public areas) to allow for repeated sampling at fixed time intervals throughout the year.

In order to address regulator's requirements and recommendations contained in the 2015 HHREA regarding the soil vapour delineation at the Site and assessment of potential presence of an active vapour intrusion pathway, Clifton prepared and submitted Revised SVMP on 20 October 2016. The following sections of this Report describe implementation of the methods outlined in the Revised SVMP.

3.0 Site Overview

The Site consists of two distinctive portions separated by 13th Avenue NW - the Hounsfield Heights area and the North Hill Mall (Mall) area:

- The Hounsfield Heights area is bound by: the southern edge of the LRT line to the north; 14th Street NW to the east; 10th Avenue SW (extending west to 17A Street NW) to the south; and, 17A Street NW to the west. The area is zoned as residential, as it primarily consists of single detached dwellings with basements. There are three areas of the Site that are zoned as Special Purpose: Hounsfield Heights Park; a parcel of land along 10th Avenue SW between 16th Street NW and 16th A Street NW; and, the area between the LRT line and 13th Avenue NW.
- The Mall area is bound by: 16th Avenue NW to the north; 14th Street NW to the east; the northern edge of the LRT line to the south; and, to the west by the western edge of the North Hill Centre property and a line extending south to the northern edge of the LRT line.

Capitol Hill, a residential area, is located to the north of the Site. To the east is SAIT Polytechnic and the Alberta College of Art + Design. Hillhurst and Briar Hill, both residential areas, are found south and west of the Site, respectively.

The Site topography is characterized by a gently south-sloping river valley plateau on the northern portion of the Site, and a more moderately sloping valley wall towards the southeast portion. The Site varies in elevation from approximately 1,094 m above sea level in the northwestern corner along 13th Avenue NW, to approximately 1,068 m above sea level in the southeastern corner, north of the intersection of 15th Street NW and 10th Avenue NW.

4.0 Objective and Scope of Work

The principle objective of the executed Soil Vapour Monitoring Program (SVMP) was to evaluate potential risk to human health from inhalation of subsurface vapours in indoor air in both residential and commercial structures present at the Site. To address this objective, Clifton carried out the following Scope of Work within the SVMP:

- Collected representative soil vapour samples from areas identified by 2015 SI as having CoPCs concentrations in groundwater or soil exceeding the 2016 AEP Tier 1 Guidelines for vapour inhalation exposure pathway;
- Sampled nested soil vapour monitoring points at locations representing changing stratigraphy of the Site to provide representative data for evaluation of the Site-specific vertical soil vapour migration and biodegradation;
- Sampled soil vapour monitoring locations constituting lateral transects to facilitate lateral delineation of the soil vapour plume extent at the Site;
- Conducted sub-slab soil vapour sampling and indoor air quality monitoring at the residential property located at 11th Avenue NW;
- Forwarded collected soil vapour and air samples to Maxxam Analytics Inc. under Chain-of -Custody protocols for laboratory analyses of COPCs;
- Implemented QA/QC procedures to assure quality and defensibility of the collected data;
- Compared CoPCs concentrations in soil vapour from soil vapour monitoring points against the Site-specific soil vapour quality guidelines developed based on the 2014 CCME Protocol by Intrinsik; and,
- Compared CoPCs concentrations in soil vapour from soil vapour monitoring points against trigger threshold values for additional investigation set as 90% of guidelines.

5.0 Sampling Methodology

The following sections provide a description of the soil vapour, sub-slab soil vapour and indoor air sampling methodologies. Where applicable, activities were completed as per *Compendium of Methods for the Determination of Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GCMS).* EPA/625/R96/01b, 1999.

The laboratory analytical and quality assurance/quality control (QA/QC) programs are also described in the following section.

5.1 Soil Vapour Monitoring Points

In order to achieve required resolution of the laboratory detection limits for investigated constituents (especially 1,2 – DCA), and to extend validity of collected samples, Clifton used as soil vapour sampling media 1.4L Summa™ canisters, which were proofed and cleaned by the laboratory as per the United States Environmental Protection Agency (USEPA) reference method TO-14A. The sampling train included: an orifice equipped flow controller calibrated for a sampling rate between 70 mL/min; and, a length of the dedicated PTFE tubing with stainless steel fitting to connect to a valve at the top of the soil vapour monitoring point.

Before any sampling event, the installed monitoring point was allowed to equilibrate for at least 48-hours. The next step was to complete a seal integrity check of the monitoring point using helium tracer. All monitoring points meeting seal integrity criteria were subsequently purged by the SKC PGX-R4 vacuum pump calibrated for a flow rate 70 mL/min for 20 minutes. Purging vacuum rate thus did not exceeded 10" (254 mm) of water column in order to avoid excessive moisture influx to the radius of influence.

The soil vapour sampling also included: measuring the initial and final Summa™ canister vacuum levels by standalone vacuum gauge; recording the start and finish time of the sampling; monitoring point identifier check; and weather observations, especially barometric pressure at the time of sampling and precipitation. The stainless-steel valve installed at the top of a soil vapour monitoring point were kept in a closed position, except when purging and sampling.

5.2 Sub-Slab Soil Vapour Monitoring Points

Before sampling event, the installed sub-slab soil vapour monitoring point was allowed to equilibrate for at least 48-hours. The next step was to carry out a competent seal integrity check of the monitoring point by helium tracer. A monitoring point meeting seal integrity criteria was subsequently purged by the vacuum for at least three probe volumes. Purging vacuum rate did not exceeded 10" of water column in order to avoid excessive moisture influx to the radius of influence.

Subsequently, a length of new PTFE tubing connected to a 1.4L Summa™ canister was attached to stainless steel fitting and soil vapour sample was collected. After recording final vacuum, sampling time and other field observations, Summa™ canister was marked by a unique ID and submitted to Maxxam Analytics Inc. under the Chain-Of-Custody protocol. The sub-slab sampling point was secured by re-attaching a tamper-proof stainless top cap until the next sampling event.

5.3 Indoor Air Quality Sampling

Indoor air quality sampling was carried out concurrently with sub-slab soil vapour sampling within the same building to assure consistency of data. Clifton collected indoor air samples using a Summa™ canister (6-Liter capacity) equipped with a critical orifice flow-regulation device sized to allow an air sample to be collected over a 24-hour sampling period. Air sampling canister was deployed at a representative indoor sampling location, based on the results of the preliminary building visit findings, and away from any forced air influence emanating from HVAC, vents, or heaters in the breathing zone, which is characterized at a level height of approximately 1.5 m. Final sampling locations were also selected based on the results of the field screening by a photoionization detector (PID) calibrated to the non-methane VOC standard , and an evaluation of the air flow/pressure gradients/stack effects in the building by digital micro-manometer, which might be caused by any HVAC systems, drafts around doors and windows, exhaust fans etc.

The stakeholders were asked for their cooperation in obtaining representative indoor air samples by refraining from activities that might affect planned indoor air sampling, such as: painting, heavy cleaning, and indoor storage of chemicals in the period ideally up to seventy-two-hours before the sampling.

5.4 Quality Assurance/Quality Control (QA/QC)

A comprehensive QA/QC program was implemented to insure that the sampling and analyses follow established protocols and provide defendable, representative results. The program included all aspects of data collection from the field to the laboratory.

The field QA/QC consisted of the following components:

- Labelling air sampling containers with the specific sample number to ensure adequate identification;
- Using laboratory-prepared batch-proofed and cleaned air sampling containers cleaned as per USEPA TO-14A reference method;
- Conducting an integrity 15-minutes shut-in vacuum test on sampling trains;
- Conducting helium tracer competent seal integrity testing;
- Collecting field duplicates and evaluating Relative Percent Difference (RPD) ratio;
- Measuring initial and final vacuum levels by the independent, standalone gauge to ensure sample validity;
- Conducting weather observations;
- Forwarding collected samples under the Chain-of -Custody protocols to Maxxam Analytics Inc.; and,
- Reviewing the laboratory quality assurance data.

Field duplicates were collected simultaneously with the primary sample, using stainless steel splitter at a rate of approximately one duplicate per ten samples, per a sampling event. Primary and duplicate analytical results above the detection limit were compared using the following equation:

$$RPD\ (\%) = [abs(x_1-x_2)/(x_1+x_2)/2] * 100$$

Where: x_1, x_2 are the parameter concentrations for the primary and duplicate samples, respectively. USEPA TO-15 method recommends the RPD to be below 25%.

5.5 Analytical Suite and Methods

Clifton selected to use soil vapour analytical methods compatible with performance-based reference method USEPA TO-15 based on the gas chromatography and mass spectrometry (GC/MS). All COPCs for vapour inhalation pathway as identified by the 2015 HHREA were investigated. Therefore, the proposed analytical suite included the following:

- PHCs fraction F1[3];
- PHCs fraction F2[4];
- BTEX (benzene, toluene, ethylbenzene, xylenes);
- Naphtalene;
- 1,2 Dichloroethane (1,2-DCA); and,
- Fixed Gases (O_2, N_2, CO_2, CH_4)[5]

Clifton used Maxxam Analytics Inc. (Maxxam) as a provider of the laboratory services for this SVMP. Maxxam is accredited under ISO/IEC 17025-2005, the Canadian Association for Laboratory Accreditation (CALA), EPA Good Laboratory Practices (GLP) as well as under the National Environmental Laboratory Accreditation Program (NELAP).

[3] Expressed in form of the constituting aliphatic and aromatic sub-fractions.
[4] Expressed in form of the constituting aliphatic and aromatic sub-fractions.
[5] Applicable for sub-slab soil vapour samples.

6.0 Sampling Results

6.1 Selection of Assessment Criteria

The selection of the assessment criteria outlines the rationale for selecting applicable exposure pathways and indicates, which guidelines should apply at the investigated Site. This evaluation is based on guidance presented in the documents further referenced in the text.

As for the indoor air quality sample (Appendix B, Table 1), the analytical data were compared to the generic air quality criteria for human toxicity based on risk-based tolerable concentrations (TC), reference concentrations (RfC), or Reference Units (RU) for carcinogens as stated in the 2016 AEP Tier 1 Guidelines, Table C-7.

Sub-slab soil vapour sample analytical results (Appendix B, Table 2), were compared to Soil Vapour Quality Guidelines (SVQG) protective of indoor air quality for residential buildings for samples collected from a depth of <100 cm and fine-textured soils as presented in the following document developed based on the 2014 CCME Protocol:

- Intrinsik Environmental Sciences Inc.: *Final Report-Development of Soil Vapour Quality Guidelines*, 31 August 2016.

The owners of the residential properties located at 1318 and 1312 16th Street NW, declared a presence of the crawl spaces with earthen floors during the “door-to-door” survey at the Site. Clifton contacted these owners with an offer of an indoor air quality monitoring and sub-slab soil vapour monitoring point installation for their property. Both owners declined the offer, therefore Clifton used the following conservative approach to estimate indoor air quality in these structures based on the Revised SVMP, Section 6.1:

- An external soil vapour monitoring point located in the shortest distance from the property was used for a rough estimate of indoor air quality. No allowance was made for either lateral or vertical biodegradation of soil vapour regardless of the soil vapour monitoring point installation depth, i.e., recorded concentrations of CoPCs in soil vapour were directly projected within the property and compared against SVQG for depth of 0 m bgs (Appendix B, Tables 3 and 4).

Soil vapour sampling analytical results were generally compared to SVQG for fine-textured soils and protective of indoor air quality for a residential building (Appendix B, Tables 7-15 B), or a commercial building (Appendix B, Table 16) based on the installation depth. 2014 CCME Protocol assumes that at least 1 m of clean soil is present immediately beneath the building as a condition for validity of the provided SVQG derivation model. Considering shallow groundwater in a portion of the Site to the south of 11th Avenue NW and default basement depth 2.44 m bgs (2016 Alberta Tier 1), this assumption may not be met for soil vapour monitoring points listed in Appendix B, Tables 5 and 6. Analytical results for these monitoring points were thus compared to SVQG based on the default attenuation factors.

In addition, AEP approved on a trial basis increased monitoring frequency trigger for soil vapour and sub-slab soil vapour monitoring points at the Site. These trigger values were set at 90% of a pertaining SVQG for CoPC. Comparison of analytical results to the trigger values is shown in Appendix B, Tables 2 and 5-16.

6.2 Sampling Results

Indoor air quality sample (Sample ID 52/2920) was collected on 6 June 2016 from the residential property located on 11th Avenue NW did not show any exceedance for investigated CoPCs in air.

In addition, one sub-slab soil vapour sample (Sample ID 51/1007) was collected from the same residential property located at 11th Avenue NW on 6 June 2016. The concentrations of measured sub-slab soil vapour constituents were below pertaining SVQG. This suggests that indoor air vapour infiltration from migration of vapour concentrations from groundwater was not active, below levels of concern or mitigated by biodegradation in the vadose zone beneath the structure.

In addition to the analyses of CoPCs, the sub-slab soil vapour sample was analyzed for fixed gases (i.e., oxygen, nitrogen, carbon oxides and methane) as an indicator of biodegradation potential. Petroleum hydrocarbons (PHCs) usually biodegrade under both anaerobic and aerobic conditions, with aerobic degradation occurring more rapidly. The Pennsylvania Department of Environmental Protection[6] defines an acceptable soil material as having greater than 2% oxygen for purposes of PHCs degradation. Oxygen content of the sample was measured to be 22.5% v/v[7]. The measured sub-slab soil vapour concentrations of PHCs constituents were very low compared to SVQG, suggesting that soil vapour infiltration into the residential structure is minimal.

A rough estimate of indoor air quality for properties with reported unusual features is based on the soil vapour samples collected from the nearest soil vapour monitoring points. Sample ID 19/2480 was therefore used for the property located at 1316 16th Street NW, and sample ID 14/2510 for the civic address 1316 16th Street NW. Albeit these monitoring points have installation depth 5.5 and 6.0 m bgs, respectively, no allowance was made for vertical or horizontal biodegradation to add a level of conservativism to the estimate. Analytical results for both samples were compared to SVQG based on default attenuation factors. No exceedances for CoPCs criteria protective of indoor air quality were recorded, thus an active vapour intrusion pathway into these structures (if present) should not pose health risk for the occupants.

A total of 44 soil vapour samples was collected at external, nested and delineation monitoring points in spring 2016 at the Site and analysed for CoPCs concentrations. There were no exceedances for the investigated CoPCs compared either to the pertaining SVQG protective of indoor air quality or to the increased monitoring frequency trigger values. Based on analytical results for soil vapour at the Site, vapour migration from groundwater or soil at the Site was not an active exposure pathway of concern for indoor vapour inhalation at the time of investigation. Distribution of the investigated CoPCs in soil vapour at the Site based on the analytical results for the spring 2016 is shown in Appendix A.

6.3 QA/QC Results

Four field duplicates (Sample IDs SV91, SV916, SV924 and SV941) were collected and analyzed for CoPCs during sampling as a part of QA/QC program. These duplicates were compared against primary samples and RPD values were calculated. USEPA TO-

[6] Pennsylvania Department of Environmental Protection: *Land Recycling Program Technical Guidance for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2*. 2015.

[7] Indication of biodegradation via oxygen content is not applicable for non-petroleum CoPCs at the Site.

15 method recommends the RPD difference to be below 25%. Summary of field duplicates analytical results and the RPD calculations are presented in Appendix C, Table 17.

RPD value for Aliphatic > C_{10}-C_{12} sub-fraction, samples SV01 and SV91, was calculated to be 36.8%, i.e., exceeding the recommended threshold of 25%. These samples were collected from soil vapour monitoring point located at the former tank nest where recorded concentrations of CoPCs in soil vapour were at maximum for the Site. To compensate for these high concentrations the laboratory had to increase detection limits for CoPCs. It is therefore Clifton's opinion that the RPD value exceedance for these samples do not imply a potential problem with analytical data quality. For further details refer to the Certificates of Analysis in Appendix D.

Prior to the sampling, soil vapour monitoring points were tested for seal integrity by helium tracer gas method. Test results are summarized in Appendix C, Tables 18A-18D. Soil vapour monitoring point SV15 located at 16th Street NW did not pass the test, and therefore this point was neither sampled, nor included in analytical results for the spring 2016.

In addition, soil vapour monitoring points SV18A and SV18B shown an atypical reaction to applied vacuum during sampling caused likely by a blockage between insert and borehole wall. These samples were considered unrepresentative, and therefore they were not included in analytical results for the spring 2016.

Soil vapour monitoring points SV15, SV18A and SV18B will be re-installed and re-tested prior to the next sampling event.

6.4 Meteorological Conditions

As ambient meteorological conditions, especially precipitation and barometric pressure, might affect soil vapour sampling, Clifton conducted limited meteorological observations during sampling, which are summarized in the following table:

Table 6.1 – Summary of Meteorological Conditions during Sampling[8]

Date	Average Wind Speed (km/h)	Average Wind Direction (deg)	Average Barometric Pressure (kPa)	Precipitation (mm)
1 June 2016	13.46	22.25	88.66	0.0
2 June 2016	17.13	24.38	88.34	0.0
3 June 2016	13.08	25.46	89.31	0.2
4 June 2016	12.58	16.96	89.52	0.0
5 June 2016	15.42	20.36	89.49	0.0
6 June 2016	16.42	17.75	88.73	0.6
7 June 2016	14.54	21.75	88.38	0.0
8 June 2016	18.13	20.5	88.11	1.1
9 June 2016	17.29	21.17	88.11	0.5
10 June 2016	14.38	20.21	88.92	0.0
11 June 2016	19.88	23.71	88.72	0.1
12 June 2016	24.21	26.75	88.83	0.0
13 June 2016	15.38	24.67	88.47	0.2
14 June 2016	18.21	22.88	87.85	0.9
15 June 2016	17.17	24.79	88.11	0.0

As neither major precipitation event (> 5 mm in 24 hour period) nor major changes of barometric pressure were observed during sampling period, in Clifton's opinion, meteorological conditions did not significantly affected recorded soil vapour data.

[8] Based on the Calgary International Airport Meteorological Station data.

7.0 Discussion of Results and Recommendations

The soil vapour analytical laboratory results collected in the spring 2016 showed that the indoor air quality within the investigated residential and commercial structures at the Site are within the Site-specific SVQG protective of indoor air quality criteria. Therefore, it is unlikely that indoor air presents an immediate health risk for the occupants of the structures present at the Site.

Future steps in soil vapour monitoring at the Site should sufficiently address expected temporal fluctuations in soil vapour concentrations caused by seasonal water table fluctuation, as well as changing temperature of soil and groundwater and saturation levels in soils at the Site. Clifton therefore recommends the following:

- The next sampling event should be completed during winter and heating season to take into account lower levels of biodegradation and possible stack effects, as well as limited air exchange in the buildings at the Site under these conditions;
- CoPCs concentration guidelines regarding delineation of soil vapour plume extent at the Site were not set, therefore soil vapour data and groundwater results should be superimposed for two correlated sampling events to determine if there are any trends or areas of potential concern;
- Soil vapour trend analysis coupled with evaluation of the Site-specific vertical soil vapour migration and biodegradation should be carried out once data from at least three sampling events are available; and,
- It is recommended to continue the soil vapour monitoring program at the Site for three continuous years.

8.0 Closure

This report was prepared by Clifton Associates Ltd. for the account of Sears Canada Inc. The material in it reflects Clifton Associates Ltd. 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, are the responsibility of such third parties. Clifton Associates Ltd. accepts 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.

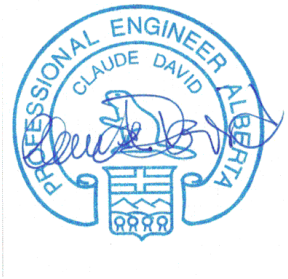
This report focuses exclusively at indoor air quality in the investigated buildings. No conclusions should be made based on this report in regards to any concentrations of substances in other areas of the Site. Other Contaminants of Concern may be present at the Site in areas that were not investigated. Clifton Associates Ltd. 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 persons interviewed, or 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.

Yours truly,
Clifton Associates Ltd.



Daniel Budai, P.Eng.
Environmental Engineer

Claude David, P.Eng.
Director, Environmental Services

Association of Professional Engineers
and Geoscientists of Alberta
Permit to Practice P4823

Reference List

Alberta Environment and Parks. (2016). *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*

Alberta Environment and Parks. (2016). *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*

The United States Environmental Protection Agency. *Compendium of Methods for the Determination of Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GCMS).* EPA/625/R96/01b, 1999.

Clifton Associates Ltd.: *Subsurface Investigation-Mall Area and Hounsfield Heights,* 22 January 2016

Clifton Associates Ltd.: *Updated Site Management Plan (2014), Hounsfield Heights-Briar Hill Community, Calgary, Alberta,* April 2014

Intrinsik Environmental Sciences Inc.: *Draft Report*, *Human Health and Ecological Risk Assessment for the Hounsfield Heights Community and North Hill Mall, Calgary, Alberta,* December 2015

Canadian Council of Ministers of the Environment: *A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapors*, 2014

British Columbia Ministry of Environment: *Technical Guidance on Contaminated Sites 4,* version 1, September 2010

Health Canada: *Federal Contaminated Site Risk Assessment in Canada, Part VII: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites*, September 2010

Johnson, P.C., & R. Ettinger: *Heuristic Model for predicting the Intrusion Rate of Contaminant Vapours into Buildings*, 1991

Pennsylvania Department of Environmental Protection: *Land Recycling Program Technical Guidance for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2*. 2015.

Clifton Associates Ltd.: *Sears Canada Inc., Revised Soil Vapour Monitoring Program (Update Fall 2016), Hounsfield Heights and North Hill Mall, Calgary, Alberta*, 20 October 2016.

Clifton Associates Ltd.: *Sears Canada Inc., Soil Vapour Monitoring Points Installation Report, Hounsfield Heights and North Hill Mall, Calgary, Alberta*, 20 October 2016.

Appendix A

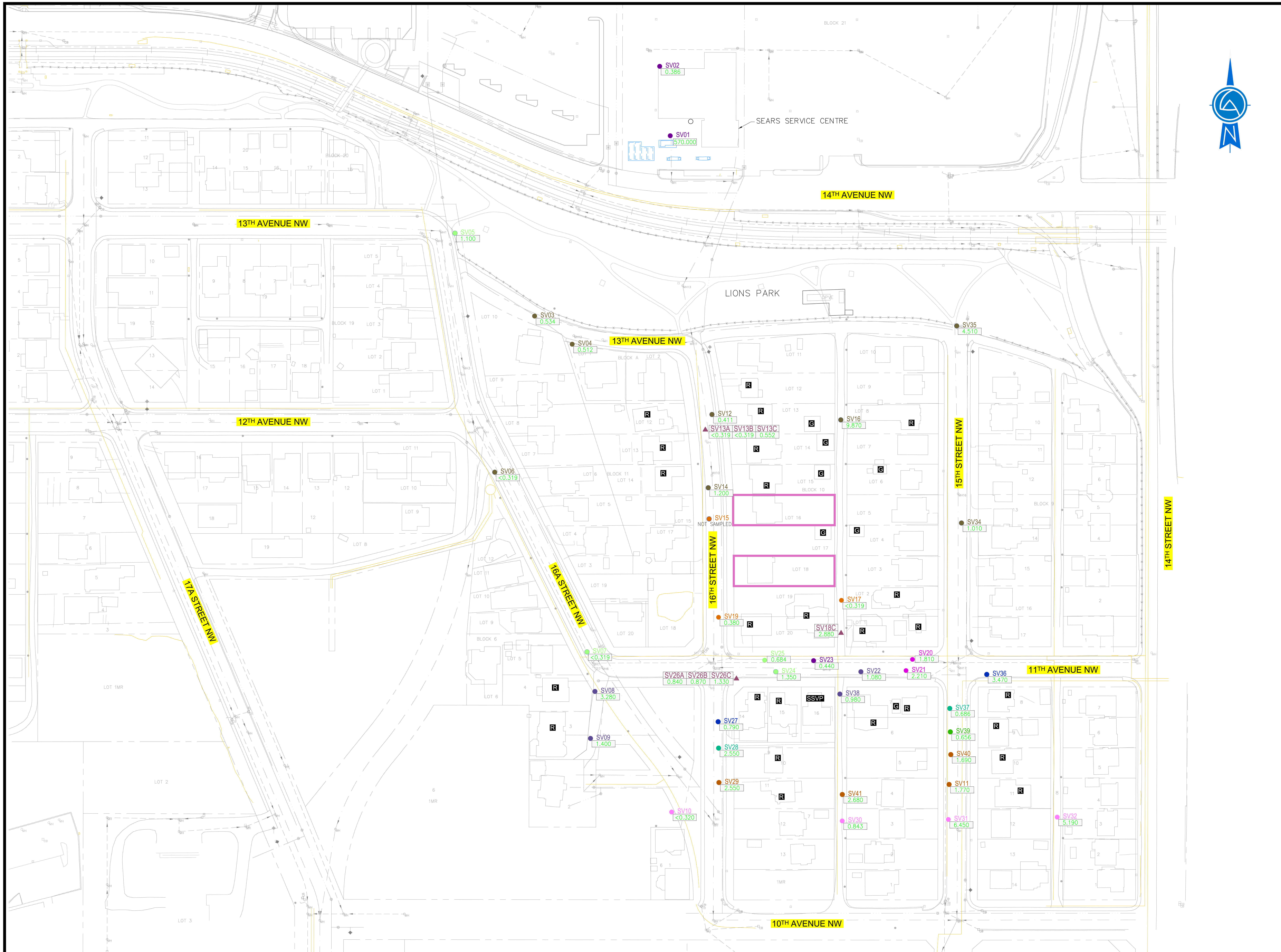
Clifton Associates
Figures

Clifton Associates

Calgary Office
2222 – 30th Avenue NE
Calgary, Alberta T2E 7K9

T (403) 263-2556
F (403) 234-9033

calgary@clifton.ca
www.clifton.ca



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
- ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

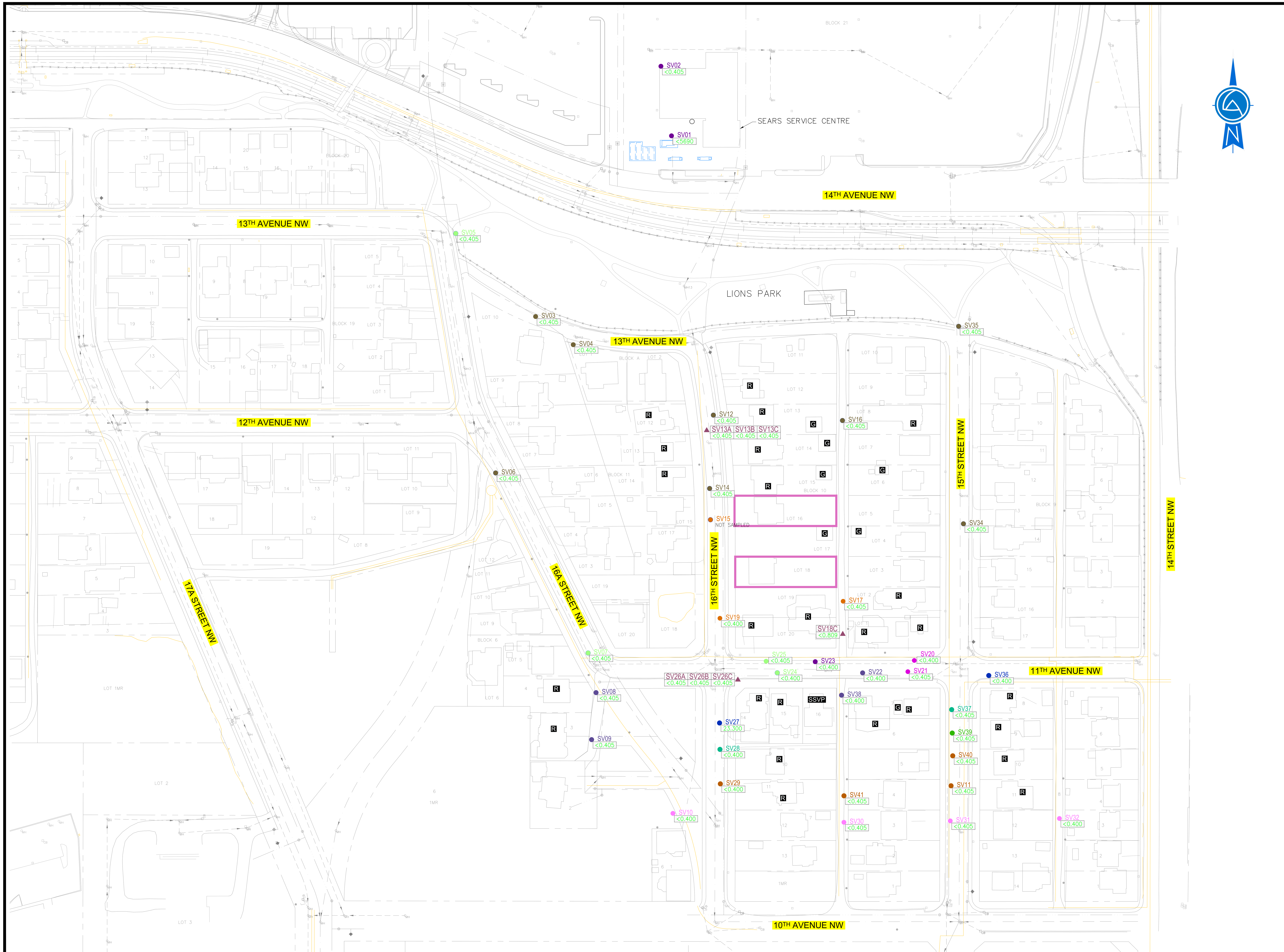
CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE: DISTRIBUTION OF BENZENE IN SOIL VAPOUR

DESIGNED	SCALE	DATE
KD	1:900	2016-09-01
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	1
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:03:51 PM



LEGEND

LRT TRACKS	
FENCE LINE	
LEGAL LINE	
FORMER FACILITY/FEATURE	
BUILDING	
SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs	SV#
NESTED SOIL VAPOUR MONITORING POINT	SV#
RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)	
SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT	SV# 4.510
ALL CONCENTRATIONS ARE EXPRESSED AS	µg/m³
RESIDENTIAL	R
DETACHED GARAGE	G
SUB-SLAB SOIL VAPOUR POINT	SSVP

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

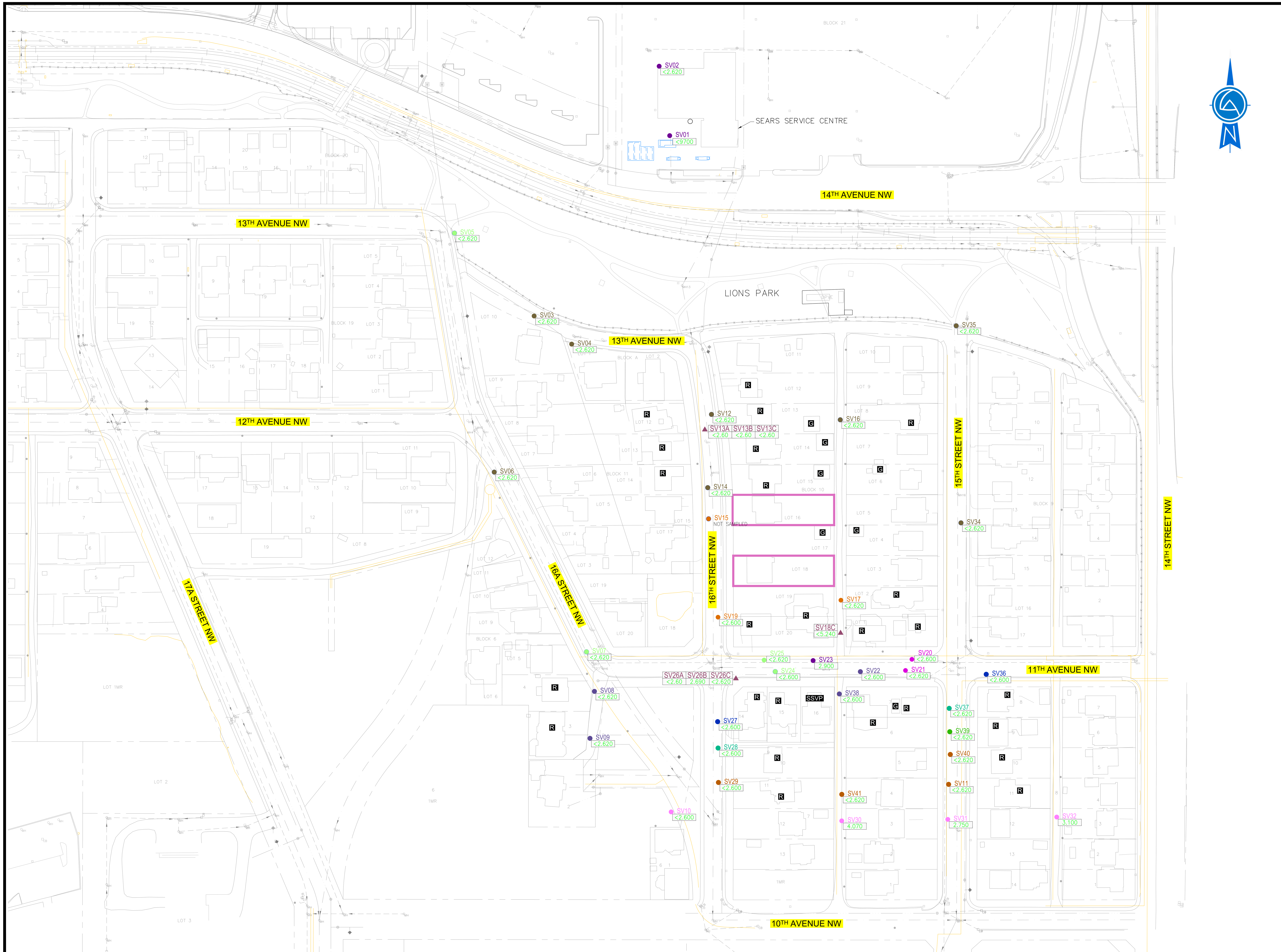
ENGINEER: Clifton Associates

CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT SPRING 2016 HOUNSFIELD HEIGHTS AND NORTH HILL MALL CALGARY, ALBERTA

TITLE: DISTRIBUTION OF 1, 2-DICHLOROETHANE IN SOIL VAPOUR

DESIGNED KD	SCALE 1:900	DATE 2016-09-01	
DRAWN MNG	PROJECT NO. CG2430.1 E06	FIG. 2	
CHECKED DB	FILE NO. CG2430.1-E06 Fig 1-14.dwg		



LEGEND

LRT TRACKS	
FENCE LINE	
LEGAL LINE	
FORMER FACILITY/FEATURE	
BUILDING	
SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs	SV#
NESTED SOIL VAPOUR MONITORING POINT	SV#
RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)	
SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT	SV# 4.510
ALL CONCENTRATIONS ARE EXPRESSED AS	µg/m³
RESIDENTIAL	R
DETACHED GARAGE	G
SUB-SLAB SOIL VAPOUR POINT	SSVP

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 Associates

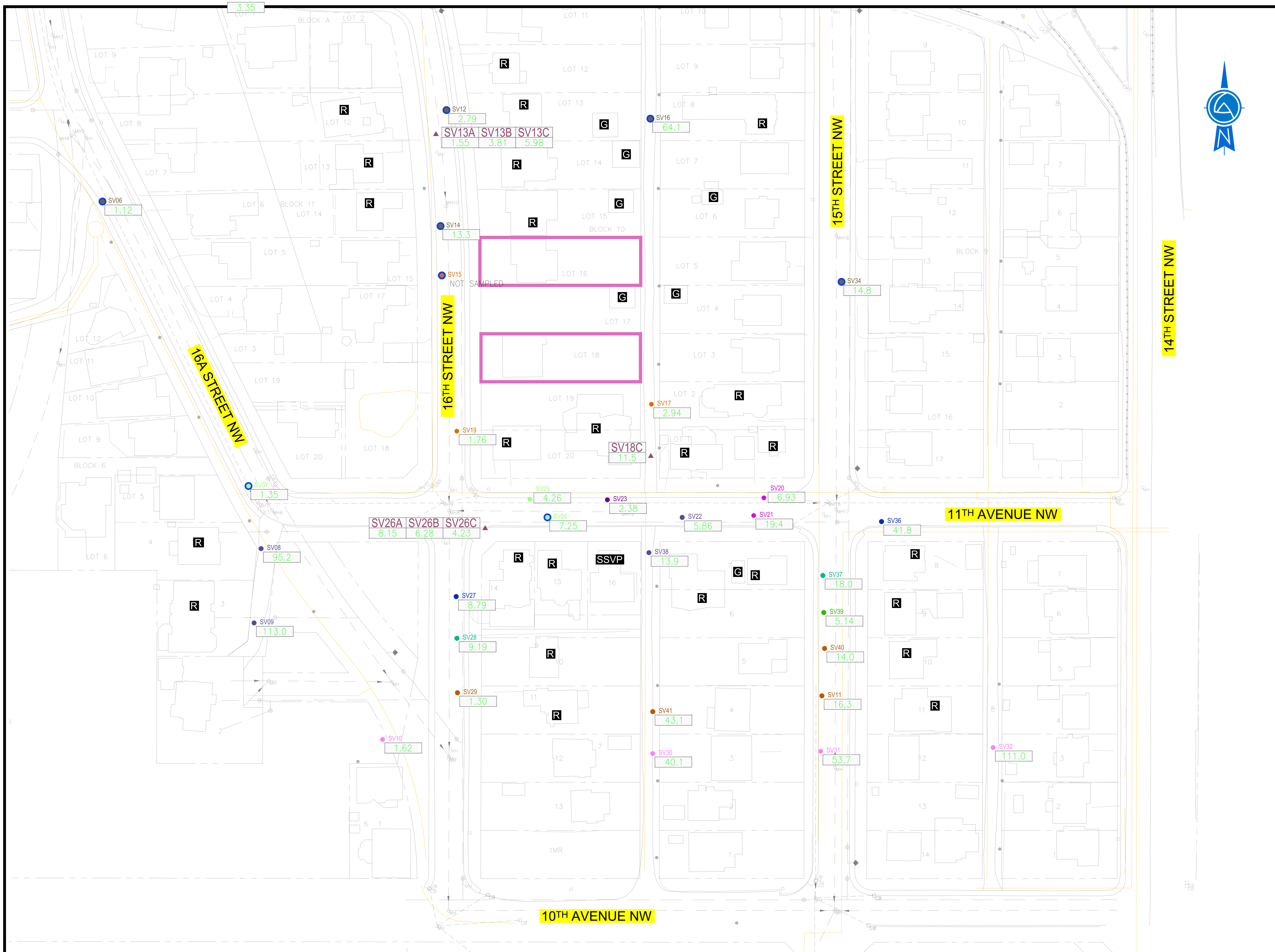
CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE: DISTRIBUTION OF NAPHTHALENE IN SOIL VAPOUR

DESIGNED	SCALE	DATE
KD	1:900	2016-09-01
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	3
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:04:22 PM



LEGEND

LRT TRACKS
FENCE LINE
LEGAL LINE
FORMER FACILITY/FEATURE
BUILDING
SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
NESTED SOIL VAPOUR MONITORING POINT — SV#
RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
ALL CONCENTRATIONS ARE EXPRESSED AS µg/m³

RESIDENTIAL — R
DETACHED GARAGE — G
SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

CLIENT: SEARS Canada Inc.

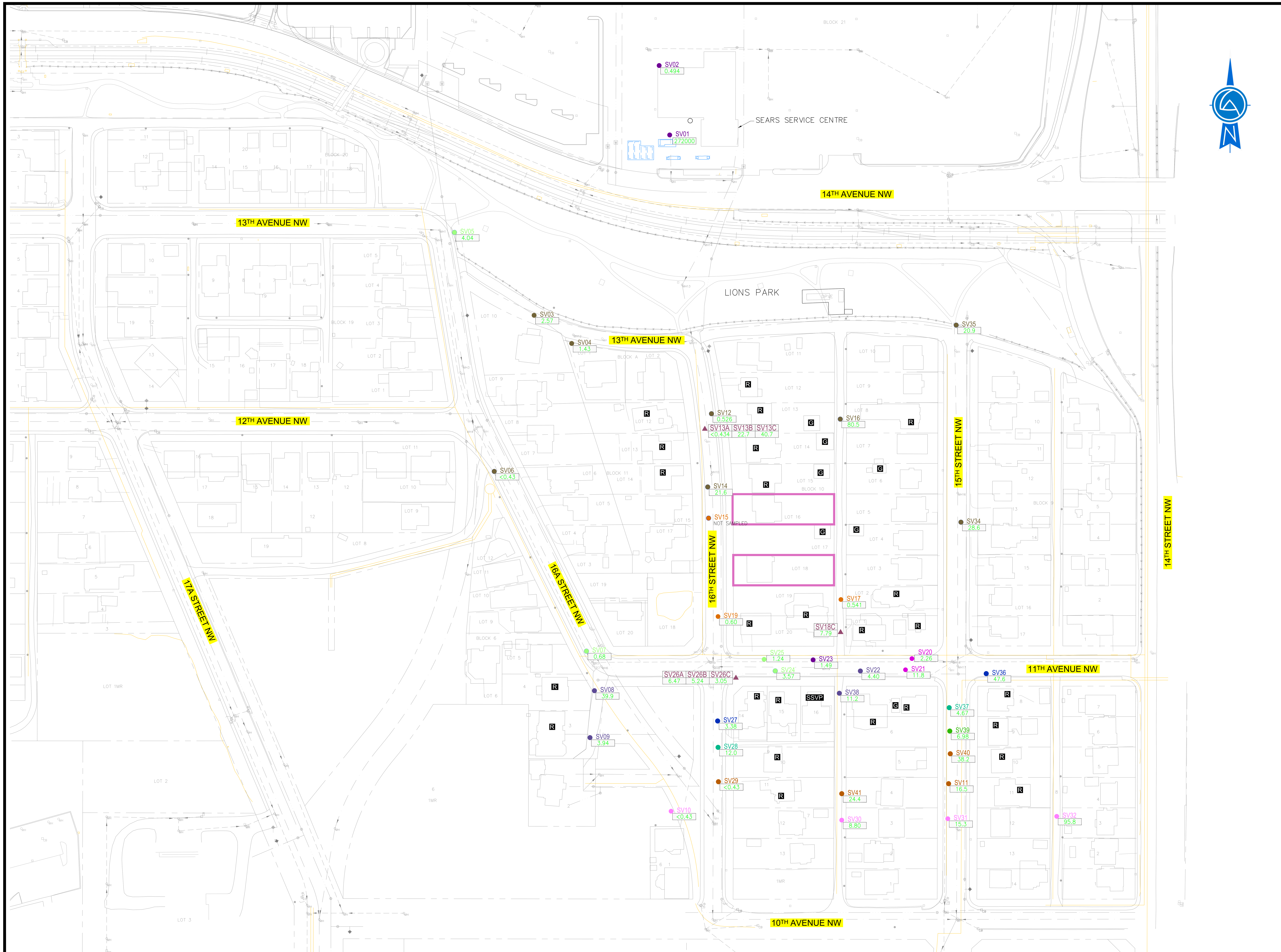
PROJECT: SOIL VAPOUR MONITORING REPORT SPRING 2016 HOUNSFIELD HEIGHTS AND NORTH HILL MALL CALGARY, ALBERTA

TITLE: DISTRIBUTION OF TOLUENE IN SOIL VAPOUR

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03

DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	4

CHECKED	FILE NO.
DB	CG2430.1-E06 Fig 1-14.dwg



LEGEND

LRT TRACKS
FENCE LINE
LEGAL LINE
FORMER FACILITY/FEATURE
BUILDING
SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
NESTED SOIL VAPOUR MONITORING POINT — SV#
RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

RESIDENTIAL — R
DETACHED GARAGE — G
SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

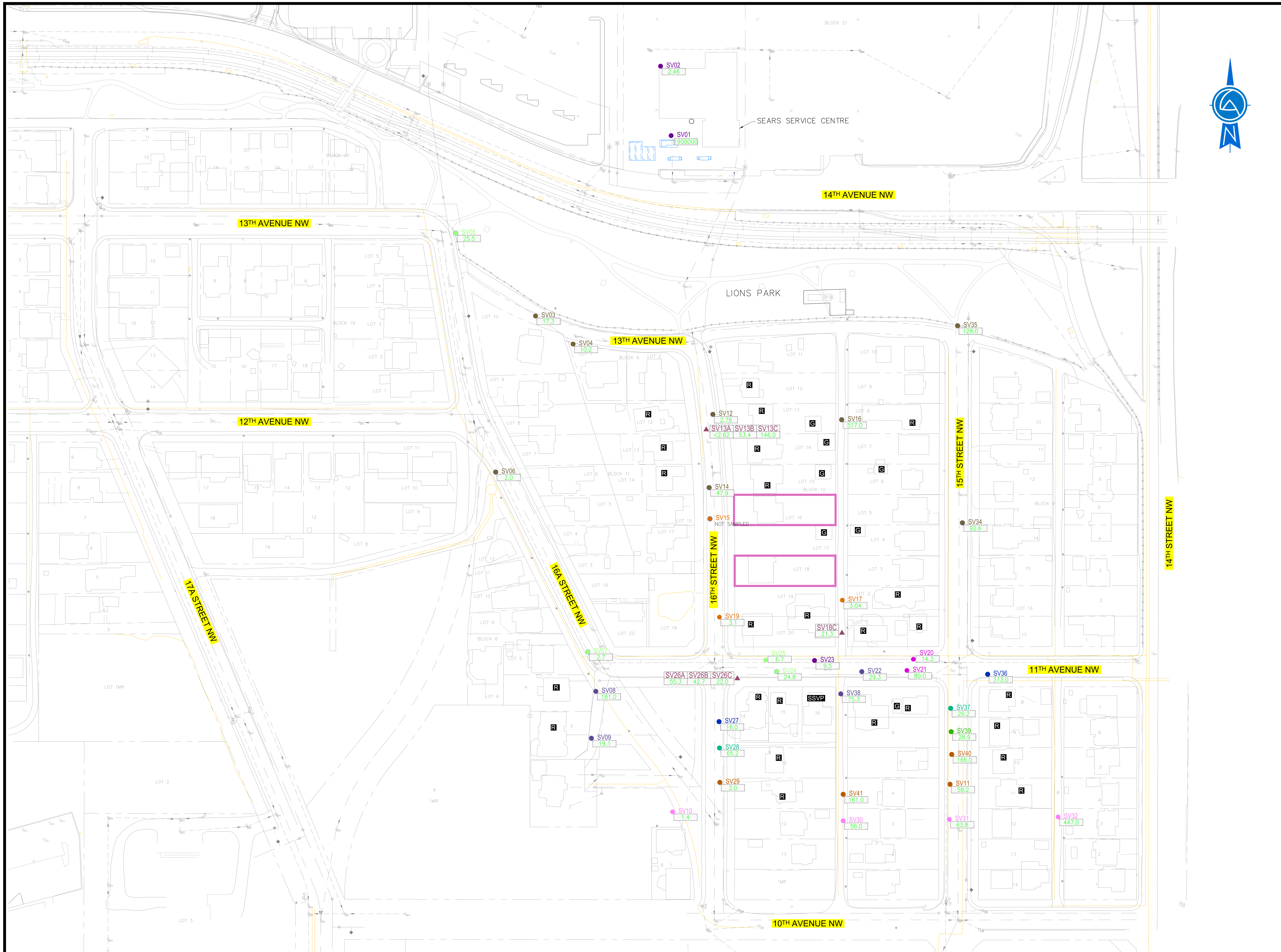
CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE: DISTRIBUTION OF ETHYL BENZENE IN SOIL VAPOUR

DESIGNED KD	SCALE 1:900	DATE 2016-10-03
DRAWN MNG	PROJECT NO. CG2430.1 E06	FIG. 5
CHECKED DB	FILE NO. CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:04:57 PM



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
- ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

CLIENT: SEARS Canada Inc.

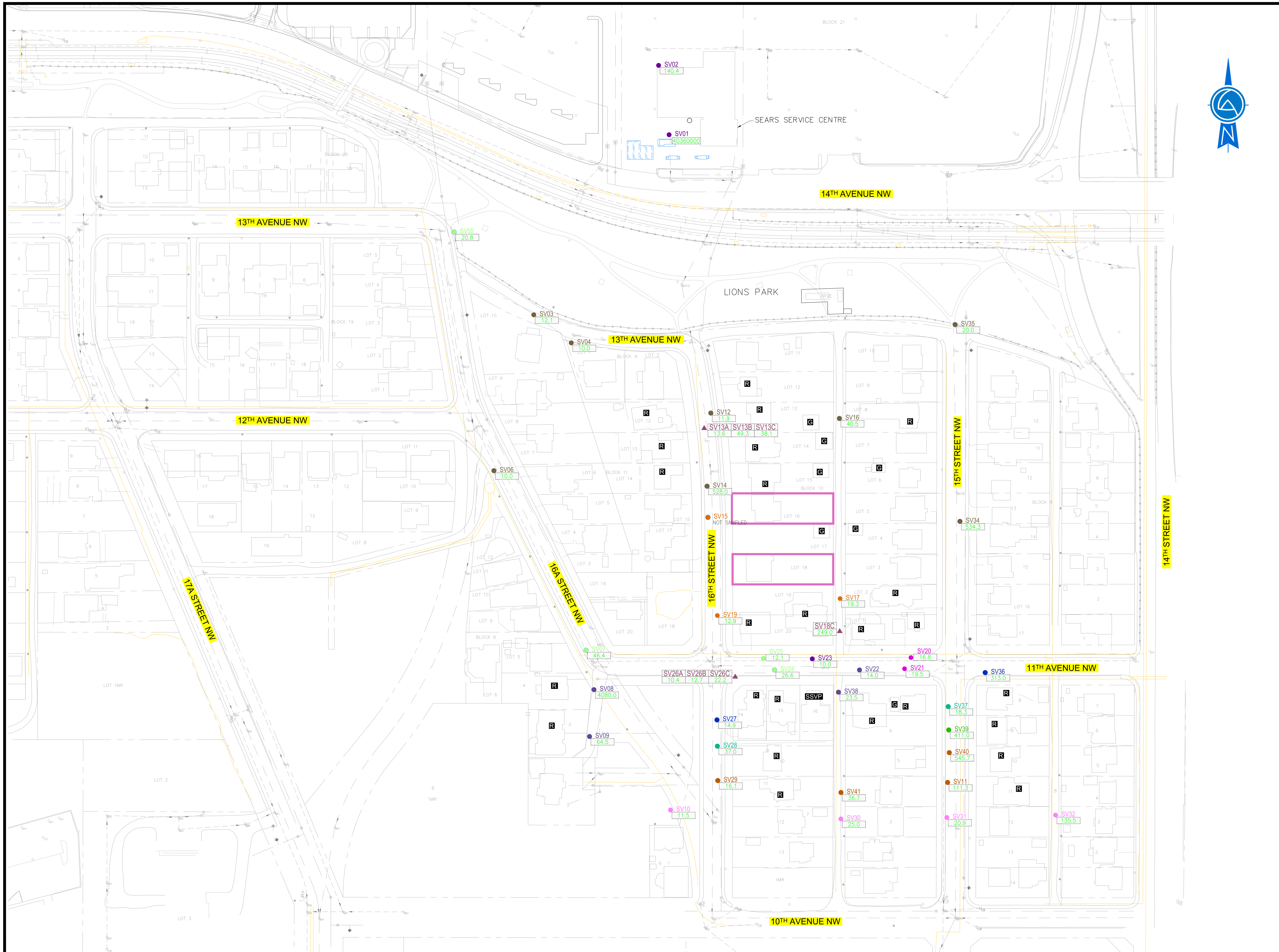
PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE:

DISTRIBUTION OF TOTAL XYLENES IN SOIL VAPOUR

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	6
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:05:13 PM



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4,510
- ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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.
2. ALIPHATIC C6-C8 VALUES CALCULATED BY SUMMING ALIPHATIC >C5-C6 AND ALIPHATIC >C6-C8 FRACTIONS WITH ANALYTICAL DETECTION LIMIT ADDED FOR INCREASED LEVEL OF CONSERVATIVISM.

0 10 20 30 40 50 m

PLOT SIZE 22x34

ENGINEER

Clifton Associates

CLIENT

SEARS Canada Inc.

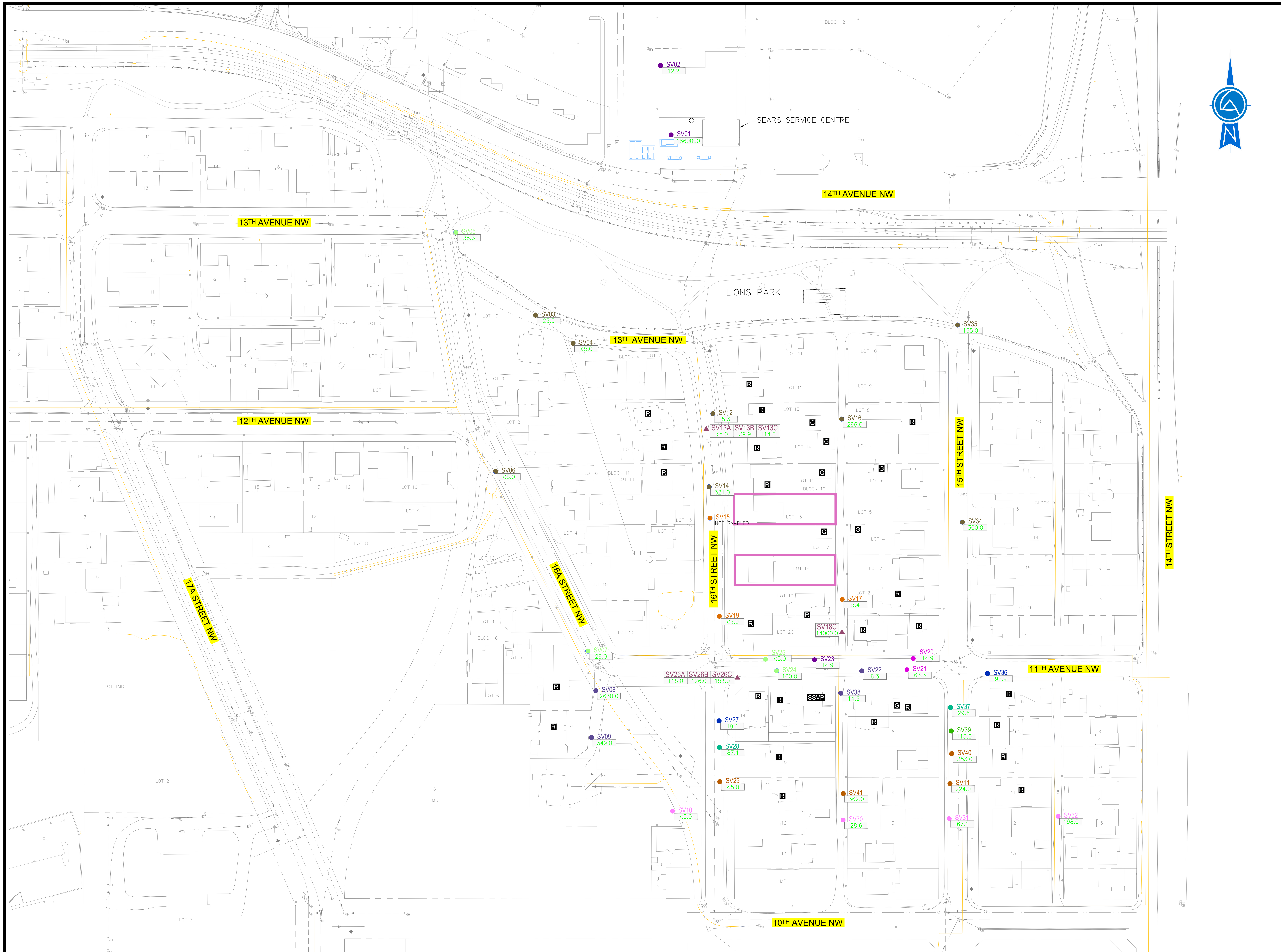
PROJECT

SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE

DISTRIBUTION OF PETROLEUM HYDROCARBONS
SUBFRACTION IN SOIL VAPOUR
ALIPHATIC C6-C8

DESIGNED KD	SCALE 1:900	DATE 2016-10-03
DRAWN MNG	PROJECT NO. CG2430.1 E06	FIG. 7
CHECKED DB	FILE NO. CG2430.1-E06 Fig 1-14.dwg	



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
- ALL CONCENTRATIONS ARE EXPRESSED AS µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

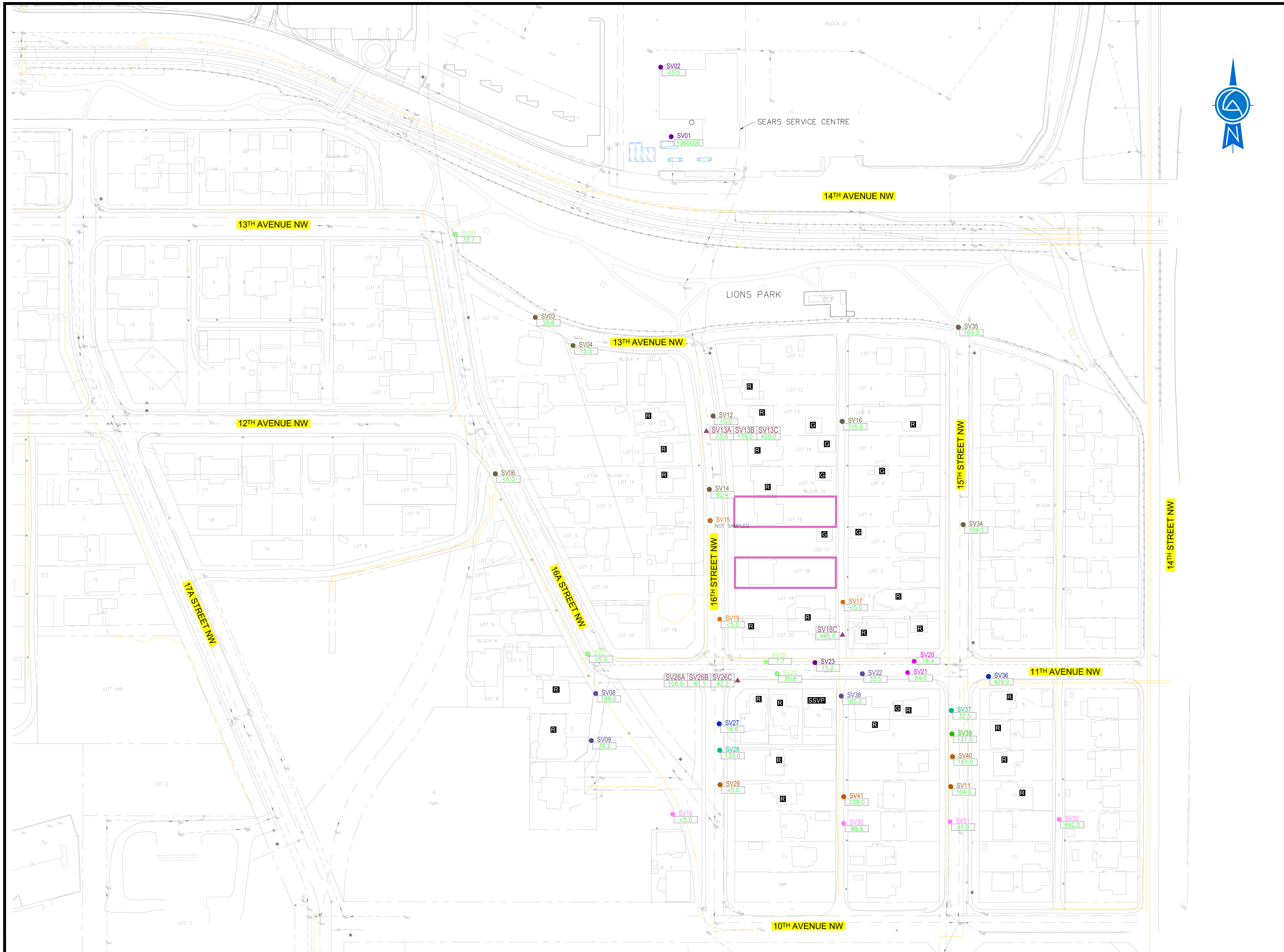
CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE: DISTRIBUTION OF PETROLEUM HYDROCARBONS SUBFRACTION IN SOIL VAPOUR ALIPHATIC C8-C10

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	8
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:05:49 PM



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4,510
- ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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

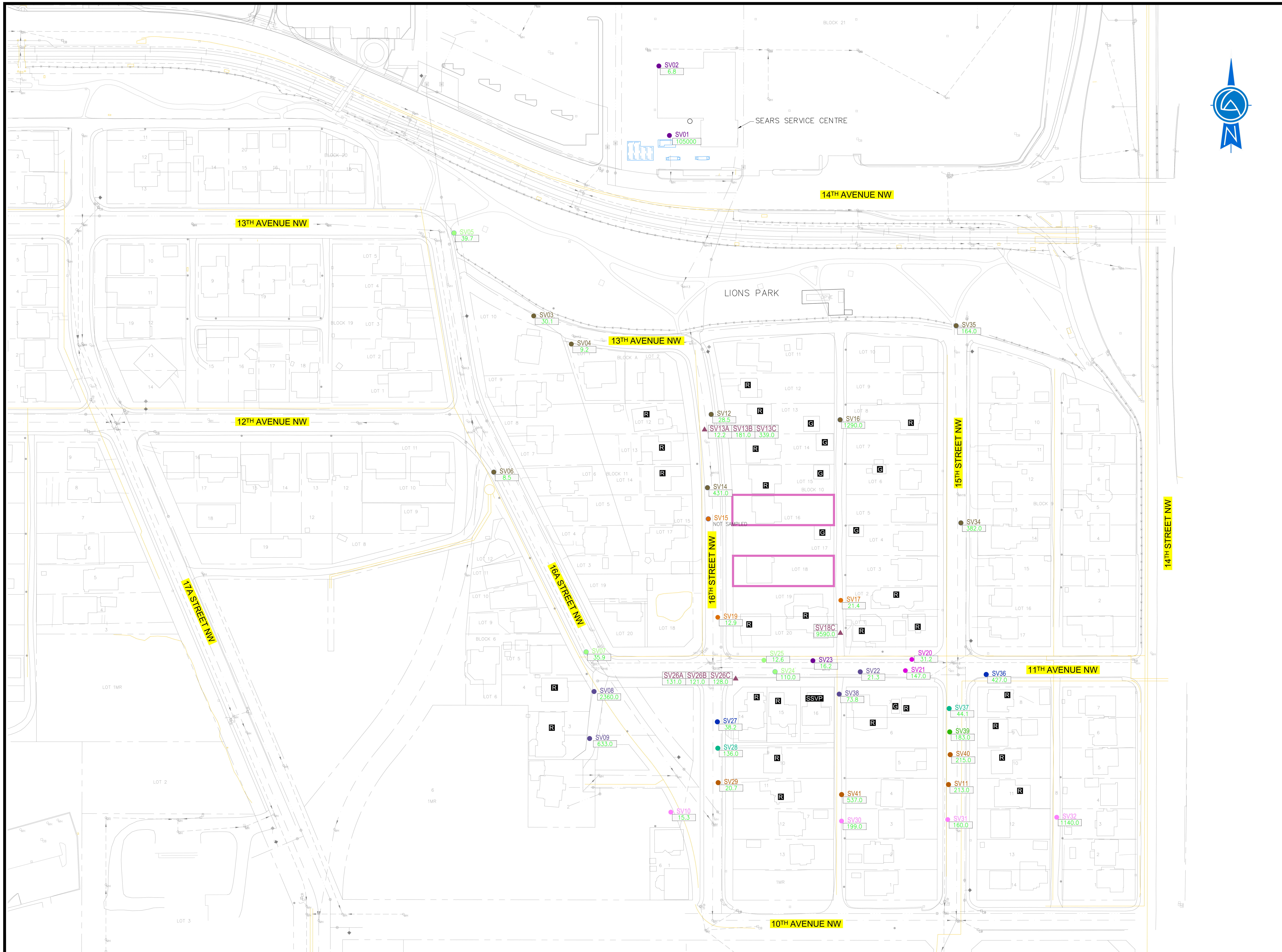
ENGINEER: Clifton Associates

CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT SPRING 2016 HOUNSFIELD HEIGHTS AND NORTH HILL MALL CALGARY, ALBERTA

TITLE: DISTRIBUTION OF PETROLEUM HYDROCARBONS SUBFRACTION IN SOIL VAPOUR AROMATIC C8-C10

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	9
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	



LEGEND

LRT TRACKS

FENCE LINE

LEGAL LINE

FORMER FACILITY/FEATURE

BUILDING

SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#

SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#

NESTED SOIL VAPOUR MONITORING POINT — SV#

RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)

SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510

ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

RESIDENTIAL — R

DETACHED GARAGE — G

SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

CLIENT

SEARS Canada Inc.

PROJECT

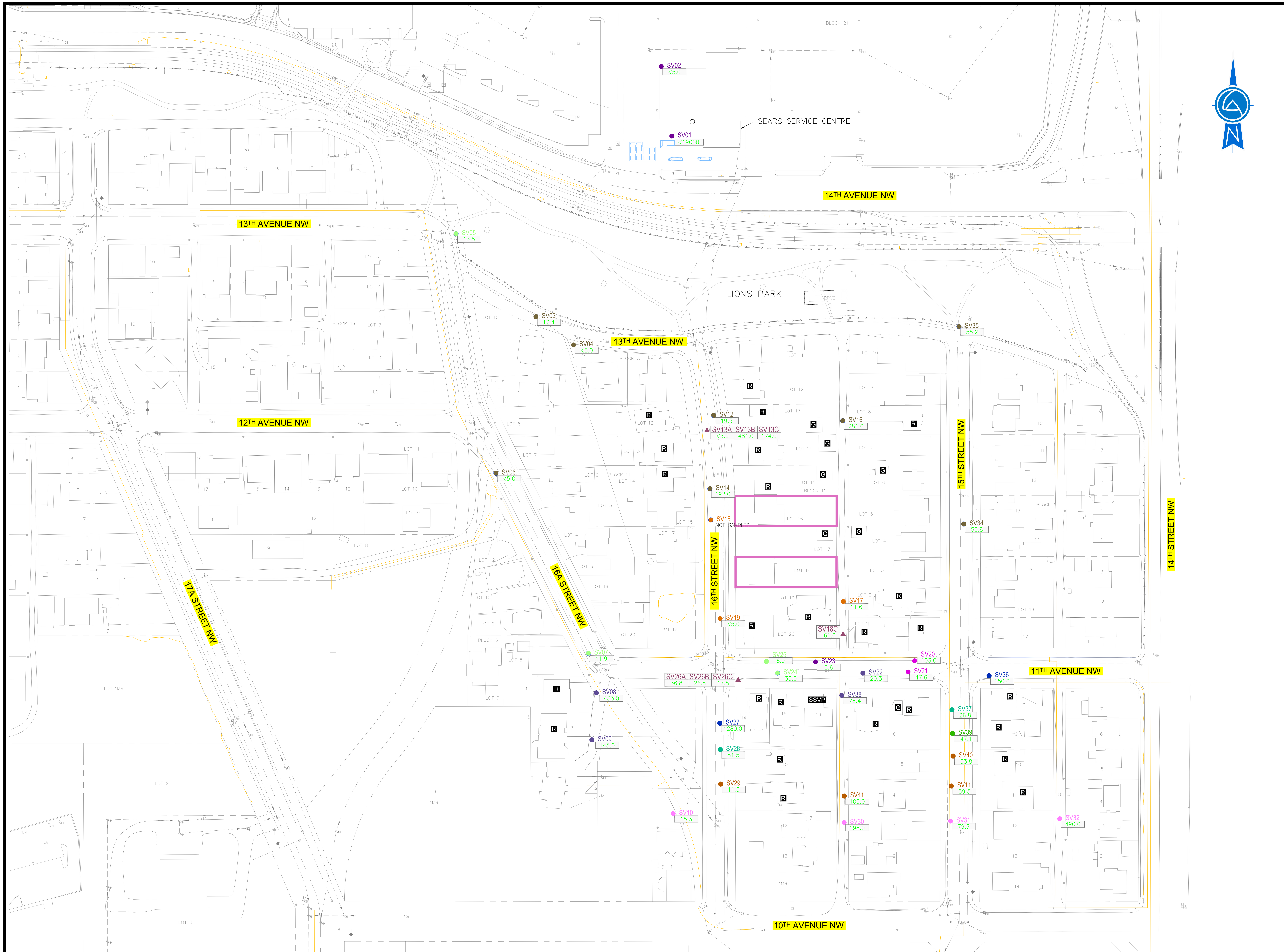
SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE

DISTRIBUTION OF PETROLEUM HYDROCARBONS
SUBFRACTION IN SOIL VAPOUR
ALIPHATIC C10-C12

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03
DRAWN MNG	PROJECT NO. CG2430.1 E06	FIG. 10
CHECKED DB	FILE NO. CG2430.1-E06 Fig 1-14.dwg	

P:\Calgary Projects\CG2400's\CG2430.1\CURRENT_Edm\E06\CG2430.1-E06 Fig 1-14.dwg, 12/08/2016 1:06:33 PM



LEGEND

LRT TRACKS	
FENCE LINE	
LEGAL LINE	
FORMER FACILITY/FEATURE	
BUILDING	
SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs	SV#
SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs	SV#
NESTED SOIL VAPOUR MONITORING POINT	SV#
RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)	
SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT	SV# 4,510
ALL CONCENTRATIONS ARE EXPRESSED AS	$\mu g/m^3$

RESIDENTIAL	R
DETACHED GARAGE	G
SUB-SLAB SOIL VAPOUR POINT	SSVP

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

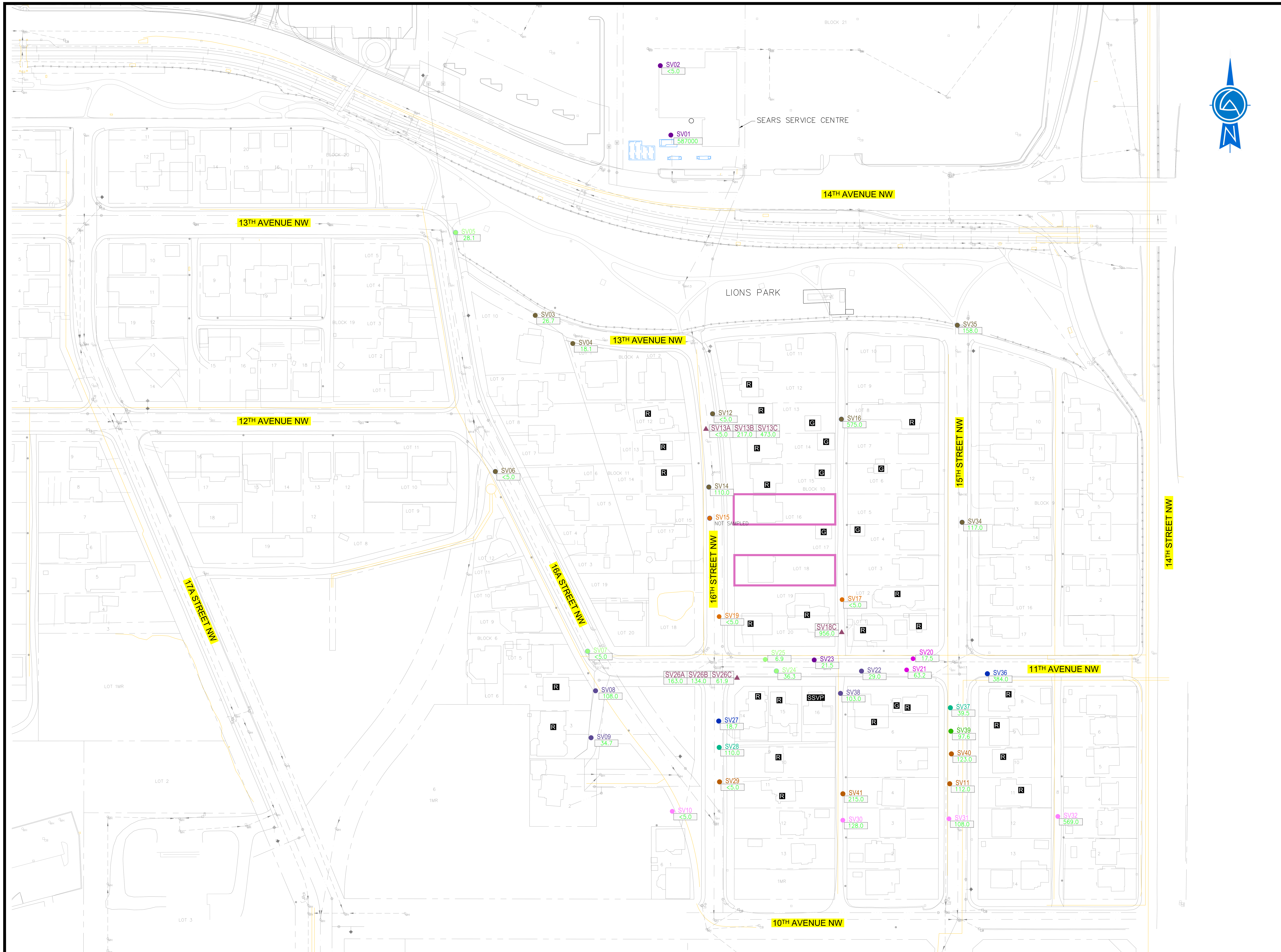
ENGINEER: Clifton Associates

CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT SPRING 2016 HOUNSFIELD HEIGHTS AND NORTH HILL MALL CALGARY, ALBERTA

TITLE: DISTRIBUTION OF PETROLEUM HYDROCARBONS SUBFRACTION IN SOIL VAPOUR ALIPHATIC C12-C16

DESIGNED	KD	SCALE	1:900	DATE	2016-10-03
DRAWN	MNG	PROJECT NO.	CG2430.1 E06	FIG.	11
CHECKED	DB	FILE NO.	CG2430.1-E06 Fig 1-14.dwg		



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4,510
- ALL CONCENTRATIONS ARE EXPRESSED AS — µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

CLIENT: SEARS Canada Inc.

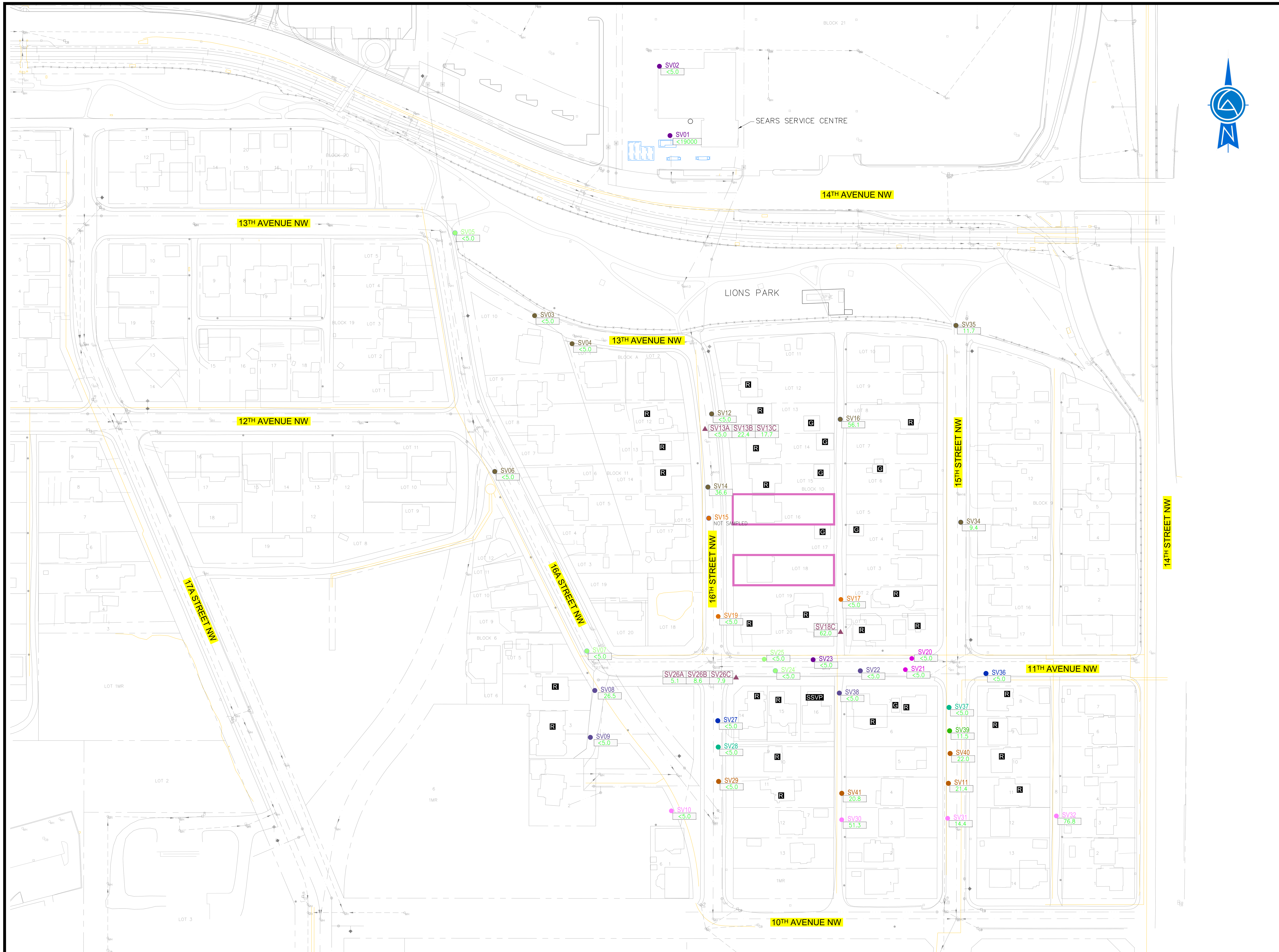
PROJECT: SOIL VAPOUR MONITORING REPORT SPRING 2016 HOUNSFIELD HEIGHTS AND NORTH HILL MALL CALGARY, ALBERTA

TITLE: DISTRIBUTION OF PETROLEUM HYDROCARBONS SUBFRACTION IN SOIL VAPOUR AROMATIC C10-C12

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03

DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	12

CHECKED	FILE NO.
DB	CG2430.1-E06 Fig 1-14.dwg



LEGEND

- LRT TRACKS
- FENCE LINE
- LEGAL LINE
- FORMER FACILITY/FEATURE
- BUILDING
- SOIL VAPOUR PROBES INSTALLED AT 1.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 1.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 2.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 3.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 4.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.0 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 5.5 mbgs — SV#
- SOIL VAPOUR PROBES INSTALLED AT 6.0 mbgs — SV#
- NESTED SOIL VAPOUR MONITORING POINT — SV#
- RESIDENTIAL STRUCTURES WITH REPORTED UNUSUAL FEATURES (EARTHEN FLOORS)
- SOIL VAPOUR MONITORING POINT ID AND RECORDED CONCENTRATION OF CONSTITUENT — SV# 4.510
- ALL CONCENTRATIONS ARE EXPRESSED AS µg/m³

- RESIDENTIAL — R
- DETACHED GARAGE — G
- SUB-SLAB SOIL VAPOUR POINT — SSVP

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 Associates

CLIENT: SEARS Canada Inc.

PROJECT: SOIL VAPOUR MONITORING REPORT
SPRING 2016
HOUNSFIELD HEIGHTS AND NORTH HILL MALL
CALGARY, ALBERTA

TITLE: DISTRIBUTION OF PETROLEUM HYDROCARBONS SUBFRACTION IN SOIL VAPOUR AROMATIC C12-C16

DESIGNED	SCALE	DATE
KD	1:900	2016-10-03
DRAWN	PROJECT NO.	FIG.
MNG	CG2430.1 E06	13
CHECKED	FILE NO.	
DB	CG2430.1-E06 Fig 1-14.dwg	

Appendix B

Clifton Associates
Analytical Results Tables

Clifton Associates

Calgary Office
2222 – 30th Avenue NE
Calgary, Alberta T2E 7K9

T (403) 263-2556
F (403) 234-9033

calgary@clifton.ca
www.clifton.ca

Table 1- Summary of Indoor Air Quality Laboratory Analysis
Chemicals of Potential Concern in Indoor Air
Residental Property at 11th Avenue NW, Calgary, Alberta

Sample ID	52/2920	Guideline[1]
Sampling Date	6-Jun-16	
Parameter		
Benzene	0.8	3 [3]
Toluene	13.1	3880 [3]
Ethylbenzene	2.3	1000 [3]
Xylenes	14.5	180 [3]
F1 – BTEX, C6-C10	72.3	531 [4]
Aliphatic >C5-C6	<5.0	700 [3]
Aliphatic >C6-C8	10.7	NG
Aliphatic C6-C8[2]	15.7	18400 [4]
Aliphatic >C8-C10	11.3	1000 [4]
Aromatic >C8-C10	18.9	200 [4]
F2, C10-C16	94.1	204 [4]
Aliphatic >C10-C12	15.2	1000 [4]
Aliphatic >C12-C16	<5.0	1000 [4]
Aromatic >C10-C12	15.7	200 [4]
Aromatic >C12-C16	<5.0	200 [4]
1,2-Dichloroethane (1,2-DCA)	<0.40	0.4

Notes:

1 Human toxicity RfC, TC or UR-based generic air quality criteria-2016 AEP Tier 1 Guidelines

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Value based on 2008 CCME Guidelines.

4 Value based on 2010 Health Canada Guidelines.

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 2- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Sub-Slab Soil Vapour
Residental Property at 11th Avenue NW, Calgary, Alberta

Sample ID	51/1007	Guideline[1]	Guideline[3]
Sampling Date	6-Jun-16		
Parameter			
Benzene	0.8	3.0E+02	2.7E+02
Toluene	13.1	1.9E+05	1.7E+05
Ethylbenzene	2.3	5.0E+04	4.5E+04
Xylenes	14.5	8.9E+03	8.0E+03
Aliphatic C6-C8[2]	72.3	9.2E+05	8.2E+05
Aliphatic C8-C10	<5.0	4.8E+04	4.3E+04
Aromatic C8_C10	10.7	8.1E+03	7.3E+03
Aliphatic >C10-C12	15.7	5.0E+04	4.5E+04
Aliphatic >C12-C16	11.3	5.0E+04	4.5E+04
Aromatic >C10-C12	18.9	1.0E+04	9.0E+03
Aromatic >C12-C16	94.1	1.0E+04	9.0E+03
1,2-Dichloroethane (1,2-DCA)	15.2	4.0E+01	3.6E+01
Naphtalene	<5.0	1.0E+02	9.3E+01
Oxygen (% v/v)	22.5	NG	NG
Nitrogen (% v/v)	76.8	NG	NG
Methane (% v/v)	0.2	NG	NG
Carbon Dioxide (% v/v)	0.5	NG	NG

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth < 100 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 3- Summary of Soil Vapour Laboratory Analysis

Chemicals of Potential Concern in Soil Vapour

Estimate of Indoor Air Quality for Residential Property at 1312 16th Street NW, Calgary, Alberta

Sample ID	19/2480	Guideline[1]
Sampling Date	8-Jun-16	
Parameter		
Benzene	0.38	3.0E+02
Toluene	1.76	1.9E+05
Ethylbenzene	0.60	5.0E+04
Xylenes	3.1	8.9E+03
Aliphatic C6-C8[2]	12.9	9.2E+05
Aliphatic C8-C10	<5.0	4.8E+04
Aromatic C8_C10	<5.0	8.1E+03
Aliphatic >C10-C12	12.9	5.0E+04
Aliphatic >C12-C16	<5.0	5.0E+04
Aromatic >C10-C12	<5.0	1.0E+04
Aromatic >C12-C16	<5.0	1.0E+04
1,2-Dichloroethane (1,2-DCA)	<0.40	4.0E+01
Naphtalene	<2.6	1.0E+02

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth < 100 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 4- Summary of Soil Vapour Laboratory Analysis

Chemicals of Potential Concern in Soil Vapour

Estimate of Indoor Air Quality for Residential Property at 1316 16th Street NW, Calgary, Alberta

Sample ID	14/2510	Guideline[1]
Sampling Date	14-Jun-16	
Parameter		
Benzene	1.20	3.0E+02
Toluene	13.3	1.9E+05
Ethylbenzene	21.6	5.0E+04
Xylenes	47.9	8.9E+03
Aliphatic C6-C8[2]	528.0	9.2E+05
Aliphatic C8-C10	321	4.8E+04
Aromatic C8_C10	62.4	8.1E+03
Aliphatic >C10-C12	431	5.0E+04
Aliphatic >C12-C16	192	5.0E+04
Aromatic >C10-C12	110	1.0E+04
Aromatic >C12-C16	36.6	1.0E+04
1,2-Dichloroethane (1,2-DCA)	<0.405	4.0E+01
Naphtalene	<2.62	1.0E+02

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth < 100 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 5- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 1.0 m bgs

Sample ID	30/1314	10/239	32/398	31 / 2074	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	1.0	1.0	1.0	1.0		
Sampling Date	4-Jun-16	8-Jun-16	8-Jun-16	9-Jun-16		
Parameter						
Benzene	0.84	<0.32	5.19	6.45	3.0E+02	2.7E+02
Toluene	40.1	1.62	111	53.7	1.9E+05	1.7E+05
Ethylbenzene	8.80	<0.43	95.8	15.3	5.0E+04	4.5E+04
Xylenes	56.0	1.4	447	63.8	8.9E+03	8.0E+03
Aliphatic C6-C8[2]	25	11.5	135.5	20.9	9.2E+05	8.2E+05
Aliphatic C8-C10	28.6	<5.0	198	67.1	4.8E+04	4.3E+04
Aromatic C8_C10	88.9	<5.0	692	91.9	8.1E+03	7.3E+03
Aliphatic >C10-C12	199	15.3	1140	160	5.0E+04	4.5E+04
Aliphatic >C12-C16	198	<5.0	490	79.7	5.0E+04	4.5E+04
Aromatic >C10-C12	128	<5.0	569	108	1.0E+04	9.0E+03
Aromatic >C12-C16	51.3	<5.0	76.8	14.4	1.0E+04	9.0E+03
1,2-Dichloroethane (1,2-DCA)	<0.40	<0.40	<0.40	<0.405	4.0E+01	3.6E+01
Naphtalene	4.1	<2.6	3.1	2.75	1.0E+02	9.3E+01

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth < 100 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 6- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 1.5 m bgs

Sample ID	11 / 1391	40 / 206	29/1366	41/2529	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	1.5	1.5	1.5	1.5		
Sampling Date	9-Jun-16	9-Jun-16	8-Jun-16	4-Jun-16		
Parameter						
Benzene	1.77	1.69	<0.32	2.68	3.0E+02	2.7E+02
Toluene	16.3	14.0	1.30	43.1	1.9E+05	1.7E+05
Ethylbenzene	16.5	38.2	<0.43	24.4	5.0E+04	4.5E+04
Xylenes	58.2	166	2.0	161	8.9E+03	8.0E+03
Aliphatic C6-C8[2]	111.3	545.7	16.1	36.7	9.2E+05	8.2E+05
Aliphatic C8-C10	224	353	<5.0	362	4.8E+04	4.3E+04
Aromatic C8_C10	104	161	<5.0	228	8.1E+03	7.3E+03
Aliphatic >C10-C12	213	215	20.7	537	5.0E+04	4.5E+04
Aliphatic >C12-C16	59.5	53.8	11.3	105	5.0E+04	4.5E+04
Aromatic >C10-C12	112	123	<5.0	215	1.0E+04	9.0E+03
Aromatic >C12-C16	21.4	22.0	<5.0	20.8	1.0E+04	9.0E+03
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.405	<0.40	<0.40	4.0E+01	3.6E+01
Naphtalene	<2.62	<2.62	<2.6	<2.6	1.0E+02	9.3E+01

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth < 100 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 7- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 2.0 m bgs

Sample ID	26C/2473	18C/1362	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	2.0	2.0		
Sampling Date	3-Jun-16	15-Jun-16		
Parameter				
Benzene	1.33	2.88	1.6E+05	1.4E+05
Toluene	4.23	11.5	9.8E+07	8.8E+07
Ethylbenzene	3.05	7.79	2.7E+07	2.4E+07
Xylenes	22.0	21.3	4.7E+06	4.3E+06
Aliphatic C6-C8[2]	22.2	249	5.3E+08	4.8E+08
Aliphatic C8-C10	153	14000	2.8E+07	2.5E+07
Aromatic C8_C10	42.2	445	4.7E+06	4.2E+06
Aliphatic >C10-C12	128	9590	2.9E+07	2.6E+07
Aliphatic >C12-C16	17.8	161	2.9E+07	2.6E+07
Aromatic >C10-C12	61.9	956	5.8E+06	5.2E+06
Aromatic >C12-C16	7.9	62	5.8E+06	5.2E+06
1,2-Dichloroethane (1,2-DCA)	<0.40	<0.809	1.9E+03	1.7E+03
Naphtalene	<2.6	<5.24	5.7E+03	5.2E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 200 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 8- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 2.5 m bgs

Sample ID	13C/3017	37/1160	28/2514	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	2.5	2.5	2.5		
Sampling Date	14-Jun-16	15-Jun-16	8-Jun-16		
Parameter					
Benzene	0.552	0.686	2.55	1.6E+05	1.5E+05
Toluene	5.98	18.0	9.19	1.0E+08	9.2E+07
Ethylbenzene	40.7	4.67	12.0	2.8E+07	2.5E+07
Xylenes	146	26.2	65.2	4.9E+06	4.4E+06
Aliphatic C6-C8[2]	38.1	18.3	37	5.6E+08	5.1E+08
Aliphatic C8-C10	114	29.6	87.1	2.9E+07	2.7E+07
Aromatic C8_C10	429	32.5	133	5.0E+06	4.5E+06
Aliphatic >C10-C12	339	44.1	136	3.1E+07	2.8E+07
Aliphatic >C12-C16	174	26.8	81.5	3.1E+07	2.8E+07
Aromatic >C10-C12	473	39.5	110	6.1E+06	5.5E+06
Aromatic >C12-C16	17.7	<5.0	<5.0	6.1E+06	5.5E+06
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.405	<0.40	2.0E+03	1.8E+03
Naphtalene	<2.62	<2.62	<2.6	6.0E+03	5.4E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 250 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 9- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 3.0 m bgs

Sample ID	36/322	27/1041	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	3.0	3.0		
Sampling Date	7-Jun-16	8-Jun-16		
Parameter				
Benzene	3.47	0.79	1.6E+05	1.4E+05
Toluene	41.8	8.79	9.8E+07	8.8E+07
Ethylbenzene	47.6	3.38	2.7E+07	2.4E+07
Xylenes	313	16.0	4.7E+06	4.3E+06
Aliphatic C6-C8[2]	40.5	14.9	5.3E+08	4.8E+08
Aliphatic C8-C10	92.9	19.1	2.8E+07	2.5E+07
Aromatic C8_C10	429	16.6	4.7E+06	4.2E+06
Aliphatic >C10-C12	427	38.2	2.9E+07	2.6E+07
Aliphatic >C12-C16	150	1280	2.9E+07	2.6E+07
Aromatic >C10-C12	384	18.7	5.8E+06	5.2E+06
Aromatic >C12-C16	<5.0	<5.0	5.8E+06	5.2E+06
1,2-Dichloroethane (1,2-DCA)	<0.40	23.3	1.9E+03	1.7E+03
Naphtalene	<2.6	<2.6	5.7E+03	5.2E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 300 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 10- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 3.5 m bgs

Sample ID	21 / 1780	20/1904	26B/1455	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	3.5	3.5	3.5		
Sampling Date	9-Jun-16	7-Jun-16	3-Jun-16		
Parameter					
Benzene	2.21	1.81	0.87	1.8E+05	1.6E+05
Toluene	19.4	6.93	6.28	1.1E+08	9.8E+07
Ethylbenzene	11.8	2.26	5.24	3.0E+07	2.7E+07
Xylenes	80.0	14.3	42.7	5.3E+06	4.8E+06
Aliphatic C6-C8[2]	19.5	16.8	12.7	6.2E+08	5.6E+08
Aliphatic C8-C10	63.3	14.9	126	3.3E+07	2.9E+07
Aromatic C8_C10	84.0	18.4	83.1	5.5E+06	5.0E+06
Aliphatic >C10-C12	147	31.2	121	3.4E+07	3.1E+07
Aliphatic >C12-C16	47.6	103	26.8	3.4E+07	3.1E+07
Aromatic >C10-C12	63.2	17.5	134	6.8E+06	6.1E+06
Aromatic >C12-C16	<5.0	<5.0	8.6	6.8E+06	6.1E+06
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.40	<0.40	2.1E+03	1.9E+03
Naphtalene	<2.62	<2.6	2.7	6.6E+03	5.9E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 350 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 11- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 4.0 m bgs

Sample ID	22/1415	8/381	9/1384	38/384	13B/2076	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	4.0	4.0	4.0	4.0	4.0		
Sampling Date	7-Jun-16	4-Jun-16	4-Jun-16	7-Jun-16	14-Jun-16		
Parameter							
Benzene	1.08	3.28	1.40	0.98	<0.319	1.8E+05	1.6E+05
Toluene	5.86	95.2	113	13.9	3.81	1.1E+08	1.0E+08
Ethylbenzene	4.40	39.9	3.94	11.2	22.7	3.1E+07	2.8E+07
Xylenes	29.3	181	19.1	75.3	53.4	5.5E+06	4.9E+06
Aliphatic C6-C8[2]	14	4080	64.5	23.5	49.3	6.5E+08	5.9E+08
Aliphatic C8-C10	6.3	2630	349	14.6	39.9	3.4E+07	3.1E+07
Aromatic C8_C10	33.5	188	36.2	105	179	5.8E+06	5.2E+06
Aliphatic >C10-C12	21.3	2360	633	73.8	181	3.6E+07	3.2E+07
Aliphatic >C12-C16	20.3	433	145	78.4	481	3.6E+07	3.2E+07
Aromatic >C10-C12	29.0	108	34.7	103	217	7.1E+06	6.4E+06
Aromatic >C12-C16	<5.0	26.5	<5.0	<5.0	22.4	7.1E+06	6.4E+06
1,2-Dichloroethane (1,2-DCA)	<0.40	<0.40	<0.40	<0.40	<0.405	2.2E+03	1.9E+03
Naphtalene	<2.6	<2.6	<2.6	<2.6	<2.62	6.9E+03	6.2E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 400 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 12- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 4.5 m bgs

Sample ID	23/1402	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	4.5		
Sampling Date	7-Jun-16		
Parameter			
Benzene	0.44	1.9E+05	1.7E+05
Toluene	2.38	1.2E+08	1.0E+08
Ethylbenzene	1.49	3.2E+07	2.9E+07
Xylenes	9.5	5.7E+06	5.1E+06
Aliphatic C6-C8[2]	10	6.8E+08	6.1E+08
Aliphatic C8-C10	14.9	3.6E+07	3.2E+07
Aromatic C8_C10	15.2	6.1E+06	5.4E+06
Aliphatic >C10-C12	16.2	3.7E+07	3.4E+07
Aliphatic >C12-C16	5.6	3.7E+07	3.4E+07
Aromatic >C10-C12	21.5	7.4E+06	6.7E+06
Aromatic >C12-C16	<5.0	7.4E+06	6.7E+06
1,2-Dichloroethane (1,2-DCA)	<0.40	2.2E+03	2.0E+03
Naphtalene	2.9	7.2E+03	6.5E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 450 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 13- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 5.0 m bgs

Sample ID	26A/1257	24/383	5/1928	25/228	7/3012	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	5.0	5.0	5.0	5.0	5.0		
Sampling Date	3-Jun-16	7-Jun-16	13-Jun-16	3-Jun-16	4-Jun-16		
Parameter							
Benzene	0.84	1.35	1.10	0.68	<0.32	1.9E+05	1.7E+05
Toluene	8.15	7.25	4.46	4.26	1.35	1.2E+08	1.1E+08
Ethylbenzene	6.47	3.57	4.04	1.24	0.68	3.3E+07	3.0E+07
Xylenes	55.3	24.8	25.5	6.7	2.7	5.9E+06	5.3E+06
Aliphatic C6-C8[2]	10.4	26.6	20.8	12.1	46.4	7.1E+08	6.4E+08
Aliphatic C8-C10	115	100	38.3	<5.0	29.0	3.7E+07	3.4E+07
Aromatic C8_C10	108	30.8	33.7	7.7	<5.0	6.3E+06	5.7E+06
Aliphatic >C10-C12	131	110	39.7	12.6	35.9	3.9E+07	3.5E+07
Aliphatic >C12-C16	36.8	33.0	13.5	6.9	11.9	3.9E+07	3.5E+07
Aromatic >C10-C12	163	36.3	28.1	6.9	<5.0	7.8E+06	7.0E+06
Aromatic >C12-C16	5.1	<5.0	<5.0	<5.0	<5.0	7.8E+06	7.0E+06
1,2-Dichloroethane (1,2-DCA)	<0.40	<0.40	<0.405	<0.40	<0.40	2.3E+03	2.1E+03
Naphtalene	<2.6	<2.6	<2.62	<2.6	<2.6	7.5E+03	6.7E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 500 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 14- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 5.5 m bgs

Sample ID	17 / 1760	19/2480	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	5.5	5.5		
Sampling Date	10-Jun-16	8-Jun-16		
Parameter				
Benzene	<0.319	0.38	2.0E+05	1.8E+05
Toluene	2.94	1.76	1.2E+08	1.1E+08
Ethylbenzene	0.541	0.60	3.4E+07	3.1E+07
Xylenes	3.04	3.1	6.1E+06	5.5E+06
Aliphatic C6-C8[2]	19.3	12.9	7.4E+08	6.7E+08
Aliphatic C8-C10	5.4	<5.0	3.9E+07	3.5E+07
Aromatic C8_C10	<5.0	<5.0	6.6E+06	5.9E+06
Aliphatic >C10-C12	21.4	12.9	4.1E+07	3.6E+07
Aliphatic >C12-C16	11.6	<5.0	4.1E+07	3.6E+07
Aromatic >C10-C12	<5.0	<5.0	8.1E+06	7.3E+06
Aromatic >C12-C16	<5.0	<5.0	8.1E+06	7.3E+06
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.40	2.3E+03	2.1E+03
Naphtalene	<2.62	<2.6	7.7E+03	7.0E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 550 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 15 A- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 6.0 m bgs

Sample ID	13A/2236	6/1921	34 / 269	16 / 1427	4/1014	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	6.0	6.0	6.0	6.0	6.0		
Sampling Date	14-Jun-16	4-Jun-16	9-Jun-16	10-Jun-16	13-Jun-16		
Parameter							
Benzene	<0.319	<0.32	1.01	9.87	0.512	2.0E+05	1.8E+05
Toluene	1.55	1.12	14.8	64.1	3.35	1.3E+08	1.1E+08
Ethylbenzene	<0.434	<0.43	28.6	80.5	1.43	3.5E+07	3.2E+07
Xylenes	<2.62	2.0	92.6	517	10.2	6.2E+06	5.6E+06
Aliphatic C6-C8[2]	13.6	10	534.3	156.1	10	7.7E+08	6.9E+08
Aliphatic C8-C10	<5.0	<5.0	300	296	<5.0	4.1E+07	3.6E+07
Aromatic C8_C10	<5.0	<5.0	159	715	15.3	6.9E+06	6.2E+06
Aliphatic >C10-C12	12.2	8.5	382	1290	9.2	4.2E+07	3.8E+07
Aliphatic >C12-C16	<5.0	<5.0	50.8	281	<5.0	4.2E+07	3.8E+07
Aromatic >C10-C12	<5.0	<5.0	117	575	18.1	8.4E+06	7.6E+06
Aromatic >C12-C16	<5.0	<5.0	9.4	56.1	<5.0	8.4E+06	7.6E+06
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.40	<0.405	<0.405	<0.405	2.4E+03	2.2E+03
Naphtalene	<1.30	<2.6	<2.62	<2.62	<2.62	8.0E+03	7.2E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 600 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 15 B- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Residential Buildings-Installation Depth 6.0 m bgs

Sample ID	3/1195	35/2239	12/1763	14/2510	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	6.0	6.0	6.0	6.0		
Sampling Date	13-Jun-16	13-Jun-16	14-Jun-16	14-Jun-16		
Parameter						
Benzene	0.534	4.51	0.411	1.20	2.0E+05	1.8E+05
Toluene	98.0	41.5	2.79	13.3	1.3E+08	1.1E+08
Ethylbenzene	2.57	20.9	0.526	21.6	3.5E+07	3.2E+07
Xylenes	17.3	128	2.76	47.9	6.2E+06	5.6E+06
Aliphatic C6-C8[2]	12.1	20	11.9	528	7.7E+08	6.9E+08
Aliphatic C8-C10	25.5	165	5.3	321	4.1E+07	3.6E+07
Aromatic C8_C10	20.8	169	<5.0	62.4	6.9E+06	6.2E+06
Aliphatic >C10-C12	30.1	164	28.5	431	4.2E+07	3.8E+07
Aliphatic >C12-C16	12.4	55.2	19.5	192	4.2E+07	3.8E+07
Aromatic >C10-C12	26.7	158	<5.0	110	8.4E+06	7.6E+06
Aromatic >C12-C16	<5.0	11.7	<5.0	36.6	8.4E+06	7.6E+06
1,2-Dichloroethane (1,2-DCA)	<0.405	<0.405	<0.405	<0.405	2.4E+03	2.2E+03
Naphtalene	<2.62	<2.62	<2.62	<2.62	8.0E+03	7.2E+03

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a residential building on fine-textured soil, depth 600 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Aliphatic C6-C8 values calculated by summing Aliphatic >C5-C6 and Aliphatic >C6-C8 fractions

3 Inreased monitoring frequency trigger values

NG No applicable guideline

All results are expressed as µg/m^3 unless otherwise noted.

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 16- Summary of Soil Vapour Laboratory Analysis
Chemicals of Potential Concern in Soil Vapour
Soil Vapour Samples-Commercial Buildings-Installation Depth 4.5 m bgs

Sample ID	1/1197	2/1480	Guideline[1]	Guideline[3]
Installation Depth (m bgs)	4.5	4.5		
Sampling Date	10-Jun-16	8-Jun-16		
Parameter				
Benzene	570,000	0.386	1.9E+06	1.7E+06
Toluene	855,000	2.13	NGR	NGR
Ethylbenzene	272,000	0.494	NGR	NGR
Xylenes	1,900,000	2.46	NGR	NGR
Aliphatic C6-C8[2]	40,360,000	140.4	NGR	NGR
Aliphatic C8-C10	1,860,000	12.2	NGR	NGR
Aromatic C8_C10	1,360,000	<5.0	NGR	NGR
Aliphatic >C10-C12	105,000	6.8	NGR	NGR
Aliphatic >C12-C16	<19000	<5.0	NGR	NGR
Aromatic >C10-C12	587,000	<5.0	NGR	NGR
Aromatic >C12-C16	<19000	<5.0	NGR	NGR
1,2-Dichloroethane (1,2-DCA)	<1500	<0.405	2.3E+04	2.1E+04
Naphtalene	<9700	<2.62	7.5E+04	6.8E+04

Notes:

1 Soil vapour quality guidelines protective of indoor air quality for a commercial building on fine-textured soil, depth 450 cm, Intrinsik 31/8/2016

Indicates that the concentration exceeds guideline

2 Inreased monitoring frequency trigger values

3 Trigger thresholds for additional investigation

NGR No guideline required, as calculated guideline value results in a vapour concentration greater than the maximum possible vapour concentration for that chemical, assuming no NAPL is present. Maximum vapour concentration calculated according to Health Canada (2010) guidance.

All results are expressed as µg/m^3 unless otherwise noted

Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Appendix C

Clifton Associates
QA/QC Tables

Clifton Associates

Calgary Office
2222 – 30th Avenue NE
Calgary, Alberta T2E 7K9

T (403) 263-2556
F (403) 234-9033

calgary@clifton.ca
www.clifton.ca

Table 17 - Summary of Field Duplicates Laboratory Analysis and Relative Percent Difference Calculations

Sample ID	RDL	SV01	SV91	RPD (%)	SV16	SV916	RPD (%)	SV24	SV924	RPD (%)	SV41	SV941	RPD (%)
Sample Date		13-Jun-16			10-Jun-16			07-Jun-16			04-Jun-16		
Parameter													
Benzene	0.32	178,000	178,000	0.0	3.1	2.8	9.1	1.4	1.2	15.1	2.7	2.5	9.0
Toluene	0.38	227,000	223,000	1.8	17.0	15.7	8.0	7.3	7.4	1.4	43.1	39.1	9.7
Ethylbenzene	0.43	62,600	60,800	2.9	18.5	16.5	11.4	3.6	3.9	8.3	24.4	21.8	11.3
Total Xylenes	1.3	438,000	433,000	1.1	119	105	12.5	24.8	28.1	12.5	161.0	144.0	11.1
Aliphatic >C5-C6	5.0	9,160,000	10,400,000	12.7	12	12	4.2	<5.0	<5.0	N/A	<5.0	<5.0	N/A
Aliphatic >C6-C8	5.0	31,200,000	33,300,000	6.5	144	134	7.2	22	18	17.1	32	31	1.9
Aliphatic C6-C8	5.0	40,360,000	43,700,000	7.9	156	146	7.0	27	23	13.7	37	36	1.6
Aliphatic >C8-C10	5.0	1,860,000	1,730,000	7.2	296	288	2.7	100	100	0.0	360	324	10.5
Aromatic >C8-C10	5.0	1,360,000	1,220,000	10.9	715	654	8.9	31	33	7.8	228	203	11.6
Aliphatic >C10-C12	5.0	105,000	72,400	36.8	1,290	1,170	9.8	110	116	5.3	537	479	11.4
Aliphatic >C12-C16	5.0	<19,000	<70000	N/A	281	248	12	33	43	26	105	91	14
Aromatic >C10-C12	5.0	587,000	469,000	22.3	575	521	9.9	36	39	6.9	215	191	11.8
Aromatic >C12-C16	5.0	<19,000	<70000	N/A	56	50	12	<5.0	<5.0	N/A	21	17	21
1,2-Dichloroethane (1,2-DCA)	0.40	<370	<1400	N/A	<0.405	<0.405	N/A	<0.405	<0.405	N/A	<0.405	<0.405	N/A
Naphtalene	2.62	<1900	<7000	N/A	<2.62	<2.62	N/A	<2.62	<2.62	N/A	<2.62	<2.62	N/A

Notes:

RDL Reportable Detection Limit
RPD Relative Percent Difference
N/A Not applicable
Indicates RPD >25%
All results are expressed as $\mu g/m^3$ unless otherwise noted
Testing was conducted by Maxxam Analytics Inc.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 18 A - Summary of Integrity Testing by Helium Tracer

SVMP ID		SV01	SV02	SV03	SV04	SV05	SV06	SV07	SV08	SV09	SV10	SV11	SV12
Installation Date		26-May-16	26-May-16	06-Jun-16	06-Jun-16	24-May-16	24-May-16	24-May-16	24-May-16	24-May-16	24-May-16	02-Jun-16	07-Jun-16
Testing Date Date		13-Jun-16	13-Jun-16	13-Jun-16	13-Jun-16	13-Jun-16	04-Jun-16	04-Jun-16	04-Jun-16	04-Jun-16	08-Jun-16	09-Jun-16	14-Jun-16
Helium Analyzer	**Units**	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002
Initial Recorded He Shroud Concentration	%	22.5	21.5	32.9	30.5	31.2	34.0	32.3	33.4	22.6	23.8	34.4	37.2
Final He Concentration after Purge	%	0.020	0.2	0.1	0.09	0.58	0.01	0.028	0.07	0	0.2	0	0.68
Difference	%	0.089	0.930	0.304	0.295	1.859	0.0294	0.0867	0.210	0	0.840	0	1.828
Integrity Test Result	PASS/FAIL	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**

Notes:

He 99.99% commercial grade helium tracer

Testing conducted by Clifton Associates Ltd.

Table 18 B - Summary of Integrity Testing by Helium Tracer

SVMP ID		SV13 A	SV13 B	SV13 C	SV14	SV15	SV16	SV17	SV18 A	SV18 B	SV18 C	SV19	SV20
Installation Date		07-Jun-16	07-Jun-16	07-Jun-16	02-Jun-16	07-Jun-16	06-Jun-16	06-Jun-16	03-Jun-16	03-Jun-16	03-Jun-16	31-May-16	31-May-16
Testing Date Date		14-Jun-16	14-Jun-16	14-Jun-16	14-Jun-16	10-Jun-16	10-Jun-16	10-Jun-16	15-Jun-16	15-Jun-16	15-Jun-16	08-Jun-16	07-Jun-16
Helium Analyzer	**Units**	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002
Initial Recorded He Shroud Concentration	%	29.2	21.5	22.4	24.6	30.5	33.5	31.9	29.9	30.9	36.4	33.0	27.3
Final He Concentration after Purge	%	0.000	0.08	0.09	0.03	17.6	0.17	0.09	0.06	0.07	0.13	0.02	0.16
Difference	%	0.000	0.372	0.402	0.122	57.705	0.507	0.282	0.201	0.227	0.357	0.061	0.586
Integrity Test Result	PASS/FAIL	PASS	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Notes:

He 99.99% commercial grade helium tracer

Testing conducted by Clifton Associates Ltd.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 18 C - Summary of Integrity Testing by Helium Tracer

SVMP ID		SV21	SV22	SV23	SV24	SV25	SV26 A	SV26 B	SV26 C	SV27	SV28	SV29	SV30
Installation Date		31-May-16	31-May-16	30-May-16	31-May-16	30-May-16	26-May-16	26-May-16	26-May-16	24-May-16	24-May-16	24-May-16	01-Jun-16
Testing Date Date		09-Jun-16	09-Jun-16	07-Jun-16	07-Jun-16	13-Jun-16	03-Jun-16	03-Jun-16	03-Jun-16	08-Jun-16	08-Jun-16	08-Jun-16	14-Jun-16
Helium Analyzer	**Units**	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002
Initial Recorded He Shroud Concentration	%	34.4	30.4	34.2	35.6	29.0	30.8	30.2	32.6	21.9	23.1	26.8	40.4
Final He Concentration after Purge	%	0.28	0.15	0.12	0.05	0.5	0.18	0.23	0.03	0	0.36	0.3	0
Difference	%	0.814	0.493	0.351	0.140	1.724	0.584	0.762	0.092	0	1.558	1.119	0.000
Integrity Test Result	PASS/FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Notes:

He 99.99% commercial grade helium tracer

Testing conducted by Clifton Associates Ltd.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Table 18 D - Summary of Integrity Testing by Helium Tracer

SVMP ID		SV31	SV32	SV34	SV35	SV36	SV37	SV38	SV39	SV40	SV41		
Installation Date		02-Jun-16	01-Jun-16	01-Jun-16	07-Jun-16	03-Jun-16	01-Jun-16	03-Jun-16	02-Jun-16	02-Jun-16	01-Jun-16		
Testing Date Date		09-Jun-16	08-Jun-16	09-Jun-16	13-Jun-16	07-Jun-16	15-Jun-16	07-Jun-16	09-Jun-16	09-Jun-16	04-Jun-16		
Helium Analyzer	**Units**	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002	MGD 2002		
Initial Recorded He Shroud Concentration	%	31.4	21.1	35.7	34.9	28.9	32.6	32.3	36.4	37.4	25.4		
Final He Concentration after Purge	%	0.06	0.013	0.02	0.13	0.09	0.09	0.52	0.04	0.02	0.04		
Difference	%	0.191	0.062	0.056	0.372	0.311	0.276	1.610	0.110	0.053	0.157		
Integrity Test Result	PASS/FAIL	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**		

Notes:

He 99.99% commercial grade helium tracer

Testing conducted by Clifton Associates Ltd.

Clifton Associates

Job No.	CG2430.1E06
Client	Sears Canada Inc.
Project	SVMP, Spring 2016
Location	Calgary, Alberta

Appendix D

Clifton Associates
Certificates of Analysis

Clifton Associates

Calgary Office
2222 – 30th Avenue NE
Calgary, Alberta T2E 7K9

T (403) 263-2556
F (403) 234-9033

calgary@clifton.ca
www.clifton.ca

Maxxam
A Bureau Veritas Group Company

Your Project #: CG2430.1E06
Your C.O.C. #: na

Attention:Daniel Budai

Clifton Associates Ltd.
2222 30 Ave. NE
Calgary, AB
CANADA T2E 7K9

Report Date: 2016/06/16
Report #: R4030948
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6B5182
Received: 2016/06/07, 10:00

Sample Matrix: AIR
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
BTEX and CCME Compounds in Air(TO-15mod)	6	N/A	2016/06/08	BRL SOP-00304	EPA TO-15 m
BTEX and CCME Compounds in Air(TO-15mod)	6	N/A	2016/06/09	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	6	N/A	2016/06/08	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	6	N/A	2016/06/09	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	6	N/A	2016/06/08	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	6	N/A	2016/06/09	BRL SOP-00304	EPA TO-15 m
Matrix Gases (1)	1	N/A	2016/06/13	CAM SOP-00225 CAM SOP-00209	
Volatile Organics in Air (ug/m3)	6	N/A	2016/06/10	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	6	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (2)	6	N/A	2016/06/08	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (2)	6	N/A	2016/06/09	BRL SOP-00304	EPA TO-15 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) Argon interferes with Oxygen and is included in the reported Oxygen concentration. The atmosphere contains about 0.9% Argon.
(2) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Marinela Sim
Project Manager
16 Jun 2016 16:29:15 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina Bacchus, Project Manager
Email: CBacchus@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

RESULTS OF ANALYSES OF AIR

Maxxam ID		CMG407	CMG408		CMG409		CMG410	CMG411		
Sampling Date		2016/06/03	2016/06/03		2016/06/03		2016/06/03	2016/06/04		
COC Number		na	na		na		na	na		
	UNITS	26A/1257	26B/1455	QC Batch	26C/2473	QC Batch	25/228	9/1384	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-4.6)	(-4.2)	4530964	(-3.7)	4533715	(-4.5)	(-4.1)	4530964	
QC Batch = Quality Control Batch										

Maxxam ID		CMG412	CMG413		CMG414	CMG415	CMG416	CMG417		
Sampling Date		2016/06/04	2016/06/04		2016/06/04	2016/06/04	2016/06/04	2016/06/04		
COC Number		na	na		na	na	na	na		
	UNITS	8/381	7/3012	QC Batch	6/1921	41/2529	941/1382	30/1314	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-2.9)	(-3)	4530964	(-3.1)	(-3.4)	(-3.1)	(-2.9)	4533715	
QC Batch = Quality Control Batch										

Maxxam ID		CMG418		
Sampling Date		2016/06/06		
COC Number		na		
	UNITS	51/1007	QC Batch	MDL
Volatile Organics				
Pressure on Receipt	psig	(-2.9)	4533715	
QC Batch = Quality Control Batch				

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

COMPRESSED GAS PARAMETERS (AIR)

Maxxam ID		CMG418			
Sampling Date		2016/06/06			
COC Number		na			
	UNITS	**51/1007**	**RDL**	**QC Batch**	**MDL**
Fixed Gases					
Oxygen	% v/v	22.5	0.2	4538513	0.02
Nitrogen	% v/v	76.8	0.2	4538513	0.02
Methane	% v/v	0.2	0.2	4538513	0.02
Carbon Dioxide	% v/v	0.5	0.2	4538513	0.02

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG407	CMG408		CMG409		CMG410			
Sampling Date		2016/06/03	2016/06/03		2016/06/03		2016/06/03			
COC Number		na	na		na		na			
	UNITS	26A/1257	26B/1455	RDL	26C/2473	RDL	25/228	RDL	QC Batch	MDL
Calculated Parameters										
Dichlorodifluoromethane (FREON 12)	ug/m3	2.49	2.40	0.99	2.48	0.99	2.43	0.99	4528342	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
Chloromethane	ug/m3	0.76	0.77	0.62	0.87	0.62	1.30	0.62	4528342	0.10
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	4528342	0.10
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	4528342	0.10
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	4528342	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	6.6	7.7	1.1	4.0	1.1	1.2	1.1	4528342	0.10
Ethanol (ethyl alcohol)	ug/m3	8.1	6.7	1.9	2.5	1.9	3.9	1.9	4528342	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
2-propanol	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	<2.5	2.5	4528342	0.60
2-Propanone	ug/m3	18.3	19.0	1.9	42.3	1.9	22.5	1.9	4528342	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	<2.9	2.9	8.8	2.9	<2.9	2.9	4528342	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	4.1	21.6	4.1	<4.1	4.1	4528342	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4528342	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	4528342	0.10
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4528342	0.50
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	2.8	<2.8	2.8	3.4	2.8	4528342	0.10
Chloroform	ug/m3	4.75	4.56	0.49	5.39	0.49	<0.49	0.49	4528342	0.10
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	4528342	0.10
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	4528342	0.10
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4528342	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4528342	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4528342	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4528342	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4528342	0.10
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4528342	0.10
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	4528342	0.10
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	4528342	0.10
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	4528342	0.10
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	4528342	0.10
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	<0.54	0.54	<0.54	0.54	4528342	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG407	CMG408		CMG409		CMG410			
Sampling Date		2016/06/03	2016/06/03		2016/06/03		2016/06/03			
COC Number		na	na		na		na			
	UNITS	26A/1257	26B/1455	RDL	26C/2473	RDL	25/228	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	<0.68	<0.68	0.68	<0.68	0.68	<0.68	0.68	4528342	0.10
Benzene	ug/m3	0.84	0.87	0.32	1.33	0.32	0.68	0.32	4528342	0.10
Toluene	ug/m3	8.15	6.28	0.38	4.23	0.38	4.26	0.38	4528342	0.10
Ethylbenzene	ug/m3	6.47	5.24	0.43	3.05	0.43	1.24	0.43	4528342	0.10
p+m-Xylene	ug/m3	36.0	27.6	0.87	14.1	0.87	4.41	0.87	4528342	0.10
o-Xylene	ug/m3	19.3	15.1	0.43	7.90	0.43	2.32	0.43	4528342	0.10
Styrene	ug/m3	2.67	2.60	0.43	1.35	0.43	<0.43	0.43	4528342	0.10
4-ethyltoluene	ug/m3	14.0	10.6	2.5	4.9	2.5	<2.5	2.5	4528342	0.50
1,3,5-Trimethylbenzene	ug/m3	14.8	10.9	2.5	5.2	2.5	<2.5	2.5	4528342	0.10
1,2,4-Trimethylbenzene	ug/m3	65.8	49.8	2.5	18.6	2.5	2.6	2.5	4528342	0.10
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4528342	0.10
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4528342	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	4528342	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4528342	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4528342	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	4528342	0.40
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	4528342	0.60
Hexane	ug/m3	<1.3	<1.3	1.3	1.7	1.1	1.6	1.1	4528342	0.10
Heptane	ug/m3	1.4	1.3	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
Cyclohexane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4528342	0.10
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4528342	0.40
Naphthalene	ug/m3	<2.6	2.7	2.6	<2.6	2.6	<2.6	2.6	4528342	N/A
Total Xylenes	ug/m3	55.3	42.7	1.3	22.0	1.3	6.7	1.3	4528342	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4528342	N/A
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	4528342	0.10
Propene	ug/m3	<0.86	0.88	0.86	<1.4	1.4	<0.86	0.86	4528342	0.10
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	<0.93	0.93	<0.93	0.93	4528342	0.10
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	<1.6	1.6	<1.6	1.6	4528342	0.10
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	4528342	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG411		CMG412		CMG413	CMG414			
Sampling Date		2016/06/04		2016/06/04		2016/06/04	2016/06/04			
COC Number		na		na		na	na			
	UNITS	9/1384	RDL	8/381	RDL	7/3012	6/1921	RDL	QC Batch	MDL
Calculated Parameters										
Dichlorodifluoromethane (FREON 12)	ug/m3	6.34	0.99	486	4.0	2.57	2.49	0.99	4528342	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	<1.2	1.2	4528342	0.10
Chloromethane	ug/m3	<0.62	0.62	<0.62	0.62	0.94	1.10	0.62	4528342	0.10
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	0.26	<0.26	<0.26	0.26	4528342	0.10
Chloroethane	ug/m3	<0.79	0.79	<0.79	0.79	<0.79	<0.79	0.79	4528342	0.10
1,3-Butadiene	ug/m3	<2.7	2.7	<13	13	<1.1	<1.1	1.1	4528342	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	2.1	1.1	2.9	1.1	<1.1	1.2	1.1	4528342	0.10
Ethanol (ethyl alcohol)	ug/m3	<1.9	1.9	<1.9	1.9	<1.9	2.1	1.9	4528342	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	<1.2	1.2	4528342	0.10
2-propanol	ug/m3	<2.5	2.5	<2.5	2.5	<2.5	<2.5	2.5	4528342	0.60
2-Propanone	ug/m3	10.6	1.9	8.1	1.9	8.1	12.2	1.9	4528342	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	2.9	<2.9	2.9	<2.9	<2.9	2.9	4528342	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	<4.1	4.1	4528342	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	<4.1	4.1	4528342	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	0.72	<0.72	<0.72	0.72	4528342	0.10
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	3.6	<3.6	<3.6	3.6	4528342	0.50
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	<0.40	0.40	4528342	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	<0.40	0.40	4528342	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	<0.40	0.40	4528342	0.10
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	2.8	<2.8	2.8	<2.8	<2.8	2.8	4528342	0.10
Chloroform	ug/m3	1.88	0.49	11.6	0.49	<0.49	<0.49	0.49	4528342	0.10
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	0.63	<0.63	<0.63	0.63	4528342	0.10
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	<0.40	0.40	4528342	0.10
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	<0.40	0.40	4528342	0.10
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	0.77	<0.77	<0.77	0.77	4528342	0.10
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	<0.55	<0.55	0.55	4528342	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	<0.55	<0.55	0.55	4528342	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	<0.69	0.69	4528342	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	<0.45	0.45	4528342	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	<0.45	0.45	4528342	0.10
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	0.46	<0.46	<0.46	0.46	4528342	0.10
Bromomethane	ug/m3	<0.39	0.39	<0.39	0.39	<0.39	<0.39	0.39	4528342	0.10
Bromoform	ug/m3	<2.1	2.1	<2.1	2.1	<2.1	<2.1	2.1	4528342	0.10
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	1.3	<1.3	<1.3	1.3	4528342	0.10
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	1.7	<1.7	<1.7	1.7	4528342	0.10
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	0.54	<0.54	<0.54	0.54	4528342	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG411		CMG412		CMG413	CMG414			
Sampling Date		2016/06/04		2016/06/04		2016/06/04	2016/06/04			
COC Number		na		na		na	na			
	UNITS	9/1384	RDL	8/381	RDL	7/3012	6/1921	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	<0.68	0.68	<0.68	0.68	<0.68	<0.68	0.68	4528342	0.10
Benzene	ug/m3	1.40	0.32	3.28	0.32	<0.32	<0.32	0.32	4528342	0.10
Toluene	ug/m3	113	0.38	95.2	0.38	1.35	1.12	0.38	4528342	0.10
Ethylbenzene	ug/m3	3.94	0.43	39.9	0.43	0.68	<0.43	0.43	4528342	0.10
p+m-Xylene	ug/m3	13.2	0.87	124	0.87	1.77	1.32	0.87	4528342	0.10
o-Xylene	ug/m3	5.90	0.43	56.0	0.43	0.93	0.63	0.43	4528342	0.10
Styrene	ug/m3	<0.43	0.43	<0.43	0.43	<0.43	<0.43	0.43	4528342	0.10
4-ethyltoluene	ug/m3	<2.5	2.5	9.0	2.5	<2.5	<2.5	2.5	4528342	0.50
1,3,5-Trimethylbenzene	ug/m3	3.1	2.5	12.3	2.5	<2.5	<2.5	2.5	4528342	0.10
1,2,4-Trimethylbenzene	ug/m3	4.9	2.5	19.0	2.5	<2.5	<2.5	2.5	4528342	0.10
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	0.46	<0.46	<0.46	0.46	4528342	0.10
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	2.6	<2.6	<2.6	2.6	4528342	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	2.4	<2.4	<2.4	2.4	4528342	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	<0.60	0.60	4528342	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	<0.60	0.60	4528342	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	3.7	<3.7	<3.7	3.7	4528342	0.40
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	5.3	<5.3	<5.3	5.3	4528342	0.60
Hexane	ug/m3	9.1	1.1	1210	4.2	<1.1	<1.1	1.1	4528342	0.10
Heptane	ug/m3	11.4	1.2	396	4.9	<1.2	<1.2	1.2	4528342	0.10
Cyclohexane	ug/m3	9.00	0.69	455	0.69	<0.69	<0.69	0.69	4528342	0.10
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	<1.2	1.2	4528342	0.10
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	3.6	<3.6	<3.6	3.6	4528342	0.40
Naphthalene	ug/m3	<2.6	2.6	<2.6	2.6	<2.6	<2.6	2.6	4528342	N/A
Total Xylenes	ug/m3	19.1	1.3	181	1.3	2.7	2.0	1.3	4528342	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	<0.69	0.69	4528342	N/A
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	0.87	<0.87	<0.87	0.87	4528342	0.10
Propene	ug/m3	40.2	0.86	<900	900	<0.86	<0.86	0.86	4528342	0.10
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<3.0	3.0	<0.93	<0.93	0.93	4528342	0.10
Carbon Disulfide	ug/m3	12.8	1.6	12.6	1.6	<1.6	<1.6	1.6	4528342	0.10
Vinyl Acetate	ug/m3	<1.1	1.1	<140	140	1.45	<0.70	0.70	4528342	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG415	CMG416		CMG417		CMG418			
Sampling Date		2016/06/04	2016/06/04		2016/06/04		2016/06/06			
COC Number		na	na		na		na			
	UNITS	41/2529	941/1382	RDL	30/1314	RDL	51/1007	RDL	QC Batch	MDL
Calculated Parameters										
Dichlorodifluoromethane (FREON 12)	ug/m3	4.29	4.13	0.99	3.70	0.99	504	2.0	4528342	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
Chloromethane	ug/m3	<0.62	<0.62	0.62	<0.62	0.62	<0.62	0.62	4528342	0.10
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	4528342	0.10
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	4528342	0.10
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	4528342	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	1.7	1.6	1.1	1.4	1.1	1.3	1.1	4528342	0.10
Ethanol (ethyl alcohol)	ug/m3	3.1	3.1	1.9	2.4	1.9	3.5	1.9	4528342	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
2-propanol	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	<2.5	2.5	4528342	0.60
2-Propanone	ug/m3	17.5	19.1	1.9	24.1	1.9	4.2	1.9	4528342	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	3.4	3.4	2.9	5.0	2.9	<2.9	2.9	4528342	0.60
Methyl Isobutyl Ketone	ug/m3	5.3	4.6	4.1	5.4	4.1	<4.1	4.1	4528342	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4528342	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	4528342	0.10
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4528342	0.50
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
Methylene Chloride(Dichloromethane)	ug/m3	3.6	4.0	2.8	<2.8	2.8	<2.8	2.8	4528342	0.10
Chloroform	ug/m3	4.11	3.64	0.49	0.84	0.49	0.63	0.49	4528342	0.10
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	4528342	0.10
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4528342	0.10
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	4528342	0.10
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4528342	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4528342	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4528342	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4528342	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4528342	0.10
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4528342	0.10
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	4528342	0.10
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	4528342	0.10
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	4528342	0.10
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	4528342	0.10
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	<0.54	0.54	<0.54	0.54	4528342	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMG415	CMG416		CMG417		CMG418			
Sampling Date		2016/06/04	2016/06/04		2016/06/04		2016/06/06			
COC Number		na	na		na		na			
	UNITS	41/2529	941/1382	RDL	30/1314	RDL	51/1007	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	<0.68	<0.68	0.68	<0.68	0.68	<0.68	0.68	4528342	0.10
Benzene	ug/m3	2.68	2.45	0.32	0.84	0.32	<0.32	0.32	4528342	0.10
Toluene	ug/m3	43.1	39.1	0.38	40.1	0.38	9.41	0.38	4528342	0.10
Ethylbenzene	ug/m3	24.4	21.8	0.43	8.80	0.43	<0.43	0.43	4528342	0.10
p+m-Xylene	ug/m3	113	101	0.87	39.2	0.87	<0.87	0.87	4528342	0.10
o-Xylene	ug/m3	48.0	43.3	0.43	16.9	0.43	<0.43	0.43	4528342	0.10
Styrene	ug/m3	1.00	0.89	0.43	0.45	0.43	<0.43	0.43	4528342	0.10
4-ethyltoluene	ug/m3	25.0	22.2	2.5	10.6	2.5	<2.5	2.5	4528342	0.50
1,3,5-Trimethylbenzene	ug/m3	24.7	22.2	2.5	11.4	2.5	<2.5	2.5	4528342	0.10
1,2,4-Trimethylbenzene	ug/m3	83.6	74.7	2.5	40.2	2.5	<2.5	2.5	4528342	0.10
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4528342	0.10
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4528342	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	4528342	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4528342	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4528342	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	4528342	0.40
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	4528342	0.60
Hexane	ug/m3	2.5	2.8	1.1	1.8	1.1	<1.1	1.1	4528342	0.10
Heptane	ug/m3	4.4	4.0	1.2	2.0	1.2	<1.2	1.2	4528342	0.10
Cyclohexane	ug/m3	0.88	0.76	0.69	<0.69	0.69	<0.69	0.69	4528342	0.10
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4528342	0.10
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4528342	0.40
Naphthalene	ug/m3	<2.6	<2.6	2.6	4.1	2.6	<2.6	2.6	4528342	N/A
Total Xylenes	ug/m3	161	144	1.3	56.0	1.3	<1.3	1.3	4528342	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4528342	N/A
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	4528342	0.10
Propene	ug/m3	<1.2	<1.2	1.2	<1.9	1.9	3.69	0.86	4528342	0.10
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	<0.93	0.93	<0.93	0.93	4528342	0.10
Carbon Disulfide	ug/m3	2.6	2.1	1.6	4.0	1.6	<1.6	1.6	4528342	0.10
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	4528342	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CMG407	CMG408		CMG409		CMG410	CMG411			
Sampling Date		2016/06/03	2016/06/03		2016/06/03		2016/06/03	2016/06/04			
COC Number		na	na		na		na	na			
	UNITS	26A/1257	26B/1455	QC Batch	26C/2473	QC Batch	25/228	9/1384	RDL	QC Batch	MDL
Volatile Organics											
F1-BTEX, C6-C10 (as Toluene)	ug/m3	1730	1720	4533174	738	4532867	119	2980	5.0	4533174	1.0
F2, C10-C16 (as Decane)	ug/m3	4250	3790	4533174	1010	4532867	255	6980	5.0	4533174	1.0
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	4533172	<5.0	4532803	<5.0	11.2	5.0	4533172	1.0
Aliphatic >C6-C8	ug/m3	5.4	7.7	4533172	17.2	4532803	7.1	53.3	5.0	4533172	1.0
Aliphatic >C8-C10	ug/m3	115	126	4533172	153	4532803	<5.0	349	5.0	4533172	1.0
Aliphatic >C10-C12	ug/m3	131	121	4533172	128	4532803	12.6	633	5.0	4533172	1.0
Aliphatic >C12-C16	ug/m3	36.8	26.8	4533172	17.8	4532803	6.9	145	5.0	4533172	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	4533172	<5.0	4532803	<5.0	<5.0	5.0	4533172	1.0
Aromatic >C8-C10	ug/m3	108	83.1	4533172	42.2	4532803	7.7	36.2	5.0	4533172	1.0
Aromatic >C10-C12	ug/m3	163	134	4533172	61.9	4532803	6.9	34.7	5.0	4533172	1.0
Aromatic >C12-C16	ug/m3	5.1	8.6	4533172	7.9	4532803	<5.0	<5.0	5.0	4533172	1.0
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	80	85	4533174	104	4532867	87	83		4533174	
Bromochloromethane	%	80	87	4533174	100	4532867	88	84		4533174	
D5-Chlorobenzene	%	75	80	4533174	101	4532867	80	79		4533174	
1,4-Difluorobenzene	%	80	85	4533172	104	4532803	87	83		4533172	
Bromochloromethane	%	80	87	4533172	100	4532803	88	84		4533172	
D5-Chlorobenzene	%	75	80	4533172	101	4532803	80	79		4533172	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CMG412	CMG413		CMG414	CMG415	CMG416			
Sampling Date		2016/06/04	2016/06/04		2016/06/04	2016/06/04	2016/06/04			
COC Number		na	na		na	na	na			
	UNITS	8/381	7/3012	QC Batch	6/1921	41/2529	941/1382	RDL	QC Batch	MDL
Volatile Organics										
F1-BTEX, C6-C10 (as Toluene)	ug/m3	29700	395	4533174	17.4	1450	1290	5.0	4532867	1.0
F2, C10-C16 (as Decane)	ug/m3	22600	325	4533174	26.2	2670	2300	5.0	4532867	1.0
Aliphatic >C5-C6	ug/m3	1030	10.0	4533172	<5.0	<5.0	<5.0	5.0	4532803	1.0
Aliphatic >C6-C8	ug/m3	3050	36.4	4533172	<5.0	31.7	31.1	5.0	4532803	1.0
Aliphatic >C8-C10	ug/m3	2630	29.0	4533172	<5.0	362	324	5.0	4532803	1.0
Aliphatic >C10-C12	ug/m3	2360	35.9	4533172	8.5	537	479	5.0	4532803	1.0
Aliphatic >C12-C16	ug/m3	433	11.9	4533172	<5.0	105	91.4	5.0	4532803	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	4533172	<5.0	<5.0	<5.0	5.0	4532803	1.0
Aromatic >C8-C10	ug/m3	188	<5.0	4533172	<5.0	228	203	5.0	4532803	1.0
Aromatic >C10-C12	ug/m3	108	<5.0	4533172	<5.0	215	191	5.0	4532803	1.0
Aromatic >C12-C16	ug/m3	26.5	<5.0	4533172	<5.0	20.8	16.9	5.0	4532803	1.0
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	89	111	4533174	101	101	102		4532867	
Bromochloromethane	%	88	114	4533174	99	99	100		4532867	
D5-Chlorobenzene	%	85	101	4533174	98	100	101		4532867	
1,4-Difluorobenzene	%	89	111	4533172	101	101	102		4532803	
Bromochloromethane	%	88	114	4533172	99	99	100		4532803	
D5-Chlorobenzene	%	85	101	4533172	98	100	101		4532803	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CMG417	CMG418			
Sampling Date		2016/06/04	2016/06/06			
COC Number		na	na			
	UNITS	30/1314	51/1007	RDL	QC Batch	MDL
Volatile Organics						
F1-BTEX, C6-C10 (as Toluene)	ug/m3	169	19.7	5.0	4532867	1.0
F2, C10-C16 (as Decane)	ug/m3	1950	66.7	5.0	4532867	1.0
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	5.0	4532803	1.0
Aliphatic >C6-C8	ug/m3	20.0	<5.0	5.0	4532803	1.0
Aliphatic >C8-C10	ug/m3	28.6	8.1	5.0	4532803	1.0
Aliphatic >C10-C12	ug/m3	199	32.8	5.0	4532803	1.0
Aliphatic >C12-C16	ug/m3	198	10.6	5.0	4532803	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	5.0	4532803	1.0
Aromatic >C8-C10	ug/m3	88.9	<5.0	5.0	4532803	1.0
Aromatic >C10-C12	ug/m3	128	<5.0	5.0	4532803	1.0
Aromatic >C12-C16	ug/m3	51.3	<5.0	5.0	4532803	1.0
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	103	102		4532867	
Bromochloromethane	%	100	99		4532867	
D5-Chlorobenzene	%	102	99		4532867	
1,4-Difluorobenzene	%	103	102		4532803	
Bromochloromethane	%	100	99		4532803	
D5-Chlorobenzene	%	102	99		4532803	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG407			CMG408					
Sampling Date		2016/06/03			2016/06/03					
COC Number		na			na					
	UNITS	26A/1257	ug/m3	DL (ug/m3)	26B/1455	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics										
Dichlorodifluoromethane (FREON 12)	ppbv	0.50	2.49	0.989	0.49	0.20	2.40	0.989	4530516	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4530516	0.10
Chloromethane	ppbv	0.37	0.762	0.620	0.37	0.30	0.774	0.620	4530516	0.10
Vinyl Chloride	ppbv	<0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4530516	0.10
Chloroethane	ppbv	<0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4530516	0.10
1,3-Butadiene	ppbv	<0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4530516	0.10
Trichlorofluoromethane (FREON 11)	ppbv	1.18	6.61	1.12	1.36	0.20	7.66	1.12	4530516	0.10
Ethanol (ethyl alcohol)	ppbv	4.3	8.11	1.88	3.5	1.0	6.65	1.88	4530516	0.50
Trichlorotrifluoroethane	ppbv	<0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4530516	0.10
2-propanol	ppbv	<1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4530516	0.60
2-Propanone	ppbv	7.72	18.3	1.90	8.00	0.80	19.0	1.90	4530516	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4530516	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4530516	0.10
Ethyl Acetate	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.50
1,1-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4530516	0.10
Chloroform	ppbv	0.97	4.75	0.488	0.93	0.10	4.56	0.488	4530516	0.10
Carbon Tetrachloride	ppbv	<0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4530516	0.10
1,1-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
1,2-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
Ethylene Dibromide	ppbv	<0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4530516	0.10
1,1,1-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
1,2-Dichloropropane	ppbv	<0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4530516	0.10
Bromomethane	ppbv	<0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4530516	0.10
Bromoform	ppbv	<0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4530516	0.10
Bromodichloromethane	ppbv	<0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4530516	0.10
Dibromochloromethane	ppbv	<0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4530516	0.10
Trichloroethylene	ppbv	<0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4530516	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG407			CMG408					
Sampling Date		2016/06/03			2016/06/03					
COC Number		na			na					
	UNITS	26A/1257	ug/m3	DL (ug/m3)	26B/1455	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4530516	0.10
Benzene	ppbv	0.26	0.845	0.319	0.27	0.10	0.869	0.319	4530516	0.10
Toluene	ppbv	2.17	8.15	0.376	1.67	0.10	6.28	0.376	4530516	0.10
Ethylbenzene	ppbv	1.49	6.47	0.434	1.21	0.10	5.24	0.434	4530516	0.10
p+m-Xylene	ppbv	8.28	36.0	0.868	6.36	0.20	27.6	0.868	4530516	0.10
o-Xylene	ppbv	4.45	19.3	0.434	3.47	0.10	15.1	0.434	4530516	0.10
Styrene	ppbv	0.63	2.67	0.426	0.61	0.10	2.60	0.426	4530516	0.10
4-ethyltoluene	ppbv	2.84	14.0	2.46	2.16	0.50	10.6	2.46	4530516	0.50
1,3,5-Trimethylbenzene	ppbv	3.01	14.8	2.46	2.21	0.50	10.9	2.46	4530516	0.10
1,2,4-Trimethylbenzene	ppbv	13.4	65.8	2.46	10.1	0.50	49.8	2.46	4530516	0.10
Chlorobenzene	ppbv	<0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4530516	0.10
Benzyl chloride	ppbv	<0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4530516	0.20
1,3-Dichlorobenzene	ppbv	<0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4530516	0.10
1,4-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4530516	0.40
Hexachlorobutadiene	ppbv	<0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4530516	0.50
Hexane	ppbv	<0.37	<1.30	1.30	<0.37	0.37	<1.30	1.30	4530516	0.10
Heptane	ppbv	0.33	1.36	1.23	0.32	0.30	1.29	1.23	4530516	0.10
Cyclohexane	ppbv	<0.20	<0.688	0.688	<0.20	0.20	<0.688	0.688	4530516	0.10
Tetrahydrofuran	ppbv	<0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4530516	0.10
1,4-Dioxane	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.40
Naphthalene	ppbv	<0.50	<2.62	2.62	0.51	0.50	2.69	2.62	4530516	N/A
Total Xylenes	ppbv	12.7	55.3	1.30	9.83	0.30	42.7	1.30	4530516	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	N/A
Vinyl Bromide	ppbv	<0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4530516	0.10
Propene	ppbv	<0.50	<0.861	0.861	0.51	0.50	0.878	0.861	4530516	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4530516	0.10
Carbon Disulfide	ppbv	<0.50	<1.56	1.56	<0.50	0.50	<1.56	1.56	4530516	0.10
Vinyl Acetate	ppbv	<0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4530516	0.10
Surrogate Recovery (%)										
Bromochloromethane	%	80	N/A	N/A	87		N/A	N/A	4530516	
D5-Chlorobenzene	%	75	N/A	N/A	80		N/A	N/A	4530516	
Difluorobenzene	%	80	N/A	N/A	85		N/A	N/A	4530516	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG409					
Sampling Date		2016/06/03					
COC Number		na					
	UNITS	26C/2473	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	0.50	0.20	2.48	0.989	4532465	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4532465	0.10
Chloromethane	ppbv	0.42	0.30	0.866	0.620	4532465	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4532465	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4532465	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4532465	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.71	0.20	3.98	1.12	4532465	0.10
Ethanol (ethyl alcohol)	ppbv	1.4	1.0	2.55	1.88	4532465	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4532465	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4532465	0.60
2-Propanone	ppbv	17.8	0.80	42.3	1.90	4532465	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	3.0	1.0	8.81	2.95	4532465	0.60
Methyl Isobutyl Ketone	ppbv	5.3	1.0	21.6	4.10	4532465	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4532465	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4532465	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4532465	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	4532465	0.10
Chloroform	ppbv	1.10	0.10	5.39	0.488	4532465	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4532465	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4532465	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4532465	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4532465	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4532465	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4532465	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4532465	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4532465	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4532465	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4532465	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4532465	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4532465	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4532465	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG409					
Sampling Date		2016/06/03					
COC Number		na					
	UNITS	26C/2473	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4532465	0.10
Benzene	ppbv	0.42	0.10	1.33	0.319	4532465	0.10
Toluene	ppbv	1.12	0.10	4.23	0.376	4532465	0.10
Ethylbenzene	ppbv	0.70	0.10	3.05	0.434	4532465	0.10
p+m-Xylene	ppbv	3.24	0.20	14.1	0.868	4532465	0.10
o-Xylene	ppbv	1.82	0.10	7.90	0.434	4532465	0.10
Styrene	ppbv	0.32	0.10	1.35	0.426	4532465	0.10
4-ethyltoluene	ppbv	1.01	0.50	4.95	2.46	4532465	0.50
1,3,5-Trimethylbenzene	ppbv	1.07	0.50	5.24	2.46	4532465	0.10
1,2,4-Trimethylbenzene	ppbv	3.78	0.50	18.6	2.46	4532465	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4532465	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4532465	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4532465	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4532465	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4532465	0.50
Hexane	ppbv	0.48	0.30	1.70	1.06	4532465	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	4532465	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4532465	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4532465	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4532465	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4532465	N/A
Total Xylenes	ppbv	5.06	0.30	22.0	1.30	4532465	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4532465	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4532465	0.10
Propene	ppbv	<0.80	0.80	<1.38	1.38	4532465	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4532465	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4532465	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4532465	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	100		N/A	N/A	4532465	
D5-Chlorobenzene	%	101		N/A	N/A	4532465	
Difluorobenzene	%	104		N/A	N/A	4532465	

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

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG410				CMG411					
Sampling Date		2016/06/03				2016/06/04					
COC Number		na				na					
	UNITS	25/228	RDL	ug/m3	DL (ug/m3)	9/1384	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.49	0.20	2.43	0.989	1.28	0.20	6.34	0.989	4530516	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4530516	0.10
Chloromethane	ppbv	0.63	0.30	1.30	0.620	<0.30	0.30	<0.620	0.620	4530516	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4530516	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4530516	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<1.2	1.2	<2.65	2.65	4530516	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.22	0.20	1.23	1.12	0.37	0.20	2.09	1.12	4530516	0.10
Ethanol (ethyl alcohol)	ppbv	2.1	1.0	3.87	1.88	<1.0	1.0	<1.88	1.88	4530516	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4530516	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4530516	0.60
2-Propanone	ppbv	9.47	0.80	22.5	1.90	4.45	0.80	10.6	1.90	4530516	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4530516	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4530516	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
Methylene Chloride(Dichloromethane)	ppbv	0.97	0.80	3.38	2.78	<0.80	0.80	<2.78	2.78	4530516	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	0.39	0.10	1.88	0.488	4530516	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4530516	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4530516	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4530516	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4530516	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4530516	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4530516	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4530516	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4530516	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG410				CMG411					
Sampling Date		2016/06/03				2016/06/04					
COC Number		na				na					
	UNITS	25/228	RDL	ug/m3	DL (ug/m3)	9/1384	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4530516	0.10
Benzene	ppbv	0.21	0.10	0.684	0.319	0.44	0.10	1.40	0.319	4530516	0.10
Toluene	ppbv	1.13	0.10	4.26	0.376	30.0	0.10	113	0.376	4530516	0.10
Ethylbenzene	ppbv	0.29	0.10	1.24	0.434	0.91	0.10	3.94	0.434	4530516	0.10
p+m-Xylene	ppbv	1.02	0.20	4.41	0.868	3.05	0.20	13.2	0.868	4530516	0.10
o-Xylene	ppbv	0.54	0.10	2.32	0.434	1.36	0.10	5.90	0.434	4530516	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	<0.10	0.10	<0.426	0.426	4530516	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4530516	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	0.64	0.50	3.12	2.46	4530516	0.10
1,2,4-Trimethylbenzene	ppbv	0.54	0.50	2.63	2.46	0.99	0.50	4.87	2.46	4530516	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4530516	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4530516	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4530516	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4530516	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4530516	0.50
Hexane	ppbv	0.44	0.30	1.56	1.06	2.58	0.30	9.09	1.06	4530516	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	2.78	0.30	11.4	1.23	4530516	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	2.61	0.20	9.00	0.688	4530516	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4530516	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4530516	N/A
Total Xylenes	ppbv	1.55	0.30	6.73	1.30	4.40	0.30	19.1	1.30	4530516	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4530516	0.10
Propene	ppbv	<0.50	0.50	<0.861	0.861	23.4	0.50	40.2	0.861	4530516	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4530516	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4.12	0.50	12.8	1.56	4530516	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.30	0.30	<1.06	1.06	4530516	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	88		N/A	N/A	84		N/A	N/A	4530516	
D5-Chlorobenzene	%	80		N/A	N/A	79		N/A	N/A	4530516	
Difluorobenzene	%	87		N/A	N/A	83		N/A	N/A	4530516	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG412				CMG413					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	8/381	RDL	ug/m3	DL (ug/m3)	7/3012	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	98.3	0.80	486	3.96	0.52	0.20	2.57	0.989	4530516	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4530516	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	0.46	0.30	0.944	0.620	4530516	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4530516	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4530516	0.10
1,3-Butadiene	ppbv	<6.0	6.0	<13.3	13.3	<0.50	0.50	<1.11	1.11	4530516	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.52	0.20	2.92	1.12	<0.20	0.20	<1.12	1.12	4530516	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	<1.0	1.0	<1.88	1.88	4530516	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4530516	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4530516	0.60
2-Propanone	ppbv	3.42	0.80	8.12	1.90	3.39	0.80	8.05	1.90	4530516	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4530516	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4530516	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4530516	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4530516	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4530516	0.10
Chloroform	ppbv	2.38	0.10	11.6	0.488	<0.10	0.10	<0.488	0.488	4530516	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4530516	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4530516	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4530516	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4530516	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4530516	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4530516	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4530516	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4530516	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4530516	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4530516	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4530516	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG412				CMG413					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	8/381	RDL	ug/m3	DL (ug/m3)	7/3012	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4530516	0.10
Benzene	ppbv	1.03	0.10	3.28	0.319	<0.10	0.10	<0.319	0.319	4530516	0.10
Toluene	ppbv	25.3	0.10	95.2	0.376	0.36	0.10	1.35	0.376	4530516	0.10
Ethylbenzene	ppbv	9.19	0.10	39.9	0.434	0.16	0.10	0.684	0.434	4530516	0.10
p+m-Xylene	ppbv	28.7	0.20	124	0.868	0.41	0.20	1.77	0.868	4530516	0.10
o-Xylene	ppbv	12.9	0.10	56.0	0.434	0.21	0.10	0.933	0.434	4530516	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	<0.10	0.10	<0.426	0.426	4530516	0.10
4-ethyltoluene	ppbv	1.84	0.50	9.02	2.46	<0.50	0.50	<2.46	2.46	4530516	0.50
1,3,5-Trimethylbenzene	ppbv	2.50	0.50	12.3	2.46	<0.50	0.50	<2.46	2.46	4530516	0.10
1,2,4-Trimethylbenzene	ppbv	3.87	0.50	19.0	2.46	<0.50	0.50	<2.46	2.46	4530516	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4530516	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4530516	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4530516	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4530516	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4530516	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4530516	0.50
Hexane	ppbv	344	1.2	1210	4.23	<0.30	0.30	<1.06	1.06	4530516	0.10
Heptane	ppbv	96.6	1.2	396	4.92	<0.30	0.30	<1.23	1.23	4530516	0.10
Cyclohexane	ppbv	132	0.20	455	0.688	<0.20	0.20	<0.688	0.688	4530516	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4530516	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4530516	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4530516	N/A
Total Xylenes	ppbv	41.6	0.30	181	1.30	0.62	0.30	2.70	1.30	4530516	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4530516	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4530516	0.10
Propene	ppbv	<520	520	<895	895	<0.50	0.50	<0.861	0.861	4530516	0.30
2,2,4-Trimethylpentane	ppbv	<0.65	0.65	<3.04	3.04	<0.20	0.20	<0.934	0.934	4530516	0.10
Carbon Disulfide	ppbv	4.03	0.50	12.6	1.56	<0.50	0.50	<1.56	1.56	4530516	0.10
Vinyl Acetate	ppbv	<39	39	<137	137	0.41	0.20	1.45	0.704	4530516	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	88		N/A	N/A	114		N/A	N/A	4530516	
D5-Chlorobenzene	%	85		N/A	N/A	101		N/A	N/A	4530516	
Difluorobenzene	%	89		N/A	N/A	111		N/A	N/A	4530516	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG414				CMG415					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	6/1921	RDL	ug/m3	DL (ug/m3)	41/2529	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.50	0.20	2.49	0.989	0.87	0.20	4.29	0.989	4532465	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4532465	0.10
Chloromethane	ppbv	0.54	0.30	1.10	0.620	<0.30	0.30	<0.620	0.620	4532465	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4532465	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4532465	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4532465	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.22	0.20	1.21	1.12	0.30	0.20	1.69	1.12	4532465	0.10
Ethanol (ethyl alcohol)	ppbv	1.1	1.0	2.13	1.88	1.6	1.0	3.09	1.88	4532465	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4532465	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4532465	0.60
2-Propanone	ppbv	5.14	0.80	12.2	1.90	7.38	0.80	17.5	1.90	4532465	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	1.1	1.0	3.36	2.95	4532465	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	1.3	1.0	5.28	4.10	4532465	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4532465	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4532465	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4532465	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	1.05	0.80	3.64	2.78	4532465	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	0.84	0.10	4.11	0.488	4532465	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4532465	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4532465	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4532465	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4532465	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4532465	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4532465	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4532465	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4532465	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4532465	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4532465	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4532465	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4532465	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4532465	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG414				CMG415					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	6/1921	RDL	ug/m3	DL (ug/m3)	41/2529	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4532465	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	0.84	0.10	2.68	0.319	4532465	0.10
Toluene	ppbv	0.30	0.10	1.12	0.376	11.5	0.10	43.1	0.376	4532465	0.10
Ethylbenzene	ppbv	<0.10	0.10	<0.434	0.434	5.62	0.10	24.4	0.434	4532465	0.10
p+m-Xylene	ppbv	0.30	0.20	1.32	0.868	26.1	0.20	113	0.868	4532465	0.10
o-Xylene	ppbv	0.15	0.10	0.635	0.434	11.0	0.10	48.0	0.434	4532465	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	0.24	0.10	1.00	0.426	4532465	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	5.09	0.50	25.0	2.46	4532465	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	5.03	0.50	24.7	2.46	4532465	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	17.0	0.50	83.6	2.46	4532465	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4532465	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4532465	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4532465	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4532465	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4532465	0.50
Hexane	ppbv	<0.30	0.30	<1.06	1.06	0.70	0.30	2.47	1.06	4532465	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	1.07	0.30	4.37	1.23	4532465	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	0.26	0.20	0.882	0.688	4532465	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4532465	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4532465	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4532465	N/A
Total Xylenes	ppbv	0.45	0.30	1.95	1.30	37.1	0.30	161	1.30	4532465	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4532465	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4532465	0.10
Propene	ppbv	<0.50	0.50	<0.861	0.861	<0.70	0.70	<1.20	1.20	4532465	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4532465	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	0.84	0.50	2.62	1.56	4532465	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4532465	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	99		N/A	N/A	99		N/A	N/A	4532465	
D5-Chlorobenzene	%	98		N/A	N/A	100		N/A	N/A	4532465	
Difluorobenzene	%	101		N/A	N/A	101		N/A	N/A	4532465	

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

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG416				CMG417					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	941/1382	RDL	ug/m3	DL (ug/m3)	30/1314	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.84	0.20	4.13	0.989	0.75	0.20	3.70	0.989	4532465	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4532465	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4532465	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4532465	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4532465	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4532465	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.28	0.20	1.57	1.12	0.25	0.20	1.42	1.12	4532465	0.10
Ethanol (ethyl alcohol)	ppbv	1.6	1.0	3.08	1.88	1.3	1.0	2.36	1.88	4532465	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4532465	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4532465	0.60
2-Propanone	ppbv	8.04	0.80	19.1	1.90	10.1	0.80	24.1	1.90	4532465	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.2	1.0	3.43	2.95	1.7	1.0	5.02	2.95	4532465	0.60
Methyl Isobutyl Ketone	ppbv	1.1	1.0	4.61	4.10	1.3	1.0	5.40	4.10	4532465	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4532465	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4532465	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4532465	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4532465	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.15	0.80	4.00	2.78	<0.80	0.80	<2.78	2.78	4532465	0.10
Chloroform	ppbv	0.75	0.10	3.64	0.488	0.17	0.10	0.845	0.488	4532465	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4532465	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4532465	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4532465	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4532465	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4532465	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4532465	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4532465	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4532465	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4532465	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4532465	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4532465	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4532465	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4532465	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG416				CMG417					
Sampling Date		2016/06/04				2016/06/04					
COC Number		na				na					
	UNITS	941/1382	RDL	ug/m3	DL (ug/m3)	30/1314	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4532465	0.10
Benzene	ppbv	0.77	0.10	2.45	0.319	0.26	0.10	0.843	0.319	4532465	0.10
Toluene	ppbv	10.4	0.10	39.1	0.376	10.7	0.10	40.1	0.376	4532465	0.10
Ethylbenzene	ppbv	5.02	0.10	21.8	0.434	2.03	0.10	8.80	0.434	4532465	0.10
p+m-Xylene	ppbv	23.3	0.20	101	0.868	9.02	0.20	39.2	0.868	4532465	0.10
o-Xylene	ppbv	9.96	0.10	43.3	0.434	3.88	0.10	16.9	0.434	4532465	0.10
Styrene	ppbv	0.21	0.10	0.892	0.426	0.11	0.10	0.449	0.426	4532465	0.10
4-ethyltoluene	ppbv	4.53	0.50	22.2	2.46	2.16	0.50	10.6	2.46	4532465	0.50
1,3,5-Trimethylbenzene	ppbv	4.53	0.50	22.2	2.46	2.31	0.50	11.4	2.46	4532465	0.10
1,2,4-Trimethylbenzene	ppbv	15.2	0.50	74.7	2.46	8.17	0.50	40.2	2.46	4532465	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4532465	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4532465	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4532465	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4532465	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4532465	0.50
Hexane	ppbv	0.79	0.30	2.80	1.06	0.52	0.30	1.83	1.06	4532465	0.10
Heptane	ppbv	0.97	0.30	3.99	1.23	0.49	0.30	2.02	1.23	4532465	0.10
Cyclohexane	ppbv	0.22	0.20	0.758	0.688	<0.20	0.20	<0.688	0.688	4532465	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4532465	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4532465	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	0.78	0.50	4.07	2.62	4532465	N/A
Total Xylenes	ppbv	33.2	0.30	144	1.30	12.9	0.30	56.0	1.30	4532465	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4532465	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4532465	0.10
Propene	ppbv	<0.70	0.70	<1.20	1.20	<1.1	1.1	<1.89	1.89	4532465	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4532465	0.10
Carbon Disulfide	ppbv	0.68	0.50	2.10	1.56	1.29	0.50	4.02	1.56	4532465	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4532465	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	100		N/A	N/A	100		N/A	N/A	4532465	
D5-Chlorobenzene	%	101		N/A	N/A	102		N/A	N/A	4532465	
Difluorobenzene	%	102		N/A	N/A	103		N/A	N/A	4532465	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG418					
Sampling Date		2016/06/06					
COC Number		na					
	UNITS	51/1007	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	102	0.40	504	1.98	4532465	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4532465	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	4532465	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4532465	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4532465	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4532465	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.24	0.20	1.33	1.12	4532465	0.10
Ethanol (ethyl alcohol)	ppbv	1.9	1.0	3.49	1.88	4532465	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4532465	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4532465	0.60
2-Propanone	ppbv	1.79	0.80	4.24	1.90	4532465	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	4532465	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4532465	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4532465	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4532465	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4532465	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4532465	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	4532465	0.10
Chloroform	ppbv	0.13	0.10	0.627	0.488	4532465	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4532465	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4532465	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4532465	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4532465	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4532465	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4532465	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4532465	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4532465	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4532465	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4532465	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4532465	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4532465	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4532465	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4532465	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMG418					
Sampling Date		2016/06/06					
COC Number		na					
	UNITS	51/1007	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4532465	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	4532465	0.10
Toluene	ppbv	2.50	0.10	9.41	0.376	4532465	0.10
Ethylbenzene	ppbv	<0.10	0.10	<0.434	0.434	4532465	0.10
p+m-Xylene	ppbv	<0.20	0.20	<0.868	0.868	4532465	0.10
o-Xylene	ppbv	<0.10	0.10	<0.434	0.434	4532465	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	4532465	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	4532465	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4532465	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4532465	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4532465	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4532465	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4532465	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4532465	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4532465	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4532465	0.50
Hexane	ppbv	<0.30	0.30	<1.06	1.06	4532465	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	4532465	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4532465	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4532465	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4532465	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4532465	N/A
Total Xylenes	ppbv	<0.30	0.30	<1.30	1.30	4532465	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4532465	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4532465	0.10
Propene	ppbv	2.14	0.50	3.69	0.861	4532465	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4532465	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4532465	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4532465	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	99		N/A	N/A	4532465	
D5-Chlorobenzene	%	99		N/A	N/A	4532465	
Difluorobenzene	%	102		N/A	N/A	4532465	

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

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMG407
Sample ID: 26A/1257
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG407 Dup
Sample ID: 26A/1257
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/16	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG408
Sample ID: 26B/1455
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG409
Sample ID: 26C/2473
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam ID: CMG410
Sample ID: 25/228
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMG410
Sample ID: 25/228
Matrix: AIR

Collected: 2016/06/03
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG411
Sample ID: 9/1384
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG412
Sample ID: 8/381
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG413
Sample ID: 7/3012
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4533174	N/A	2016/06/08	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4533172	N/A	2016/06/08	Mark Reid
Canister Pressure (TO-15)	PRES	4530964	N/A	2016/06/08	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4530516	N/A	2016/06/08	Mark Reid

Maxxam ID: CMG414
Sample ID: 6/1921
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMG415
Sample ID: 41/2529
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam ID: CMG416
Sample ID: 941/1382
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam ID: CMG417
Sample ID: 30/1314
Matrix: AIR

Collected: 2016/06/04
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam ID: CMG418
Sample ID: 51/1007
Matrix: AIR

Collected: 2016/06/06
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4532867	N/A	2016/06/09	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4532803	N/A	2016/06/09	Diane Temniuk
Canister Pressure (TO-15)	PRES	4533715	N/A	2016/06/09	Diane Temniuk
Matrix Gases	GC/TCD	4538513	N/A	2016/06/13	Vasan Thiagarajah
Volatile Organics in Air (ug/m3)	GC/MS	4528342	N/A	2016/06/10	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4532465	N/A	2016/06/09	Diane Temniuk

Maxxam ID: CMG418 Dup
Sample ID: 51/1007
Matrix: AIR

Collected: 2016/06/06
Shipped:
Received: 2016/06/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Matrix Gases	GC/TCD	4538513	N/A	2016/06/13	Vasan Thiagarajah

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

Sample CMG407-01 : Increased DL for hexane due matrix interference on a possible positive.

Sample CMG408-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
Increased DL for hexane due matrix interference on a possible positive.

Sample CMG409-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CMG411-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
Increased DLs for 1,3-butadiene and vinyl acetate due matrix interference.

Sample CMG412-01 : Dichlorodifluoromethane, hexane, and heptane were analyzed at a 4X dilution. The DLs were adjusted accordingly.
Increased DLs for Propene, 1,3-butadiene, vinyl acetate and 2,2,4-trimethylpentane due matrix interference.

Sample CMG415-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CMG416-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CMG417-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CMG418-01 : Dichlorodifluoromethane was analyzed at a 2X dilution. The DL was adjusted accordingly.
Matrix Gas Analysis: Canister was pressurized with Helium to enable sampling. Results and DLs adjusted accordingly.

Matrix Gas Analysis: Results normalized to 100% dry volume.

VOLATILE ORGANICS BY GC/MS (AIR)

Volatile Organics in Air (TO-15): 3 compounds in the reference standard had recoveries between 60%- 70%. The compounds meet the %RSD criteria in the continuing calibration standard. The failure of these 3 compounds is not believed to have an effect on the integrity of the results.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4528342	ASC	RPD - Sample/Sample Dup	Vinyl Chloride	2016/06/13	NC		%	25
			2-Propanone	2016/06/13	2.8		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13	NC		%	25
			Methyl Isobutyl Ketone	2016/06/13	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/13	NC		%	25
			1,1-Dichloroethylene	2016/06/13	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/13	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/13	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/13	NC		%	25
			Chloroform	2016/06/13	NC		%	25
			Carbon Tetrachloride	2016/06/13	NC		%	25
			1,1-Dichloroethane	2016/06/13	NC		%	25
			1,2-Dichloroethane	2016/06/13	NC		%	25
			Ethylene Dibromide	2016/06/13	NC		%	25
			1,1,1-Trichloroethane	2016/06/13	NC		%	25
			1,1,2-Trichloroethane	2016/06/13	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/13	NC		%	25
			cis-1,3-Dichloropropene	2016/06/13	NC		%	25
			trans-1,3-Dichloropropene	2016/06/13	NC		%	25
			1,2-Dichloropropane	2016/06/13	NC		%	25
			Bromomethane	2016/06/13	NC		%	25
			Bromoform	2016/06/13	NC		%	25
			Trichloroethylene	2016/06/13	NC		%	25
			Tetrachloroethylene	2016/06/13	NC		%	25
			Benzene	2016/06/13	NC		%	25
			Toluene	2016/06/13	2.0		%	25
			Ethylbenzene	2016/06/13	NC		%	25
			p+m-Xylene	2016/06/13	NC		%	25
			o-Xylene	2016/06/13	NC		%	25
			Styrene	2016/06/13	NC		%	25
			Chlorobenzene	2016/06/13	NC		%	25
			1,4-Dichlorobenzene	2016/06/13	12		%	25
			1,2-Dichlorobenzene	2016/06/13	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/13	NC		%	25
			Hexachlorobutadiene	2016/06/13	NC		%	25
			Hexane	2016/06/13	NC		%	25
			Naphthalene	2016/06/13	NC		%	25
			Total Xylenes	2016/06/13	NC		%	25
			1,1,1,2-Tetrachloroethane	2016/06/13	NC		%	25
			Dichlorodifluoromethane (FREON 12)	2016/06/16	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/16	NC		%	25
			Chloromethane	2016/06/16	NC		%	25
			Vinyl Chloride	2016/06/16	NC		%	25
			Chloroethane	2016/06/16	NC		%	25
			1,3-Butadiene	2016/06/16	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/16	1.5		%	25
			Ethanol (ethyl alcohol)	2016/06/16	NC		%	25
			Trichlorotrifluoroethane	2016/06/16	NC		%	25
			2-propanol	2016/06/16	NC		%	25
			2-Propanone	2016/06/16	0.63		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/16	NC		%	25
			Methyl Isobutyl Ketone	2016/06/16	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/16	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Methyl t-butyl ether (MTBE)	2016/06/16	NC		%	25
			Ethyl Acetate	2016/06/16	NC		%	25
			1,1-Dichloroethylene	2016/06/16	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/16	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/16	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/16	NC		%	25
			Chloroform	2016/06/16	2.8		%	25
			Carbon Tetrachloride	2016/06/16	NC		%	25
			1,1-Dichloroethane	2016/06/16	NC		%	25
			1,2-Dichloroethane	2016/06/16	NC		%	25
			Ethylene Dibromide	2016/06/16	NC		%	25
			1,1,1-Trichloroethane	2016/06/16	NC		%	25
			1,1,2-Trichloroethane	2016/06/16	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/16	NC		%	25
			cis-1,3-Dichloropropene	2016/06/16	NC		%	25
			trans-1,3-Dichloropropene	2016/06/16	NC		%	25
			1,2-Dichloropropane	2016/06/16	NC		%	25
			Bromomethane	2016/06/16	NC		%	25
			Bromoform	2016/06/16	NC		%	25
			Bromodichloromethane	2016/06/16	NC		%	25
			Dibromochloromethane	2016/06/16	NC		%	25
			Trichloroethylene	2016/06/16	NC		%	25
			Tetrachloroethylene	2016/06/16	NC		%	25
			Benzene	2016/06/16	NC		%	25
			Toluene	2016/06/16	1.2		%	25
			Ethylbenzene	2016/06/16	1.4		%	25
			p+m-Xylene	2016/06/16	0.95		%	25
			o-Xylene	2016/06/16	3.1		%	25
			Styrene	2016/06/16	5.1		%	25
			4-ethyltoluene	2016/06/16	0.47		%	25
			1,3,5-Trimethylbenzene	2016/06/16	0.90		%	25
			1,2,4-Trimethylbenzene	2016/06/16	3.3		%	25
			Chlorobenzene	2016/06/16	NC		%	25
			Benzyl chloride	2016/06/16	NC		%	25
			1,3-Dichlorobenzene	2016/06/16	NC		%	25
			1,4-Dichlorobenzene	2016/06/16	NC		%	25
			1,2-Dichlorobenzene	2016/06/16	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/16	NC		%	25
			Hexachlorobutadiene	2016/06/16	NC		%	25
			Hexane	2016/06/16	NC		%	25
			Heptane	2016/06/16	NC		%	25
			Cyclohexane	2016/06/16	NC		%	25
			Tetrahydrofuran	2016/06/16	NC		%	25
			1,4-Dioxane	2016/06/16	NC		%	25
			Naphthalene	2016/06/16	NC		%	25
			Total Xylenes	2016/06/16	1.7		%	25
			1,1,1,2-Tetrachloroethane	2016/06/16	NC		%	25
			Vinyl Bromide	2016/06/16	NC		%	25
			Propene	2016/06/16	NC		%	25
			2,2,4-Trimethylpentane	2016/06/16	NC		%	25
			Carbon Disulfide	2016/06/16	NC		%	25
			Vinyl Acetate	2016/06/16	NC		%	25
			Vinyl Chloride	2016/06/15	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Chloroethane	2016/06/15	NC		%	25
			1,3-Butadiene	2016/06/15	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/15	NC		%	25
			1,1-Dichloroethylene	2016/06/15	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/15	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/15	NC		%	25
			1,2-Dichloroethane	2016/06/15	NC		%	25
			Ethylene Dibromide	2016/06/15	NC		%	25
			1,1,1-Trichloroethane	2016/06/15	NC		%	25
			Trichloroethylene	2016/06/15	NC		%	25
			Tetrachloroethylene	2016/06/15	0.93		%	25
			Benzene	2016/06/15	NC		%	25
			Toluene	2016/06/15	NC		%	25
			Ethylbenzene	2016/06/15	NC		%	25
			p+m-Xylene	2016/06/15	NC		%	25
			o-Xylene	2016/06/15	NC		%	25
			Styrene	2016/06/15	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/15	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/15	NC		%	25
			Hexane	2016/06/15	NC		%	25
			Naphthalene	2016/06/15	NC		%	25
			Total Xylenes	2016/06/15	NC		%	25
			1,3-Butadiene	2016/06/13	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/13	NC		%	25
			1,2-Dichloroethane	2016/06/13	NC		%	25
			Ethylene Dibromide	2016/06/13	NC		%	25
			Benzene	2016/06/13	NC		%	25
			Toluene	2016/06/13	1.6		%	25
			Ethylbenzene	2016/06/13	NC		%	25
			p+m-Xylene	2016/06/13	0.74		%	25
			o-Xylene	2016/06/13	2.4		%	25
			Styrene	2016/06/13	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/13	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/13	NC		%	25
			Hexane	2016/06/13	2.0		%	25
			Naphthalene	2016/06/13	NC		%	25
			Total Xylenes	2016/06/13	1.1		%	25
			Vinyl Chloride	2016/06/10	NC		%	25
			1,1-Dichloroethylene	2016/06/10	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/10	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/10	NC		%	25
			Trichloroethylene	2016/06/10	NC		%	25
			Tetrachloroethylene	2016/06/10	NC		%	25
4530516	MR2	Spiked Blank	Bromochloromethane	2016/06/08		102	%	60 - 140
			D5-Chlorobenzene	2016/06/08		100	%	60 - 140
			Difluorobenzene	2016/06/08		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/08		87	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/08		78	%	70 - 130
			Chloromethane	2016/06/08		91	%	70 - 130
			Vinyl Chloride	2016/06/08		92	%	70 - 130
			Chloroethane	2016/06/08		89	%	70 - 130
			1,3-Butadiene	2016/06/08		94	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/08		80	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Ethanol (ethyl alcohol)	2016/06/08		84	%	70 - 130
			Trichlorotrifluoroethane	2016/06/08		92	%	70 - 130
			2-propanol	2016/06/08		105	%	70 - 130
			2-Propanone	2016/06/08		92	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/08		101	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/08		101	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/08		104	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/08		101	%	70 - 130
			Ethyl Acetate	2016/06/08		99	%	70 - 130
			1,1-Dichloroethylene	2016/06/08		96	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/08		94	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/08		98	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/08		87	%	70 - 130
			Chloroform	2016/06/08		87	%	70 - 130
			Carbon Tetrachloride	2016/06/08		89	%	70 - 130
			1,1-Dichloroethane	2016/06/08		91	%	70 - 130
			1,2-Dichloroethane	2016/06/08		90	%	70 - 130
			Ethylene Dibromide	2016/06/08		90	%	70 - 130
			1,1,1-Trichloroethane	2016/06/08		83	%	70 - 130
			1,1,2-Trichloroethane	2016/06/08		91	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/08		85	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/08		97	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/08		100	%	70 - 130
			1,2-Dichloropropane	2016/06/08		93	%	70 - 130
			Bromomethane	2016/06/08		91	%	70 - 130
			Bromoform	2016/06/08		89	%	70 - 130
			Bromodichloromethane	2016/06/08		92	%	70 - 130
			Dibromochloromethane	2016/06/08		98	%	70 - 130
			Trichloroethylene	2016/06/08		96	%	70 - 130
			Tetrachloroethylene	2016/06/08		92	%	70 - 130
			Benzene	2016/06/08		95	%	70 - 130
			Toluene	2016/06/08		98	%	70 - 130
			Ethylbenzene	2016/06/08		94	%	70 - 130
			p+m-Xylene	2016/06/08		89	%	70 - 130
			o-Xylene	2016/06/08		91	%	70 - 130
			Styrene	2016/06/08		97	%	70 - 130
			4-ethyltoluene	2016/06/08		93	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/08		87	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/08		87	%	70 - 130
			Chlorobenzene	2016/06/08		92	%	70 - 130
			Benzyl chloride	2016/06/08		88	%	70 - 130
			1,3-Dichlorobenzene	2016/06/08		86	%	70 - 130
			1,4-Dichlorobenzene	2016/06/08		84	%	70 - 130
			1,2-Dichlorobenzene	2016/06/08		83	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/08		61 (1)	%	70 - 130
			Hexachlorobutadiene	2016/06/08		62 (1)	%	70 - 130
			Hexane	2016/06/08		94	%	70 - 130
			Heptane	2016/06/08		98	%	70 - 130
			Cyclohexane	2016/06/08		100	%	70 - 130
			Tetrahydrofuran	2016/06/08		101	%	70 - 130
			1,4-Dioxane	2016/06/08		96	%	70 - 130
			Naphthalene	2016/06/08		60 (1)	%	70 - 130
			Total Xylenes	2016/06/08		90	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vinyl Bromide	2016/06/08		89	%	70 - 130
			Propene	2016/06/08		108	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/08		103	%	70 - 130
			Carbon Disulfide	2016/06/08		107	%	70 - 130
			Vinyl Acetate	2016/06/08		97	%	70 - 130
4530516	MR2	Method Blank	Bromochloromethane	2016/06/08		91	%	60 - 140
			D5-Chlorobenzene	2016/06/08		86	%	60 - 140
			Difluorobenzene	2016/06/08		92	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/08	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/08	<0.17		ppbv	
			Chloromethane	2016/06/08	<0.30		ppbv	
			Vinyl Chloride	2016/06/08	<0.10		ppbv	
			Chloroethane	2016/06/08	<0.30		ppbv	
			1,3-Butadiene	2016/06/08	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/08	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/08	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/08	<0.15		ppbv	
			2-propanol	2016/06/08	<1.0		ppbv	
			2-Propanone	2016/06/08	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/08	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/08	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/08	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/08	<0.20		ppbv	
			Ethyl Acetate	2016/06/08	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/08	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/08	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/08	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/08	<0.80		ppbv	
			Chloroform	2016/06/08	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/08	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/08	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/08	<0.10		ppbv	
			Ethylene Dibromide	2016/06/08	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/08	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/08	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/08	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/08	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/08	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/08	<0.10		ppbv	
			Bromomethane	2016/06/08	<0.10		ppbv	
			Bromoform	2016/06/08	<0.20		ppbv	
			Bromodichloromethane	2016/06/08	<0.20		ppbv	
			Dibromochloromethane	2016/06/08	<0.20		ppbv	
			Trichloroethylene	2016/06/08	<0.10		ppbv	
			Tetrachloroethylene	2016/06/08	<0.10		ppbv	
			Benzene	2016/06/08	<0.10		ppbv	
			Toluene	2016/06/08	<0.10		ppbv	
			Ethylbenzene	2016/06/08	<0.10		ppbv	
			p+m-Xylene	2016/06/08	<0.20		ppbv	
			o-Xylene	2016/06/08	<0.10		ppbv	
			Styrene	2016/06/08	<0.10		ppbv	
			4-ethyltoluene	2016/06/08	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/08	<0.50		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,4-Trimethylbenzene	2016/06/08	<0.50		ppbv	
			Chlorobenzene	2016/06/08	<0.10		ppbv	
			Benzyl chloride	2016/06/08	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/08	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/08	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/08	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/08	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/08	<0.50		ppbv	
			Hexane	2016/06/08	<0.30		ppbv	
			Heptane	2016/06/08	<0.30		ppbv	
			Cyclohexane	2016/06/08	<0.20		ppbv	
			Tetrahydrofuran	2016/06/08	<0.40		ppbv	
			1,4-Dioxane	2016/06/08	<1.0		ppbv	
			Naphthalene	2016/06/08	<0.50		ppbv	
			Total Xylenes	2016/06/08	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/08	<0.10		ppbv	
			Vinyl Bromide	2016/06/08	<0.20		ppbv	
			Propene	2016/06/08	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/08	<0.20		ppbv	
			Carbon Disulfide	2016/06/08	<0.50		ppbv	
			Vinyl Acetate	2016/06/08	<0.20		ppbv	
4530516	MR2	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/08	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/08	NC		%	25
			Chloromethane	2016/06/08	NC		%	25
			Vinyl Chloride	2016/06/08	NC		%	25
			Chloroethane	2016/06/08	NC		%	25
			1,3-Butadiene	2016/06/08	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/08	1.5		%	25
			Ethanol (ethyl alcohol)	2016/06/08	NC		%	25
			Trichlorotrifluoroethane	2016/06/08	NC		%	25
			2-propanol	2016/06/08	NC		%	25
			2-Propanone	2016/06/08	0.63		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/08	NC		%	25
			Methyl Isobutyl Ketone	2016/06/08	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/08	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/08	NC		%	25
			Ethyl Acetate	2016/06/08	NC		%	25
			1,1-Dichloroethylene	2016/06/08	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/08	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/08	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/08	NC		%	25
			Chloroform	2016/06/08	2.8		%	25
			Carbon Tetrachloride	2016/06/08	NC		%	25
			1,1-Dichloroethane	2016/06/08	NC		%	25
			1,2-Dichloroethane	2016/06/08	NC		%	25
			Ethylene Dibromide	2016/06/08	NC		%	25
			1,1,1-Trichloroethane	2016/06/08	NC		%	25
			1,1,2-Trichloroethane	2016/06/08	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/08	NC		%	25
			cis-1,3-Dichloropropene	2016/06/08	NC		%	25
			trans-1,3-Dichloropropene	2016/06/08	NC		%	25
			1,2-Dichloropropane	2016/06/08	NC		%	25
			Bromomethane	2016/06/08	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Bromoform	2016/06/08	NC		%	25
			Bromodichloromethane	2016/06/08	NC		%	25
			Dibromochloromethane	2016/06/08	NC		%	25
			Trichloroethylene	2016/06/08	NC		%	25
			Tetrachloroethylene	2016/06/08	NC		%	25
			Benzene	2016/06/08	NC		%	25
			Toluene	2016/06/08	1.2		%	25
			Ethylbenzene	2016/06/08	1.4		%	25
			p+m-Xylene	2016/06/08	0.95		%	25
			o-Xylene	2016/06/08	3.1		%	25
			Styrene	2016/06/08	5.1		%	25
			4-ethyltoluene	2016/06/08	0.47		%	25
			1,3,5-Trimethylbenzene	2016/06/08	0.90		%	25
			1,2,4-Trimethylbenzene	2016/06/08	3.3		%	25
			Chlorobenzene	2016/06/08	NC		%	25
			Benzyl chloride	2016/06/08	NC		%	25
			1,3-Dichlorobenzene	2016/06/08	NC		%	25
			1,4-Dichlorobenzene	2016/06/08	NC		%	25
			1,2-Dichlorobenzene	2016/06/08	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/08	NC		%	25
			Hexachlorobutadiene	2016/06/08	NC		%	25
			Hexane	2016/06/08	NC		%	25
			Heptane	2016/06/08	NC		%	25
			Cyclohexane	2016/06/08	NC		%	25
			Tetrahydrofuran	2016/06/08	NC		%	25
			1,4-Dioxane	2016/06/08	NC		%	25
			Naphthalene	2016/06/08	NC		%	25
			Total Xylenes	2016/06/08	1.7		%	25
			1,1,1,2-Tetrachloroethane	2016/06/08	NC		%	25
			Vinyl Bromide	2016/06/08	NC		%	25
			Propene	2016/06/08	NC		%	25
			2,2,4-Trimethylpentane	2016/06/08	NC		%	25
			Carbon Disulfide	2016/06/08	NC		%	25
			Vinyl Acetate	2016/06/08	NC		%	25
4532465	DVO	Spiked Blank	Bromochloromethane	2016/06/09		104	%	60 - 140
			D5-Chlorobenzene	2016/06/09		106	%	60 - 140
			Difluorobenzene	2016/06/09		105	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/09		94	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/09		79	%	70 - 130
			Chloromethane	2016/06/09		93	%	70 - 130
			Vinyl Chloride	2016/06/09		93	%	70 - 130
			Chloroethane	2016/06/09		92	%	70 - 130
			1,3-Butadiene	2016/06/09		97	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/09		87	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/09		85	%	70 - 130
			Trichlorotrifluoroethane	2016/06/09		100	%	70 - 130
			2-propanol	2016/06/09		100	%	70 - 130
			2-Propanone	2016/06/09		99	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/09		110	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/09		98	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/09		98	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/09		98	%	70 - 130
			Ethyl Acetate	2016/06/09		101	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,1-Dichloroethylene	2016/06/09		102	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/09		97	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/09		101	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/09		93	%	70 - 130
			Chloroform	2016/06/09		94	%	70 - 130
			Carbon Tetrachloride	2016/06/09		94	%	70 - 130
			1,1-Dichloroethane	2016/06/09		97	%	70 - 130
			1,2-Dichloroethane	2016/06/09		97	%	70 - 130
			Ethylene Dibromide	2016/06/09		96	%	70 - 130
			1,1,1-Trichloroethane	2016/06/09		91	%	70 - 130
			1,1,2-Trichloroethane	2016/06/09		95	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/09		91	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/09		100	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/09		100	%	70 - 130
			1,2-Dichloropropane	2016/06/09		96	%	70 - 130
			Bromomethane	2016/06/09		96	%	70 - 130
			Bromoform	2016/06/09		92	%	70 - 130
			Bromodichloromethane	2016/06/09		98	%	70 - 130
			Dibromochloromethane	2016/06/09		104	%	70 - 130
			Trichloroethylene	2016/06/09		100	%	70 - 130
			Tetrachloroethylene	2016/06/09		97	%	70 - 130
			Benzene	2016/06/09		98	%	70 - 130
			Toluene	2016/06/09		100	%	70 - 130
			Ethylbenzene	2016/06/09		95	%	70 - 130
			p+m-Xylene	2016/06/09		90	%	70 - 130
			o-Xylene	2016/06/09		90	%	70 - 130
			Styrene	2016/06/09		94	%	70 - 130
			4-ethyltoluene	2016/06/09		94	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/09		87	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/09		88	%	70 - 130
			Chlorobenzene	2016/06/09		98	%	70 - 130
			Benzyl chloride	2016/06/09		88	%	70 - 130
			1,3-Dichlorobenzene	2016/06/09		93	%	70 - 130
			1,4-Dichlorobenzene	2016/06/09		89	%	70 - 130
			1,2-Dichlorobenzene	2016/06/09		88	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/09		90	%	70 - 130
			Hexachlorobutadiene	2016/06/09		95	%	70 - 130
			Hexane	2016/06/09		95	%	70 - 130
			Heptane	2016/06/09		95	%	70 - 130
			Cyclohexane	2016/06/09		94	%	70 - 130
			Tetrahydrofuran	2016/06/09		98	%	70 - 130
			1,4-Dioxane	2016/06/09		92	%	70 - 130
			Naphthalene	2016/06/09		93	%	70 - 130
			Total Xylenes	2016/06/09		90	%	70 - 130
			Vinyl Bromide	2016/06/09		93	%	70 - 130
			Propene	2016/06/09		105	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/09		104	%	70 - 130
			Carbon Disulfide	2016/06/09		115	%	70 - 130
			Vinyl Acetate	2016/06/09		92	%	70 - 130
4532465	DVO	Method Blank	Bromochloromethane	2016/06/09		98	%	60 - 140
			D5-Chlorobenzene	2016/06/09		100	%	60 - 140
			Difluorobenzene	2016/06/09		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/09	<0.20		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichlorotetrafluoroethane	2016/06/09	<0.17		ppbv	
			Chloromethane	2016/06/09	<0.30		ppbv	
			Vinyl Chloride	2016/06/09	<0.10		ppbv	
			Chloroethane	2016/06/09	<0.30		ppbv	
			1,3-Butadiene	2016/06/09	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/09	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/09	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/09	<0.15		ppbv	
			2-propanol	2016/06/09	<1.0		ppbv	
			2-Propanone	2016/06/09	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/09	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/09	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/09	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/09	<0.20		ppbv	
			Ethyl Acetate	2016/06/09	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/09	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/09	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/09	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/09	<0.80		ppbv	
			Chloroform	2016/06/09	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/09	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/09	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/09	<0.10		ppbv	
			Ethylene Dibromide	2016/06/09	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/09	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/09	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/09	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/09	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/09	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/09	<0.10		ppbv	
			Bromomethane	2016/06/09	<0.10		ppbv	
			Bromoform	2016/06/09	<0.20		ppbv	
			Bromodichloromethane	2016/06/09	<0.20		ppbv	
			Dibromochloromethane	2016/06/09	<0.20		ppbv	
			Trichloroethylene	2016/06/09	<0.10		ppbv	
			Tetrachloroethylene	2016/06/09	<0.10		ppbv	
			Benzene	2016/06/09	<0.10		ppbv	
			Toluene	2016/06/09	<0.10		ppbv	
			Ethylbenzene	2016/06/09	<0.10		ppbv	
			p+m-Xylene	2016/06/09	<0.20		ppbv	
			o-Xylene	2016/06/09	<0.10		ppbv	
			Styrene	2016/06/09	<0.10		ppbv	
			4-ethyltoluene	2016/06/09	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/09	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/09	<0.50		ppbv	
			Chlorobenzene	2016/06/09	<0.10		ppbv	
			Benzyl chloride	2016/06/09	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/09	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/09	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/09	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/09	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/09	<0.50		ppbv	
			Hexane	2016/06/09	<0.30		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Heptane	2016/06/09	<0.30		ppbv	
			Cyclohexane	2016/06/09	<0.20		ppbv	
			Tetrahydrofuran	2016/06/09	<0.40		ppbv	
			1,4-Dioxane	2016/06/09	<1.0		ppbv	
			Naphthalene	2016/06/09	<0.50		ppbv	
			Total Xylenes	2016/06/09	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/09	<0.10		ppbv	
			Vinyl Bromide	2016/06/09	<0.20		ppbv	
			Propene	2016/06/09	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/09	<0.20		ppbv	
			Carbon Disulfide	2016/06/09	<0.50		ppbv	
			Vinyl Acetate	2016/06/09	<0.20		ppbv	
4532803	DVO	Spiked Blank	1,4-Difluorobenzene	2016/06/09		105	%	60 - 140
			Bromochloromethane	2016/06/09		104	%	60 - 140
			D5-Chlorobenzene	2016/06/09		106	%	60 - 140
4532803	DVO	Method Blank	1,4-Difluorobenzene	2016/06/09		102	%	60 - 140
			Bromochloromethane	2016/06/09		98	%	60 - 140
			D5-Chlorobenzene	2016/06/09		100	%	60 - 140
			Aliphatic >C5-C6	2016/06/09	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/09	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/09	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/09	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/09	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/09	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/09	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/09	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/09	<5.0		ug/m3	
4532803	DVO	RPD - Sample/Sample Dup	Aliphatic >C5-C6	2016/06/09	2.1		%	25
			Aliphatic >C6-C8	2016/06/09	2.8		%	25
			Aliphatic >C8-C10	2016/06/09	NC		%	25
			Aliphatic >C10-C12	2016/06/09	1.6		%	25
			Aliphatic >C12-C16	2016/06/09	0.97		%	25
			Aromatic >C7-C8 (TEX Excluded)	2016/06/09	NC		%	25
			Aromatic >C8-C10	2016/06/09	NC		%	25
			Aromatic >C10-C12	2016/06/09	0.58		%	25
			Aromatic >C12-C16	2016/06/09	0.32		%	25
4532867	DVO	Spiked Blank	1,4-Difluorobenzene	2016/06/09		105	%	60 - 140
			Bromochloromethane	2016/06/09		104	%	60 - 140
			D5-Chlorobenzene	2016/06/09		106	%	60 - 140
4532867	DVO	Method Blank	1,4-Difluorobenzene	2016/06/09		102	%	60 - 140
			Bromochloromethane	2016/06/09		98	%	60 - 140
			D5-Chlorobenzene	2016/06/09		100	%	60 - 140
			F1-BTEX, C6-C10 (as Toluene)	2016/06/09	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/09	<5.0		ug/m3	
4532867	DVO	RPD - Sample/Sample Dup	F1-BTEX, C6-C10 (as Toluene)	2016/06/09	9.5		%	25
			F2, C10-C16 (as Decane)	2016/06/09	2.0		%	25
4533172	MR2	Spiked Blank	1,4-Difluorobenzene	2016/06/08		101	%	60 - 140
			Bromochloromethane	2016/06/08		102	%	60 - 140
			D5-Chlorobenzene	2016/06/08		100	%	60 - 140
4533172	MR2	Method Blank	1,4-Difluorobenzene	2016/06/08		92	%	60 - 140
			Bromochloromethane	2016/06/08		91	%	60 - 140
			D5-Chlorobenzene	2016/06/08		86	%	60 - 140
			Aliphatic >C5-C6	2016/06/08	<5.0		ug/m3	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Aliphatic >C6-C8	2016/06/08	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/08	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/08	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/08	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/08	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/08	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/08	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/08	<5.0		ug/m3	
4533172	MR2	RPD - Sample/Sample Dup	Aliphatic >C5-C6	2016/06/08	NC		%	25
			Aliphatic >C6-C8	2016/06/08	NC		%	25
			Aliphatic >C8-C10	2016/06/08	6.0		%	25
			Aliphatic >C10-C12	2016/06/08	2.4		%	25
			Aliphatic >C12-C16	2016/06/08	3.1		%	25
			Aromatic >C7-C8 (TEX Excluded)	2016/06/08	NC		%	25
			Aromatic >C8-C10	2016/06/08	1.1		%	25
			Aromatic >C10-C12	2016/06/08	0.74		%	25
			Aromatic >C12-C16	2016/06/08	NC		%	25
4533174	MR2	Spiked Blank	1,4-Difluorobenzene	2016/06/08		101	%	60 - 140
			Bromochloromethane	2016/06/08		102	%	60 - 140
			D5-Chlorobenzene	2016/06/08		100	%	60 - 140
4533174	MR2	Method Blank	1,4-Difluorobenzene	2016/06/08		92	%	60 - 140
			Bromochloromethane	2016/06/08		91	%	60 - 140
			D5-Chlorobenzene	2016/06/08		86	%	60 - 140
			F1-BTEX, C6-C10 (as Toluene)	2016/06/08	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/08	<5.0		ug/m3	
4533174	MR2	RPD - Sample/Sample Dup	F1-BTEX, C6-C10 (as Toluene)	2016/06/08	1.8		%	25
			F2, C10-C16 (as Decane)	2016/06/08	2.2		%	25
4538513	VTH	Method Blank	Oxygen	2016/06/13	<0.1		% v/v	
			Nitrogen	2016/06/13	<0.1		% v/v	
			Methane	2016/06/13	<0.1		% v/v	
			Carbon Dioxide	2016/06/13	<0.1		% v/v	
4538513	VTH	RPD - Sample/Sample Dup	Oxygen	2016/06/13	0.044		%	20
			Nitrogen	2016/06/13	0.013		%	20
			Methane	2016/06/13	NC		%	20
			Carbon Dioxide	2016/06/13	NC		%	20

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

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

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

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

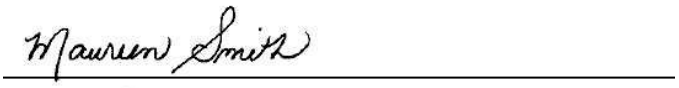
Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B5182
Report Date: 2016/06/16

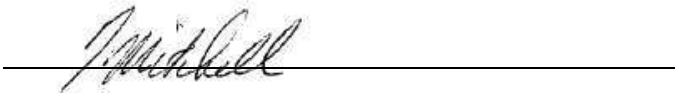
Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VALIDATION SIGNATURE PAGE

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



Maureen Smith, Supervisor, Volatiles



Tom Mitchell, B.Sc, Supervisor, Compressed Gases

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Your Project #: CG2430.1E06
Your C.O.C. #: na

Attention:Daniel Budai

Clifton Associates Ltd.
2222 30 Ave. NE
Calgary, AB
CANADA T2E 7K9

Report Date: 2016/06/23
Report #: R4039053
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6B8657
Received: 2016/06/10, 10:00

Sample Matrix: AIR
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
BTEX and CCME Compounds in Air(TO-15mod)	14	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	7	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	7	N/A	2016/06/14	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	14	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	7	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	7	N/A	2016/06/15	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	14	N/A	2016/06/13	BRL SOP-00304	EPA TO-15 m

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

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Marinela Sim
Project Manager
23 Jun 2016 15:11:59 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina Bacchus, Project Manager
Email: CBacchus@maxxam.ca
Phone# (905) 817-5700

==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

RESULTS OF ANALYSES OF AIR

Maxxam ID		CMW156	CMW157	CMW158	CMW159	CMW160	CMW161	CMW162		
Sampling Date		2016/06/07	2016/06/07	2016/06/07	2016/06/07	2016/06/07	2016/06/07	2016/06/07		
COC Number		na	na	na	na	na	na	na		
	UNITS	52/2920	24/383	924/406	38/384	23/1402	22/1415	20/1904	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-4.8)	(-2.7)	(-3.6)	(-2.5)	(-2.5)	(-2.2)	(-2.6)	4536997	
QC Batch = Quality Control Batch										

Maxxam ID		CMW163	CMW164	CMW165	CMW166	CMW167	CMW168	CMW169		
Sampling Date		2016/06/07	2016/06/08	2016/06/08	2016/06/08	2016/06/08	2016/06/08	2016/06/08		
COC Number		na	na	na	na	na	na	na		
	UNITS	36/322	28/2514	29/1366	10/239	32/398	27/1041	19/2480	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-2.2)	(-2.6)	(-3.1)	(-2.9)	(-2.9)	(-3.0)	(-4.2)	4537989	
QC Batch = Quality Control Batch										

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW156		CMW157		CMW158		CMW159			
Sampling Date		2016/06/07		2016/06/07		2016/06/07		2016/06/07			
COC Number		na		na		na		na			
	UNITS	52/2920	RDL	24/383	RDL	924/406	RDL	38/384	RDL	QC Batch	MDL
Calculated Parameters											
Dichlorodifluoromethane (FREON 12)	ug/m3	8.69	0.99	10.1	0.99	9.65	0.99	16.2	0.99	4534819	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
Chloromethane	ug/m3	1.20	0.62	0.82	0.62	<0.62	0.62	<0.62	0.62	4534819	0.10
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	4534819	0.10
Chloroethane	ug/m3	<0.79	0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	4534819	0.10
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	4534819	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	1.7	1.1	9.2	1.1	9.3	1.1	2.1	1.1	4534819	0.10
Ethanol (ethyl alcohol)	ug/m3	406	7.5	9.1	1.9	3.7	1.9	11.5	1.9	4534819	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
2-propanol	ug/m3	120	2.5	11.3	2.5	<2.5	2.5	6.1	2.5	4534819	0.60
2-Propanone	ug/m3	57.8	1.9	19.6	1.9	16.3	1.9	28.8	1.9	4534819	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	4.2	2.9	8.9	2.9	8.6	2.9	5.3	2.9	4534819	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4534819	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4534819	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	4534819	0.10
Ethyl Acetate	ug/m3	4.8	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4534819	0.50
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Methylene Chloride(Dichloromethane)	ug/m3	5.3	2.8	6.2	2.8	3.2	2.8	4.4	2.8	4534819	0.10
Chloroform	ug/m3	0.99	0.49	9.68	0.49	10.2	0.49	2.76	0.49	4534819	0.10
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	4534819	0.10
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	4534819	0.10
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4534819	0.10
Bromomethane	ug/m3	<0.39	0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	4534819	0.10
Bromoform	ug/m3	<2.1	2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	4534819	0.10
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	4534819	0.10
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	4534819	0.10
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	0.54	<0.54	0.54	<0.54	0.54	4534819	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW156		CMW157		CMW158		CMW159			
Sampling Date		2016/06/07		2016/06/07		2016/06/07		2016/06/07			
COC Number		na		na		na		na			
	UNITS	52/2920	RDL	24/383	RDL	924/406	RDL	38/384	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	<0.68	0.68	<0.68	0.68	<0.68	0.68	<0.68	0.68	4534819	0.10
Benzene	ug/m3	0.82	0.32	1.35	0.32	1.16	0.32	0.98	0.32	4534819	0.10
Toluene	ug/m3	13.1	0.38	7.25	0.38	7.35	0.38	13.9	0.38	4534819	0.10
Ethylbenzene	ug/m3	2.34	0.43	3.57	0.43	3.88	0.43	11.2	0.43	4534819	0.10
p+m-Xylene	ug/m3	10.2	0.87	16.2	0.87	18.5	0.87	52.8	0.87	4534819	0.10
o-Xylene	ug/m3	4.22	0.43	8.59	0.43	9.57	0.43	22.4	0.43	4534819	0.10
Styrene	ug/m3	1.85	0.43	0.86	0.43	0.77	0.43	<0.43	0.43	4534819	0.10
4-ethyltoluene	ug/m3	<2.5	2.5	2.8	2.5	3.3	2.5	16.1	2.5	4534819	0.50
1,3,5-Trimethylbenzene	ug/m3	<3.9	3.9	4.7	2.5	5.2	2.5	13.7	2.5	4534819	0.10
1,2,4-Trimethylbenzene	ug/m3	5.9	2.5	11.9	2.5	13.4	2.5	55.6	2.5	4534819	0.10
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	0.46	0.54	0.46	<0.46	0.46	4534819	0.10
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4534819	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	4534819	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	4534819	0.40
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	4534819	0.60
Hexane	ug/m3	2.7	1.1	5.7	1.1	2.5	1.1	2.7	1.1	4534819	0.10
Heptane	ug/m3	<1.2	1.2	2.1	1.2	2.3	1.2	3.8	1.2	4534819	0.10
Cyclohexane	ug/m3	<0.69	0.69	0.86	0.69	0.85	0.69	1.09	0.69	4534819	0.10
Tetrahydrofuran	ug/m3	<1.2	1.2	4.3	1.2	4.5	1.2	<1.2	1.2	4534819	0.10
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4534819	0.40
Naphthalene	ug/m3	<2.6	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4534819	N/A
Total Xylenes	ug/m3	14.5	1.3	24.8	1.3	28.1	1.3	75.3	1.3	4534819	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	N/A
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	4534819	0.10
Propene	ug/m3	<1.4	1.4	<2.2	2.2	<1.7	1.7	6.38	0.86	4534819	0.10
2,2,4-Trimethylpentane	ug/m3	2.13	0.93	<0.93	0.93	1.03	0.93	<0.93	0.93	4534819	0.10
Carbon Disulfide	ug/m3	<1.6	1.6	2.6	1.6	2.2	1.6	3.3	1.6	4534819	0.10
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	4534819	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW160		CMW161		CMW162		CMW163			
Sampling Date		2016/06/07		2016/06/07		2016/06/07		2016/06/07			
COC Number		na		na		na		na			
	UNITS	23/1402	RDL	22/1415	RDL	20/1904	RDL	36/322	RDL	QC Batch	MDL
Calculated Parameters											
Dichlorodifluoromethane (FREON 12)	ug/m3	3.91	0.99	3.33	0.99	5.25	0.99	2.59	0.99	4534819	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
Chloromethane	ug/m3	<0.62	0.62	<0.62	0.62	0.89	0.62	<0.62	0.62	4534819	0.10
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	4534819	0.10
Chloroethane	ug/m3	<0.79	0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	4534819	0.10
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	4534819	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	3.5	1.1	1.6	1.1	2.1	1.1	40.4	1.1	4534819	0.10
Ethanol (ethyl alcohol)	ug/m3	2.2	1.9	4.9	1.9	3.5	1.9	54.7	1.9	4534819	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
2-propanol	ug/m3	<2.5	2.5	3.8	2.5	<2.5	2.5	3.4	2.5	4534819	0.60
2-Propanone	ug/m3	8.0	1.9	15.9	1.9	18.0	1.9	49.2	1.9	4534819	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	2.9	<2.9	2.9	<2.9	2.9	19.3	2.9	4534819	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	4.1	5.0	4.1	4534819	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4534819	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	4534819	0.10
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4534819	0.50
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Methylene Chloride(Dichloromethane)	ug/m3	9.0	2.8	10.1	2.8	6.5	2.8	4.3	2.8	4534819	0.10
Chloroform	ug/m3	22.6	0.49	1.67	0.49	0.64	0.49	10.6	0.49	4534819	0.10
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	4534819	0.10
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	4534819	0.10
1,1,1-Trichloroethane	ug/m3	0.62	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4534819	0.10
Bromomethane	ug/m3	<0.39	0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	4534819	0.10
Bromoform	ug/m3	<2.1	2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	4534819	0.10
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	4534819	0.10
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	4534819	0.10
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	0.54	<0.54	0.54	0.56	0.54	4534819	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW160		CMW161		CMW162		CMW163			
Sampling Date		2016/06/07		2016/06/07		2016/06/07		2016/06/07			
COC Number		na		na		na		na			
	UNITS	23/1402	RDL	22/1415	RDL	20/1904	RDL	36/322	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	<0.68	0.68	<0.68	0.68	<0.68	0.68	<0.68	0.68	4534819	0.10
Benzene	ug/m3	0.44	0.32	1.08	0.32	1.81	0.32	3.47	0.32	4534819	0.10
Toluene	ug/m3	2.38	0.38	5.86	0.38	6.93	0.38	41.8	0.38	4534819	0.10
Ethylbenzene	ug/m3	1.49	0.43	4.40	0.43	2.26	0.43	47.6	0.43	4534819	0.10
p+m-Xylene	ug/m3	6.22	0.87	19.8	0.87	9.57	0.87	221	0.87	4534819	0.10
o-Xylene	ug/m3	3.26	0.43	9.55	0.43	4.75	0.43	92.6	0.43	4534819	0.10
Styrene	ug/m3	0.47	0.43	<0.43	0.43	<0.85	0.85	0.61	0.43	4534819	0.10
4-ethyltoluene	ug/m3	<2.5	2.5	4.2	2.5	<2.5	2.5	58.2	2.5	4534819	0.50
1,3,5-Trimethylbenzene	ug/m3	2.7	2.5	4.5	2.5	<2.5	2.5	49.9	2.5	4534819	0.10
1,2,4-Trimethylbenzene	ug/m3	8.6	2.5	14.5	2.5	7.5	2.5	183	2.5	4534819	0.10
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4534819	0.10
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4534819	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	4534819	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	4534819	0.40
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	4534819	0.60
Hexane	ug/m3	3.0	1.1	3.0	1.1	3.1	1.1	2.7	1.1	4534819	0.10
Heptane	ug/m3	<1.2	1.2	1.7	1.2	2.8	1.2	4.6	1.2	4534819	0.10
Cyclohexane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	0.10
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4534819	0.40
Naphthalene	ug/m3	2.9	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4534819	N/A
Total Xylenes	ug/m3	9.5	1.3	29.3	1.3	14.3	1.3	313	1.3	4534819	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	N/A
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	4534819	0.10
Propene	ug/m3	<0.86	0.86	<2.8	2.8	<0.86	0.86	1.02	0.86	4534819	0.10
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	0.93	<0.93	0.93	<0.93	0.93	4534819	0.10
Carbon Disulfide	ug/m3	2.2	1.6	2.0	1.6	<1.6	1.6	8.9	1.6	4534819	0.10
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	4534819	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW164	CMW165		CMW166		CMW167			
Sampling Date		2016/06/08	2016/06/08		2016/06/08		2016/06/08			
COC Number		na	na		na		na			
	UNITS	28/2514	29/1366	RDL	10/239	RDL	32/398	RDL	QC Batch	MDL
Calculated Parameters										
Dichlorodifluoromethane (FREON 12)	ug/m3	3.25	2.91	0.99	2.69	0.99	2.96	0.99	4534819	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
Chloromethane	ug/m3	<0.62	1.34	0.62	1.03	0.62	<0.62	0.62	4534819	0.10
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	4534819	0.10
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	4534819	0.10
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	4534819	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	8.8	1.3	1.1	1.3	1.1	1.5	1.1	4534819	0.10
Ethanol (ethyl alcohol)	ug/m3	2.1	6.4	1.9	8.7	1.9	5.0	1.9	4534819	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
2-propanol	ug/m3	<2.5	4.9	2.5	<2.5	2.5	<2.5	2.5	4534819	0.60
2-Propanone	ug/m3	9.0	25.1	1.9	17.2	1.9	8.3	1.9	4534819	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	<2.9	2.9	<2.9	2.9	<6.8	6.8	4534819	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4534819	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	4534819	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	4534819	0.10
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	4534819	0.50
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Methylene Chloride(Dichloromethane)	ug/m3	7.5	10.2	2.8	10.3	2.8	9.7	2.8	4534819	0.10
Chloroform	ug/m3	1.20	<0.49	0.49	<0.49	0.49	4.27	0.49	4534819	0.10
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	4534819	0.10
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4534819	0.10
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	4534819	0.10
1,1,1-Trichloroethane	ug/m3	0.67	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	4534819	0.10
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4534819	0.10
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	4534819	0.10
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	4534819	0.10
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	4534819	0.10
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	4534819	0.10
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	<0.54	0.54	<0.54	0.54	4534819	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW164	CMW165		CMW166		CMW167			
Sampling Date		2016/06/08	2016/06/08		2016/06/08		2016/06/08			
COC Number		na	na		na		na			
	UNITS	28/2514	29/1366	RDL	10/239	RDL	32/398	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	2.09	<0.68	0.68	<0.68	0.68	<0.68	0.68	4534819	0.10
Benzene	ug/m3	2.55	<0.32	0.32	<0.32	0.32	5.19	0.32	4534819	0.10
Toluene	ug/m3	9.19	1.30	0.38	1.62	0.38	111	0.38	4534819	0.10
Ethylbenzene	ug/m3	12.0	<0.43	0.43	<0.43	0.43	95.8	0.43	4534819	0.10
p+m-Xylene	ug/m3	27.6	1.13	0.87	0.95	0.87	292	0.87	4534819	0.10
o-Xylene	ug/m3	37.6	0.84	0.43	0.48	0.43	156	0.43	4534819	0.10
Styrene	ug/m3	<0.43	<0.43	0.43	<0.43	0.43	0.95	0.43	4534819	0.10
4-ethyltoluene	ug/m3	21.2	<2.5	2.5	<2.5	2.5	96.7	2.5	4534819	0.50
1,3,5-Trimethylbenzene	ug/m3	23.3	<2.5	2.5	<2.5	2.5	91.8	2.5	4534819	0.10
1,2,4-Trimethylbenzene	ug/m3	28.2	<2.5	2.5	<2.5	2.5	231	2.5	4534819	0.10
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	4534819	0.10
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	4534819	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	4534819	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	4534819	0.40
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	4534819	0.60
Hexane	ug/m3	4.2	2.9	1.1	2.5	1.1	10.4	1.1	4534819	0.10
Heptane	ug/m3	1.4	<1.2	1.2	<1.2	1.2	6.4	1.2	4534819	0.10
Cyclohexane	ug/m3	1.53	<0.69	0.69	<0.69	0.69	2.02	0.69	4534819	0.10
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	4534819	0.10
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	6.0	3.6	<3.6	3.6	4534819	0.40
Naphthalene	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	3.1	2.6	4534819	N/A
Total Xylenes	ug/m3	65.2	2.0	1.3	1.4	1.3	447	1.3	4534819	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	4534819	N/A
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	4534819	0.10
Propene	ug/m3	6.99	4.05	0.86	<1.5	1.5	3.58	0.86	4534819	0.10
2,2,4-Trimethylpentane	ug/m3	1.24	<0.93	0.93	<0.93	0.93	7.39	0.93	4534819	0.10
Carbon Disulfide	ug/m3	41.9	<1.6	1.6	<1.6	1.6	58.5	1.6	4534819	0.10
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<0.70	0.70	<1.4	1.4	4534819	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW168		CMW169			
Sampling Date		2016/06/08		2016/06/08			
COC Number		na		na			
	UNITS	27/1041	RDL	19/2480	RDL	QC Batch	MDL
Calculated Parameters							
Dichlorodifluoromethane (FREON 12)	ug/m3	3.32	0.99	2.94	0.99	4534819	0.10
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	4534819	0.10
Chloromethane	ug/m3	<0.62	0.62	1.13	0.62	4534819	0.10
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	0.26	4534819	0.10
Chloroethane	ug/m3	<0.79	0.79	<0.79	0.79	4534819	0.10
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	1.1	4534819	0.10
Trichlorofluoromethane (FREON 11)	ug/m3	9.9	1.1	1.5	1.1	4534819	0.10
Ethanol (ethyl alcohol)	ug/m3	2.7	1.9	17.5	1.9	4534819	0.50
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	1.2	4534819	0.10
2-propanol	ug/m3	<2.5	2.5	<2.5	2.5	4534819	0.60
2-Propanone	ug/m3	14.9	1.9	19.7	1.9	4534819	0.20
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	2.9	<5.3	5.3	4534819	0.60
Methyl Isobutyl Ketone	ug/m3	<4.1	4.1	<4.1	4.1	4534819	0.60
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	4.1	4534819	0.40
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	0.72	4534819	0.10
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	3.6	4534819	0.50
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	4534819	0.10
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	4534819	0.10
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	0.40	4534819	0.10
Methylene Chloride(Dichloromethane)	ug/m3	9.8	2.8	25.4	2.8	4534819	0.10
Chloroform	ug/m3	0.94	0.49	0.54	0.49	4534819	0.10
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	0.63	4534819	0.10
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	0.40	4534819	0.10
1,2-Dichloroethane	ug/m3	23.3	0.40	<0.40	0.40	4534819	0.10
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	0.77	4534819	0.10
1,1,1-Trichloroethane	ug/m3	1.17	0.55	<0.55	0.55	4534819	0.10
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	0.55	4534819	0.10
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	4534819	0.10
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	4534819	0.10
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	0.45	4534819	0.10
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	0.46	4534819	0.10
Bromomethane	ug/m3	<0.39	0.39	<0.39	0.39	4534819	0.10
Bromoform	ug/m3	<2.1	2.1	<2.1	2.1	4534819	0.10
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	1.3	4534819	0.10
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	1.7	4534819	0.10
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	0.54	4534819	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		CMW168		CMW169			
Sampling Date		2016/06/08		2016/06/08			
COC Number		na		na			
	UNITS	27/1041	RDL	19/2480	RDL	QC Batch	MDL
Tetrachloroethylene	ug/m3	2.25	0.68	<0.68	0.68	4534819	0.10
Benzene	ug/m3	0.79	0.32	0.38	0.32	4534819	0.10
Toluene	ug/m3	8.79	0.38	1.76	0.38	4534819	0.10
Ethylbenzene	ug/m3	3.38	0.43	0.60	0.43	4534819	0.10
p+m-Xylene	ug/m3	10.7	0.87	2.16	0.87	4534819	0.10
o-Xylene	ug/m3	5.26	0.43	0.98	0.43	4534819	0.10
Styrene	ug/m3	1.96	0.43	<0.43	0.43	4534819	0.10
4-ethyltoluene	ug/m3	<2.5	2.5	<2.5	2.5	4534819	0.50
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	2.5	4534819	0.10
1,2,4-Trimethylbenzene	ug/m3	5.3	2.5	<2.5	2.5	4534819	0.10
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	0.46	4534819	0.10
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	2.6	4534819	0.20
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	2.4	4534819	0.10
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	0.60	4534819	0.10
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	3.7	4534819	0.40
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	5.3	4534819	0.60
Hexane	ug/m3	3.0	1.1	5.9	1.1	4534819	0.10
Heptane	ug/m3	<1.2	1.2	<1.2	1.2	4534819	0.10
Cyclohexane	ug/m3	<0.69	0.69	<0.69	0.69	4534819	0.10
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	1.2	4534819	0.10
1,4-Dioxane	ug/m3	59.8	3.6	<3.6	3.6	4534819	0.40
Naphthalene	ug/m3	<2.6	2.6	<2.6	2.6	4534819	N/A
Total Xylenes	ug/m3	16.0	1.3	3.1	1.3	4534819	N/A
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	0.69	4534819	N/A
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	0.87	4534819	0.10
Propene	ug/m3	<1.5	1.5	2.22	0.86	4534819	0.10
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	0.93	4534819	0.10
Carbon Disulfide	ug/m3	8.9	1.6	<1.6	1.6	4534819	0.10
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	0.70	4534819	0.10

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CMW156	CMW157	CMW158	CMW159	CMW160	CMW161			
Sampling Date		2016/06/07	2016/06/07	2016/06/07	2016/06/07	2016/06/07	2016/06/07			
COC Number		na	na	na	na	na	na			
	UNITS	52/2920	24/383	924/406	38/384	23/1402	22/1415	RDL	QC Batch	MDL
Volatile Organics										
F1-BTEX, C6-C10 (as Toluene)	ug/m3	72.3	412	404	146	86.7	58.1	5.0	4537125	1.0
F2, C10-C16 (as Decane)	ug/m3	94.1	604	616	909	134	192	5.0	4537125	1.0
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4537129	1.0
Aliphatic >C6-C8	ug/m3	10.7	21.6	18.2	18.5	<5.0	9.0	5.0	4537129	1.0
Aliphatic >C8-C10	ug/m3	11.3	100	100	14.6	14.9	6.3	5.0	4537129	1.0
Aliphatic >C10-C12	ug/m3	15.2	110	116	73.8	16.2	21.3	5.0	4537129	1.0
Aliphatic >C12-C16	ug/m3	<5.0	33.0	43.0	78.4	5.6	20.3	5.0	4537129	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4537129	1.0
Aromatic >C8-C10	ug/m3	18.9	30.8	33.3	105	15.2	33.5	5.0	4537129	1.0
Aromatic >C10-C12	ug/m3	15.7	36.3	38.9	103	21.5	29.0	5.0	4537129	1.0
Aromatic >C12-C16	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4537129	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		CMW162		CMW163	CMW164	CMW165	CMW166			
Sampling Date		2016/06/07		2016/06/07	2016/06/08	2016/06/08	2016/06/08			
COC Number		na		na	na	na	na			
	UNITS	20/1904	QC Batch	36/322	28/2514	29/1366	10/239	RDL	QC Batch	MDL
Volatile Organics										
F1-BTEX, C6-C10 (as Toluene)	ug/m3	89.3	4537125	2530	1560	103	151	5.0	4537991	1.0
F2, C10-C16 (as Decane)	ug/m3	1540	4537125	8150	2920	258	237	5.0	4537991	1.0
Aliphatic >C5-C6	ug/m3	<5.0	4537129	<5.0	<5.0	<5.0	<5.0	5.0	4537990	1.0
Aliphatic >C6-C8	ug/m3	11.8	4537129	35.5	32.0	11.1	6.5	5.0	4537990	1.0
Aliphatic >C8-C10	ug/m3	14.9	4537129	92.9	87.1	<5.0	<5.0	5.0	4537990	1.0
Aliphatic >C10-C12	ug/m3	31.2	4537129	427	136	20.7	15.3	5.0	4537990	1.0
Aliphatic >C12-C16	ug/m3	103	4537129	150	81.5	11.3	<5.0	5.0	4537990	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	4537129	<5.0	<5.0	<5.0	<5.0	5.0	4537990	1.0
Aromatic >C8-C10	ug/m3	18.4	4537129	429	133	<5.0	<5.0	5.0	4537990	1.0
Aromatic >C10-C12	ug/m3	17.5	4537129	384	110	<5.0	<5.0	5.0	4537990	1.0
Aromatic >C12-C16	ug/m3	<5.0	4537129	<5.0	<5.0	<5.0	<5.0	5.0	4537990	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CMW167	CMW168	CMW169			
Sampling Date		2016/06/08	2016/06/08	2016/06/08			
COC Number		na	na	na			
	UNITS	32/398	27/1041	19/2480	RDL	QC Batch	MDL
Volatile Organics							
F1-BTEX, C6-C10 (as Toluene)	ug/m3	4690	621	102	5.0	4537991	1.0
F2, C10-C16 (as Decane)	ug/m3	22000	5810	148	5.0	4537991	1.0
Aliphatic >C5-C6	ug/m3	12.5	<5.0	<5.0	5.0	4537990	1.0
Aliphatic >C6-C8	ug/m3	123	9.9	7.9	5.0	4537990	1.0
Aliphatic >C8-C10	ug/m3	198	19.1	<5.0	5.0	4537990	1.0
Aliphatic >C10-C12	ug/m3	1140	38.2	12.9	5.0	4537990	1.0
Aliphatic >C12-C16	ug/m3	490	1280	<5.0	5.0	4537990	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	5.0	4537990	1.0
Aromatic >C8-C10	ug/m3	692	16.6	<5.0	5.0	4537990	1.0
Aromatic >C10-C12	ug/m3	569	18.7	<5.0	5.0	4537990	1.0
Aromatic >C12-C16	ug/m3	76.8	<5.0	<5.0	5.0	4537990	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW156				CMW157					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	52/2920	RDL	ug/m3	DL (ug/m3)	24/383	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	1.76	0.20	8.69	0.989	2.05	0.20	10.1	0.989	4536504	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536504	0.10
Chloromethane	ppbv	0.58	0.30	1.20	0.620	0.40	0.30	0.822	0.620	4536504	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536504	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536504	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536504	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.31	0.20	1.72	1.12	1.63	0.20	9.16	1.12	4536504	0.10
Ethanol (ethyl alcohol)	ppbv	215	4.0	406	7.54	4.8	1.0	9.13	1.88	4536504	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536504	0.10
2-propanol	ppbv	49.0	1.0	120	2.46	4.6	1.0	11.3	2.46	4536504	0.60
2-Propanone	ppbv	24.3	0.80	57.8	1.90	8.27	0.80	19.6	1.90	4536504	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.4	1.0	4.21	2.95	3.0	1.0	8.93	2.95	4536504	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536504	0.10
Ethyl Acetate	ppbv	1.3	1.0	4.76	3.60	<1.0	1.0	<3.60	3.60	4536504	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.53	0.80	5.32	2.78	1.79	0.80	6.21	2.78	4536504	0.10
Chloroform	ppbv	0.20	0.10	0.989	0.488	1.98	0.10	9.68	0.488	4536504	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536504	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536504	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536504	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536504	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536504	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536504	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536504	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4536504	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW156				CMW157					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	52/2920	RDL	ug/m3	DL (ug/m3)	24/383	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4536504	0.10
Benzene	ppbv	0.26	0.10	0.821	0.319	0.42	0.10	1.35	0.319	4536504	0.10
Toluene	ppbv	3.48	0.10	13.1	0.376	1.93	0.10	7.25	0.376	4536504	0.10
Ethylbenzene	ppbv	0.54	0.10	2.34	0.434	0.82	0.10	3.57	0.434	4536504	0.10
p+m-Xylene	ppbv	2.36	0.20	10.2	0.868	3.74	0.20	16.2	0.868	4536504	0.10
o-Xylene	ppbv	0.97	0.10	4.22	0.434	1.98	0.10	8.59	0.434	4536504	0.10
Styrene	ppbv	0.43	0.10	1.85	0.426	0.20	0.10	0.861	0.426	4536504	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	0.57	0.50	2.81	2.46	4536504	0.50
1,3,5-Trimethylbenzene	ppbv	<0.80	0.80	<3.93	3.93	0.97	0.50	4.75	2.46	4536504	0.10
1,2,4-Trimethylbenzene	ppbv	1.21	0.50	5.93	2.46	2.41	0.50	11.9	2.46	4536504	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4536504	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536504	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536504	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536504	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536504	0.50
Hexane	ppbv	0.76	0.30	2.68	1.06	1.63	0.30	5.74	1.06	4536504	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	0.51	0.30	2.10	1.23	4536504	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	0.25	0.20	0.860	0.688	4536504	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	1.46	0.40	4.31	1.18	4536504	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536504	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4536504	N/A
Total Xylenes	ppbv	3.33	0.30	14.5	1.30	5.71	0.30	24.8	1.30	4536504	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536504	0.10
Propene	ppbv	<0.80	0.80	<1.38	1.38	<1.3	1.3	<2.24	2.24	4536504	0.30
2,2,4-Trimethylpentane	ppbv	0.46	0.20	2.13	0.934	<0.20	0.20	<0.934	0.934	4536504	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	0.85	0.50	2.64	1.56	4536504	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4536504	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	82		N/A	N/A	82		N/A	N/A	4536504	
D5-Chlorobenzene	%	68		N/A	N/A	72		N/A	N/A	4536504	
Difluorobenzene	%	80		N/A	N/A	80		N/A	N/A	4536504	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW158				CMW159					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	924/406	RDL	ug/m3	DL (ug/m3)	38/384	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	1.95	0.20	9.65	0.989	3.28	0.20	16.2	0.989	4536504	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536504	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4536504	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536504	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536504	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536504	0.10
Trichlorofluoromethane (FREON 11)	ppbv	1.65	0.20	9.28	1.12	0.37	0.20	2.10	1.12	4536504	0.10
Ethanol (ethyl alcohol)	ppbv	2.0	1.0	3.75	1.88	6.1	1.0	11.5	1.88	4536504	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536504	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	2.5	1.0	6.10	2.46	4536504	0.60
2-Propanone	ppbv	6.86	0.80	16.3	1.90	12.1	0.80	28.8	1.90	4536504	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	2.9	1.0	8.59	2.95	1.8	1.0	5.29	2.95	4536504	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536504	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536504	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
Methylene Chloride(Dichloromethane)	ppbv	0.91	0.80	3.16	2.78	1.27	0.80	4.42	2.78	4536504	0.10
Chloroform	ppbv	2.09	0.10	10.2	0.488	0.57	0.10	2.76	0.488	4536504	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536504	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536504	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536504	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536504	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536504	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536504	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536504	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4536504	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW158				CMW159					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	924/406	RDL	ug/m3	DL (ug/m3)	38/384	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4536504	0.10
Benzene	ppbv	0.36	0.10	1.16	0.319	0.31	0.10	0.984	0.319	4536504	0.10
Toluene	ppbv	1.95	0.10	7.35	0.376	3.69	0.10	13.9	0.376	4536504	0.10
Ethylbenzene	ppbv	0.89	0.10	3.88	0.434	2.58	0.10	11.2	0.434	4536504	0.10
p+m-Xylene	ppbv	4.26	0.20	18.5	0.868	12.2	0.20	52.8	0.868	4536504	0.10
o-Xylene	ppbv	2.20	0.10	9.57	0.434	5.17	0.10	22.4	0.434	4536504	0.10
Styrene	ppbv	0.18	0.10	0.774	0.426	<0.10	0.10	<0.426	0.426	4536504	0.10
4-ethyltoluene	ppbv	0.67	0.50	3.31	2.46	3.28	0.50	16.1	2.46	4536504	0.50
1,3,5-Trimethylbenzene	ppbv	1.05	0.50	5.19	2.46	2.79	0.50	13.7	2.46	4536504	0.10
1,2,4-Trimethylbenzene	ppbv	2.72	0.50	13.4	2.46	11.3	0.50	55.6	2.46	4536504	0.10
Chlorobenzene	ppbv	0.12	0.10	0.540	0.460	<0.10	0.10	<0.460	0.460	4536504	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536504	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536504	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536504	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536504	0.50
Hexane	ppbv	0.72	0.30	2.54	1.06	0.78	0.30	2.73	1.06	4536504	0.10
Heptane	ppbv	0.55	0.30	2.26	1.23	0.92	0.30	3.78	1.23	4536504	0.10
Cyclohexane	ppbv	0.25	0.20	0.849	0.688	0.32	0.20	1.09	0.688	4536504	0.10
Tetrahydrofuran	ppbv	1.54	0.40	4.53	1.18	<0.40	0.40	<1.18	1.18	4536504	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536504	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4536504	N/A
Total Xylenes	ppbv	6.46	0.30	28.1	1.30	17.3	0.30	75.3	1.30	4536504	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536504	0.10
Propene	ppbv	<1.0	1.0	<1.72	1.72	3.70	0.50	6.38	0.861	4536504	0.30
2,2,4-Trimethylpentane	ppbv	0.22	0.20	1.03	0.934	<0.20	0.20	<0.934	0.934	4536504	0.10
Carbon Disulfide	ppbv	0.72	0.50	2.24	1.56	1.07	0.50	3.33	1.56	4536504	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4536504	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	81		N/A	N/A	81		N/A	N/A	4536504	
D5-Chlorobenzene	%	69		N/A	N/A	69		N/A	N/A	4536504	
Difluorobenzene	%	80		N/A	N/A	80		N/A	N/A	4536504	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW160				CMW161					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	23/1402	RDL	ug/m3	DL (ug/m3)	22/1415	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.79	0.20	3.91	0.989	0.67	0.20	3.33	0.989	4536504	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536504	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4536504	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536504	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536504	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536504	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.61	0.20	3.46	1.12	0.28	0.20	1.59	1.12	4536504	0.10
Ethanol (ethyl alcohol)	ppbv	1.2	1.0	2.20	1.88	2.6	1.0	4.86	1.88	4536504	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536504	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	1.6	1.0	3.84	2.46	4536504	0.60
2-Propanone	ppbv	3.38	0.80	8.03	1.90	6.68	0.80	15.9	1.90	4536504	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4536504	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536504	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536504	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536504	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536504	0.10
Methylene Chloride(Dichloromethane)	ppbv	2.58	0.80	8.97	2.78	2.92	0.80	10.1	2.78	4536504	0.10
Chloroform	ppbv	4.63	0.10	22.6	0.488	0.34	0.10	1.67	0.488	4536504	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536504	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536504	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536504	0.10
1,1,1-Trichloroethane	ppbv	0.11	0.10	0.622	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536504	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536504	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536504	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536504	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536504	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536504	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4536504	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW160				CMW161					
Sampling Date		2016/06/07				2016/06/07					
COC Number		na				na					
	UNITS	23/1402	RDL	ug/m3	DL (ug/m3)	22/1415	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4536504	0.10
Benzene	ppbv	0.14	0.10	0.437	0.319	0.34	0.10	1.08	0.319	4536504	0.10
Toluene	ppbv	0.63	0.10	2.38	0.376	1.56	0.10	5.86	0.376	4536504	0.10
Ethylbenzene	ppbv	0.34	0.10	1.49	0.434	1.01	0.10	4.40	0.434	4536504	0.10
p+m-Xylene	ppbv	1.43	0.20	6.22	0.868	4.55	0.20	19.8	0.868	4536504	0.10
o-Xylene	ppbv	0.75	0.10	3.26	0.434	2.20	0.10	9.55	0.434	4536504	0.10
Styrene	ppbv	0.11	0.10	0.474	0.426	<0.10	0.10	<0.426	0.426	4536504	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	0.85	0.50	4.16	2.46	4536504	0.50
1,3,5-Trimethylbenzene	ppbv	0.55	0.50	2.73	2.46	0.92	0.50	4.51	2.46	4536504	0.10
1,2,4-Trimethylbenzene	ppbv	1.75	0.50	8.59	2.46	2.96	0.50	14.5	2.46	4536504	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4536504	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536504	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536504	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536504	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536504	0.50
Hexane	ppbv	0.85	0.30	3.01	1.06	0.84	0.30	2.96	1.06	4536504	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	0.41	0.30	1.68	1.23	4536504	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	<0.20	0.20	<0.688	0.688	4536504	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4536504	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536504	0.40
Naphthalene	ppbv	0.55	0.50	2.87	2.62	<0.50	0.50	<2.62	2.62	4536504	N/A
Total Xylenes	ppbv	2.18	0.30	9.48	1.30	6.75	0.30	29.3	1.30	4536504	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536504	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536504	0.10
Propene	ppbv	<0.50	0.50	<0.861	0.861	<1.6	1.6	<2.75	2.75	4536504	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4536504	0.10
Carbon Disulfide	ppbv	0.71	0.50	2.20	1.56	0.63	0.50	1.96	1.56	4536504	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4536504	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	81		N/A	N/A	82		N/A	N/A	4536504	
D5-Chlorobenzene	%	72		N/A	N/A	71		N/A	N/A	4536504	
Difluorobenzene	%	80		N/A	N/A	80		N/A	N/A	4536504	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW162					
Sampling Date		2016/06/07					
COC Number		na					
	UNITS	20/1904	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	1.06	0.20	5.25	0.989	4536504	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4536504	0.10
Chloromethane	ppbv	0.43	0.30	0.885	0.620	4536504	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4536504	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4536504	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4536504	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.37	0.20	2.08	1.12	4536504	0.10
Ethanol (ethyl alcohol)	ppbv	1.9	1.0	3.53	1.88	4536504	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4536504	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4536504	0.60
2-Propanone	ppbv	7.59	0.80	18.0	1.90	4536504	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	4536504	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4536504	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4536504	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4536504	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4536504	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536504	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536504	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536504	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.87	0.80	6.49	2.78	4536504	0.10
Chloroform	ppbv	0.13	0.10	0.642	0.488	4536504	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4536504	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4536504	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4536504	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4536504	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4536504	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4536504	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4536504	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4536504	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4536504	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4536504	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4536504	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4536504	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4536504	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4536504	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW162					
Sampling Date		2016/06/07					
COC Number		na					
	UNITS	20/1904	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4536504	0.10
Benzene	ppbv	0.57	0.10	1.81	0.319	4536504	0.10
Toluene	ppbv	1.84	0.10	6.93	0.376	4536504	0.10
Ethylbenzene	ppbv	0.52	0.10	2.26	0.434	4536504	0.10
p+m-Xylene	ppbv	2.20	0.20	9.57	0.868	4536504	0.10
o-Xylene	ppbv	1.09	0.10	4.75	0.434	4536504	0.10
Styrene	ppbv	<0.20	0.20	<0.852	0.852	4536504	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	4536504	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4536504	0.10
1,2,4-Trimethylbenzene	ppbv	1.52	0.50	7.49	2.46	4536504	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4536504	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4536504	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4536504	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4536504	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4536504	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4536504	0.50
Hexane	ppbv	0.87	0.30	3.07	1.06	4536504	0.10
Heptane	ppbv	0.69	0.30	2.81	1.23	4536504	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4536504	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4536504	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4536504	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4536504	N/A
Total Xylenes	ppbv	3.30	0.30	14.3	1.30	4536504	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4536504	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4536504	0.10
Propene	ppbv	<0.50	0.50	<0.861	0.861	4536504	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4536504	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4536504	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4536504	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	82		N/A	N/A	4536504	
D5-Chlorobenzene	%	74		N/A	N/A	4536504	
Difluorobenzene	%	81		N/A	N/A	4536504	

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

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW163			CMW164					
Sampling Date		2016/06/07			2016/06/08					
COC Number		na			na					
	UNITS	36/322	ug/m3	DL (ug/m3)	28/2514	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics										
Dichlorodifluoromethane (FREON 12)	ppbv	0.52	2.59	0.989	0.66	0.20	3.25	0.989	4536843	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536843	0.10
Chloromethane	ppbv	<0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4536843	0.10
Vinyl Chloride	ppbv	<0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536843	0.10
Chloroethane	ppbv	<0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536843	0.10
1,3-Butadiene	ppbv	<0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536843	0.10
Trichlorofluoromethane (FREON 11)	ppbv	7.19	40.4	1.12	1.56	0.20	8.75	1.12	4536843	0.10
Ethanol (ethyl alcohol)	ppbv	29.0	54.7	1.88	1.1	1.0	2.06	1.88	4536843	0.50
Trichlorotrifluoroethane	ppbv	<0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536843	0.10
2-propanol	ppbv	1.4	3.38	2.46	<1.0	1.0	<2.46	2.46	4536843	0.60
2-Propanone	ppbv	20.7	49.2	1.90	3.80	0.80	9.02	1.90	4536843	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	6.6	19.3	2.95	<1.0	1.0	<2.95	2.95	4536843	0.60
Methyl Isobutyl Ketone	ppbv	1.2	4.96	4.10	<1.0	1.0	<4.10	4.10	4536843	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536843	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536843	0.10
Ethyl Acetate	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536843	0.50
1,1-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.25	4.35	2.78	2.17	0.80	7.54	2.78	4536843	0.10
Chloroform	ppbv	2.18	10.6	0.488	0.25	0.10	1.20	0.488	4536843	0.10
Carbon Tetrachloride	ppbv	<0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536843	0.10
1,1-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536843	0.10
1,2-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536843	0.10
Ethylene Dibromide	ppbv	<0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536843	0.10
1,1,1-Trichloroethane	ppbv	<0.10	<0.546	0.546	0.12	0.10	0.668	0.546	4536843	0.10
1,1,2-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
1,2-Dichloropropane	ppbv	<0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536843	0.10
Bromomethane	ppbv	<0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536843	0.10
Bromoform	ppbv	<0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536843	0.10
Bromodichloromethane	ppbv	<0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536843	0.10
Dibromochloromethane	ppbv	<0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536843	0.10
Trichloroethylene	ppbv	0.10	0.561	0.537	<0.10	0.10	<0.537	0.537	4536843	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW163			CMW164					
Sampling Date		2016/06/07			2016/06/08					
COC Number		na			na					
	UNITS	36/322	ug/m3	DL (ug/m3)	28/2514	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	<0.678	0.678	0.31	0.10	2.09	0.678	4536843	0.10
Benzene	ppbv	1.09	3.47	0.319	0.80	0.10	2.55	0.319	4536843	0.10
Toluene	ppbv	11.1	41.8	0.376	2.44	0.10	9.19	0.376	4536843	0.10
Ethylbenzene	ppbv	11.0	47.6	0.434	2.75	0.10	12.0	0.434	4536843	0.10
p+m-Xylene	ppbv	50.8	221	0.868	6.35	0.20	27.6	0.868	4536843	0.10
o-Xylene	ppbv	21.3	92.6	0.434	8.66	0.10	37.6	0.434	4536843	0.10
Styrene	ppbv	0.14	0.607	0.426	<0.10	0.10	<0.426	0.426	4536843	0.10
4-ethyltoluene	ppbv	11.8	58.2	2.46	4.32	0.50	21.2	2.46	4536843	0.50
1,3,5-Trimethylbenzene	ppbv	10.2	49.9	2.46	4.73	0.50	23.3	2.46	4536843	0.10
1,2,4-Trimethylbenzene	ppbv	37.2	183	2.46	5.73	0.50	28.2	2.46	4536843	0.10
Chlorobenzene	ppbv	<0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4536843	0.10
Benzyl chloride	ppbv	<0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536843	0.20
1,3-Dichlorobenzene	ppbv	<0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536843	0.10
1,4-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536843	0.40
Hexachlorobutadiene	ppbv	<0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536843	0.50
Hexane	ppbv	0.77	2.70	1.06	1.20	0.30	4.24	1.06	4536843	0.10
Heptane	ppbv	1.11	4.56	1.23	0.34	0.30	1.38	1.23	4536843	0.10
Cyclohexane	ppbv	<0.20	<0.688	0.688	0.44	0.20	1.53	0.688	4536843	0.10
Tetrahydrofuran	ppbv	<0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4536843	0.10
1,4-Dioxane	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536843	0.40
Naphthalene	ppbv	<0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4536843	N/A
Total Xylenes	ppbv	72.2	313	1.30	15.0	0.30	65.2	1.30	4536843	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	N/A
Vinyl Bromide	ppbv	<0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536843	0.10
Propene	ppbv	0.59	1.02	0.861	4.06	0.50	6.99	0.861	4536843	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	<0.934	0.934	0.26	0.20	1.24	0.934	4536843	0.10
Carbon Disulfide	ppbv	2.85	8.86	1.56	13.5	0.50	41.9	1.56	4536843	0.10
Vinyl Acetate	ppbv	<0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4536843	0.10
Surrogate Recovery (%)										
Bromochloromethane	%	77	N/A	N/A	100		N/A	N/A	4536843	
D5-Chlorobenzene	%	77	N/A	N/A	95		N/A	N/A	4536843	
Difluorobenzene	%	78	N/A	N/A	99		N/A	N/A	4536843	

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

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW165				CMW166					
Sampling Date		2016/06/08				2016/06/08					
COC Number		na				na					
	UNITS	29/1366	RDL	ug/m3	DL (ug/m3)	10/239	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.59	0.20	2.91	0.989	0.54	0.20	2.69	0.989	4536843	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536843	0.10
Chloromethane	ppbv	0.65	0.30	1.34	0.620	0.50	0.30	1.03	0.620	4536843	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536843	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536843	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536843	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.24	0.20	1.34	1.12	0.23	0.20	1.30	1.12	4536843	0.10
Ethanol (ethyl alcohol)	ppbv	3.4	1.0	6.39	1.88	4.6	1.0	8.70	1.88	4536843	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536843	0.10
2-propanol	ppbv	2.0	1.0	4.87	2.46	<1.0	1.0	<2.46	2.46	4536843	0.60
2-Propanone	ppbv	10.6	0.80	25.1	1.90	7.23	0.80	17.2	1.90	4536843	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4536843	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536843	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536843	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536843	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536843	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
Methylene Chloride(Dichloromethane)	ppbv	2.95	0.80	10.2	2.78	2.96	0.80	10.3	2.78	4536843	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	<0.10	0.10	<0.488	0.488	4536843	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536843	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536843	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536843	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536843	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536843	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536843	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536843	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536843	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536843	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4536843	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW165				CMW166					
Sampling Date		2016/06/08				2016/06/08					
COC Number		na				na					
	UNITS	29/1366	RDL	ug/m3	DL (ug/m3)	10/239	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4536843	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	<0.10	0.10	<0.319	0.319	4536843	0.10
Toluene	ppbv	0.35	0.10	1.30	0.376	0.43	0.10	1.62	0.376	4536843	0.10
Ethylbenzene	ppbv	<0.10	0.10	<0.434	0.434	<0.10	0.10	<0.434	0.434	4536843	0.10
p+m-Xylene	ppbv	0.26	0.20	1.13	0.868	0.22	0.20	0.949	0.868	4536843	0.10
o-Xylene	ppbv	0.19	0.10	0.845	0.434	0.11	0.10	0.479	0.434	4536843	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	<0.10	0.10	<0.426	0.426	4536843	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4536843	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4536843	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4536843	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4536843	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536843	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536843	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536843	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536843	0.50
Hexane	ppbv	0.81	0.30	2.87	1.06	0.72	0.30	2.52	1.06	4536843	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	<0.30	0.30	<1.23	1.23	4536843	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	<0.20	0.20	<0.688	0.688	4536843	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4536843	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	1.7	1.0	6.04	3.60	4536843	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4536843	N/A
Total Xylenes	ppbv	0.45	0.30	1.97	1.30	0.33	0.30	1.43	1.30	4536843	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536843	0.10
Propene	ppbv	2.35	0.50	4.05	0.861	<0.90	0.90	<1.55	1.55	4536843	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4536843	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	<0.50	0.50	<1.56	1.56	4536843	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4536843	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	87		N/A	N/A	77		N/A	N/A	4536843	
D5-Chlorobenzene	%	82		N/A	N/A	75		N/A	N/A	4536843	
Difluorobenzene	%	87		N/A	N/A	78		N/A	N/A	4536843	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW167				CMW168					
Sampling Date		2016/06/08				2016/06/08					
COC Number		na				na					
	UNITS	32/398	RDL	ug/m3	DL (ug/m3)	27/1041	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.60	0.20	2.96	0.989	0.67	0.20	3.32	0.989	4536843	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4536843	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4536843	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4536843	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4536843	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4536843	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.27	0.20	1.51	1.12	1.76	0.20	9.87	1.12	4536843	0.10
Ethanol (ethyl alcohol)	ppbv	2.6	1.0	4.99	1.88	1.4	1.0	2.69	1.88	4536843	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4536843	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4536843	0.60
2-Propanone	ppbv	3.51	0.80	8.33	1.90	6.28	0.80	14.9	1.90	4536843	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<2.3	2.3	<6.78	6.78	<1.0	1.0	<2.95	2.95	4536843	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536843	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4536843	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4536843	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4536843	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4536843	0.10
Methylene Chloride(Dichloromethane)	ppbv	2.79	0.80	9.69	2.78	2.82	0.80	9.78	2.78	4536843	0.10
Chloroform	ppbv	0.87	0.10	4.27	0.488	0.19	0.10	0.937	0.488	4536843	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4536843	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4536843	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	5.76	0.10	23.3	0.405	4536843	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4536843	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	0.21	0.10	1.17	0.546	4536843	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4536843	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4536843	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4536843	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4536843	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4536843	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4536843	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4536843	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW167				CMW168					
Sampling Date		2016/06/08				2016/06/08					
COC Number		na				na					
	UNITS	32/398	RDL	ug/m3	DL (ug/m3)	27/1041	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	0.33	0.10	2.25	0.678	4536843	0.10
Benzene	ppbv	1.62	0.10	5.19	0.319	0.25	0.10	0.790	0.319	4536843	0.10
Toluene	ppbv	29.5	0.10	111	0.376	2.34	0.10	8.79	0.376	4536843	0.10
Ethylbenzene	ppbv	22.1	0.10	95.8	0.434	0.78	0.10	3.38	0.434	4536843	0.10
p+m-Xylene	ppbv	67.1	0.20	292	0.868	2.46	0.20	10.7	0.868	4536843	0.10
o-Xylene	ppbv	35.9	0.10	156	0.434	1.21	0.10	5.26	0.434	4536843	0.10
Styrene	ppbv	0.22	0.10	0.954	0.426	0.46	0.10	1.96	0.426	4536843	0.10
4-ethyltoluene	ppbv	19.7	0.50	96.7	2.46	<0.50	0.50	<2.46	2.46	4536843	0.50
1,3,5-Trimethylbenzene	ppbv	18.7	0.50	91.8	2.46	<0.50	0.50	<2.46	2.46	4536843	0.10
1,2,4-Trimethylbenzene	ppbv	47.1	0.50	231	2.46	1.08	0.50	5.29	2.46	4536843	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4536843	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4536843	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4536843	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4536843	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4536843	0.50
Hexane	ppbv	2.94	0.30	10.4	1.06	0.87	0.30	3.05	1.06	4536843	0.10
Heptane	ppbv	1.57	0.30	6.44	1.23	<0.30	0.30	<1.23	1.23	4536843	0.10
Cyclohexane	ppbv	0.59	0.20	2.02	0.688	<0.20	0.20	<0.688	0.688	4536843	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4536843	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	16.6	1.0	59.8	3.60	4536843	0.40
Naphthalene	ppbv	0.60	0.50	3.14	2.62	<0.50	0.50	<2.62	2.62	4536843	N/A
Total Xylenes	ppbv	103	0.30	447	1.30	3.68	0.30	16.0	1.30	4536843	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4536843	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4536843	0.10
Propene	ppbv	2.08	0.50	3.58	0.861	<0.90	0.90	<1.55	1.55	4536843	0.30
2,2,4-Trimethylpentane	ppbv	1.58	0.20	7.39	0.934	<0.20	0.20	<0.934	0.934	4536843	0.10
Carbon Disulfide	ppbv	18.8	0.50	58.5	1.56	2.85	0.50	8.87	1.56	4536843	0.10
Vinyl Acetate	ppbv	<0.40	0.40	<1.41	1.41	<0.20	0.20	<0.704	0.704	4536843	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	80		N/A	N/A	72		N/A	N/A	4536843	
D5-Chlorobenzene	%	78		N/A	N/A	72		N/A	N/A	4536843	
Difluorobenzene	%	80		N/A	N/A	73		N/A	N/A	4536843	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW169					
Sampling Date		2016/06/08					
COC Number		na					
	UNITS	19/2480	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	0.59	0.20	2.94	0.989	4536843	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4536843	0.10
Chloromethane	ppbv	0.55	0.30	1.13	0.620	4536843	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4536843	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4536843	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4536843	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.26	0.20	1.45	1.12	4536843	0.10
Ethanol (ethyl alcohol)	ppbv	9.3	1.0	17.5	1.88	4536843	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4536843	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4536843	0.60
2-Propanone	ppbv	8.29	0.80	19.7	1.90	4536843	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.8	1.8	<5.31	5.31	4536843	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4536843	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4536843	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4536843	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4536843	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536843	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536843	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4536843	0.10
Methylene Chloride(Dichloromethane)	ppbv	7.31	0.80	25.4	2.78	4536843	0.10
Chloroform	ppbv	0.11	0.10	0.536	0.488	4536843	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4536843	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4536843	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4536843	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4536843	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4536843	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4536843	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4536843	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4536843	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4536843	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4536843	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4536843	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4536843	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4536843	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4536843	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CMW169					
Sampling Date		2016/06/08					
COC Number		na					
	UNITS	19/2480	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4536843	0.10
Benzene	ppbv	0.12	0.10	0.377	0.319	4536843	0.10
Toluene	ppbv	0.47	0.10	1.76	0.376	4536843	0.10
Ethylbenzene	ppbv	0.14	0.10	0.603	0.434	4536843	0.10
p+m-Xylene	ppbv	0.50	0.20	2.16	0.868	4536843	0.10
o-Xylene	ppbv	0.23	0.10	0.979	0.434	4536843	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	4536843	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	4536843	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4536843	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4536843	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4536843	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4536843	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4536843	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4536843	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4536843	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4536843	0.50
Hexane	ppbv	1.67	0.30	5.90	1.06	4536843	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	4536843	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4536843	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4536843	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4536843	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4536843	N/A
Total Xylenes	ppbv	0.72	0.30	3.14	1.30	4536843	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4536843	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4536843	0.10
Propene	ppbv	1.29	0.50	2.22	0.861	4536843	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4536843	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4536843	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4536843	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	76		N/A	N/A	4536843	
D5-Chlorobenzene	%	74		N/A	N/A	4536843	
Difluorobenzene	%	76		N/A	N/A	4536843	

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

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMW156
Sample ID: 52/2920
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW157
Sample ID: 24/383
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW158
Sample ID: 924/406
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW159
Sample ID: 38/384
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW160
Sample ID: 23/1402
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMW160
Sample ID: 23/1402
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW161
Sample ID: 22/1415
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW162
Sample ID: 20/1904
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537125	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537129	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4536997	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/13	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536504	N/A	2016/06/13	Kethumali (Ubayarathna) Mendis

Maxxam ID: CMW163
Sample ID: 36/322
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW163 Dup
Sample ID: 36/322
Matrix: AIR

Collected: 2016/06/07
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/17	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMW164
Sample ID: 28/2514
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW165
Sample ID: 29/1366
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW166
Sample ID: 10/239
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW167
Sample ID: 32/398
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW168
Sample ID: 27/1041
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CMW168
Sample ID: 27/1041
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam ID: CMW169
Sample ID: 19/2480
Matrix: AIR

Collected: 2016/06/08
Shipped:
Received: 2016/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4537991	N/A	2016/06/13	Mark Reid
BTEX Fractionation in Air (TO-15mod)	GC/MS	4537990	N/A	2016/06/14	Mark Reid
Canister Pressure (TO-15)	PRES	4537989	N/A	2016/06/13	Mark Reid
Volatile Organics in Air (ug/m3)	GC/MS	4534819	N/A	2016/06/15	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4536843	N/A	2016/06/13	Mark Reid

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

Sample CMW156-01 : Increased DL for propene due to interference from propane.
Increased DL for 1,3,5-trimethylbenzene due to matrix interference.
Ethanol was above calibration range and was reanalyzed at a 4X dilution. The DL was adjusted accordingly.

Sample CMW157-01 : Increased DL for propene due to interference from propane.

Sample CMW158-01 : Increased DL for propene due to interference from propane.

Sample CMW161-01 : Increased DL for propene due to interference from propane.

Sample CMW162-01 : Increased DL for styrene due to matrix interference

Sample CMW164-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CMW165-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CMW166-01 : Increased DL for propene due to interference from propane.

Sample CMW167-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
Increased DL for vinyl acetate due to matrix interference
Increased DL for 2-butanone due to interference from hexane.

Sample CMW168-01 : Increased DL for propene due to interference from propane.

Sample CMW169-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
Increased DL for 2-butanone due to interference from hexane.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4534819	ASC	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/17	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/17	NC		%	25
			Chloromethane	2016/06/17	NC		%	25
			Vinyl Chloride	2016/06/17	NC		%	25
			Chloroethane	2016/06/17	NC		%	25
			1,3-Butadiene	2016/06/17	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/17	0.00042		%	25
			Ethanol (ethyl alcohol)	2016/06/17	8.3		%	25
			Trichlorotrifluoroethane	2016/06/17	NC		%	25
			2-propanol	2016/06/17	NC		%	25
			2-Propanone	2016/06/17	19		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/17	24		%	25
			Methyl Isobutyl Ketone	2016/06/17	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/17	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/17	NC		%	25
			Ethyl Acetate	2016/06/17	NC		%	25
			1,1-Dichloroethylene	2016/06/17	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/17	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/17	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/17	NC		%	25
			Chloroform	2016/06/17	0.31		%	25
			Carbon Tetrachloride	2016/06/17	NC		%	25
			1,1-Dichloroethane	2016/06/17	NC		%	25
			1,2-Dichloroethane	2016/06/17	NC		%	25
			Ethylene Dibromide	2016/06/17	NC		%	25
			1,1,1-Trichloroethane	2016/06/17	NC		%	25
			1,1,2-Trichloroethane	2016/06/17	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/17	NC		%	25
			cis-1,3-Dichloropropene	2016/06/17	NC		%	25
			trans-1,3-Dichloropropene	2016/06/17	NC		%	25
			1,2-Dichloropropane	2016/06/17	NC		%	25
			Bromomethane	2016/06/17	NC		%	25
			Bromoform	2016/06/17	NC		%	25
			Bromodichloromethane	2016/06/17	NC		%	25
			Dibromochloromethane	2016/06/17	NC		%	25
			Trichloroethylene	2016/06/17	NC		%	25
			Tetrachloroethylene	2016/06/17	NC		%	25
			Benzene	2016/06/17	3.0		%	25
			Toluene	2016/06/17	3.7		%	25
			Ethylbenzene	2016/06/17	0.68		%	25
			p+m-Xylene	2016/06/17	0.73		%	25
			o-Xylene	2016/06/17	1.6		%	25
			Styrene	2016/06/17	NC		%	25
			4-ethyltoluene	2016/06/17	0.32		%	25
			1,3,5-Trimethylbenzene	2016/06/17	0.48		%	25
			1,2,4-Trimethylbenzene	2016/06/17	0.66		%	25
			Chlorobenzene	2016/06/17	NC		%	25
			Benzyl chloride	2016/06/17	NC		%	25
			1,3-Dichlorobenzene	2016/06/17	NC		%	25
			1,4-Dichlorobenzene	2016/06/17	NC		%	25
			1,2-Dichlorobenzene	2016/06/17	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/17	NC		%	25
			Hexachlorobutadiene	2016/06/17	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Hexane	2016/06/17	NC		%	25
			Heptane	2016/06/17	NC		%	25
			Cyclohexane	2016/06/17	NC		%	25
			Tetrahydrofuran	2016/06/17	NC		%	25
			1,4-Dioxane	2016/06/17	NC		%	25
			Naphthalene	2016/06/17	NC		%	25
			Total Xylenes	2016/06/17	0.99		%	25
			1,1,1,2-Tetrachloroethane	2016/06/17	NC		%	25
			Vinyl Bromide	2016/06/17	NC		%	25
			Propene	2016/06/17	NC		%	25
			2,2,4-Trimethylpentane	2016/06/17	NC		%	25
			Carbon Disulfide	2016/06/17	0.96		%	25
			Vinyl Acetate	2016/06/17	NC		%	25
			Vinyl Chloride	2016/06/17	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/17	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/17	NC		%	25
			Dichlorodifluoromethane (FREON 12)	2016/06/20	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/20	NC		%	25
			Chloromethane	2016/06/20	NC		%	25
			Vinyl Chloride	2016/06/20	NC		%	25
			Chloroethane	2016/06/20	NC		%	25
			1,3-Butadiene	2016/06/20	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/20	NC		%	25
			Ethanol (ethyl alcohol)	2016/06/20	1.7		%	25
			Trichlorotrifluoroethane	2016/06/20	NC		%	25
			2-propanol	2016/06/20	NC		%	25
			2-Propanone	2016/06/20	4.0		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20	NC		%	25
			Methyl Isobutyl Ketone	2016/06/20	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/20	NC		%	25
			Ethyl Acetate	2016/06/20	NC		%	25
			1,1-Dichloroethylene	2016/06/20	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/20	2.1		%	25
			trans-1,2-Dichloroethylene	2016/06/20	4.4		%	25
			Methylene Chloride(Dichloromethane)	2016/06/20	1.5		%	25
			Chloroform	2016/06/20	NC		%	25
			Carbon Tetrachloride	2016/06/20	NC		%	25
			1,1-Dichloroethane	2016/06/20	NC		%	25
			1,2-Dichloroethane	2016/06/20	NC		%	25
			Ethylene Dibromide	2016/06/20	NC		%	25
			1,1,1-Trichloroethane	2016/06/20	NC		%	25
			1,1,2-Trichloroethane	2016/06/20	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/20	NC		%	25
			cis-1,3-Dichloropropene	2016/06/20	NC		%	25
			trans-1,3-Dichloropropene	2016/06/20	NC		%	25
			1,2-Dichloropropane	2016/06/20	NC		%	25
			Bromomethane	2016/06/20	NC		%	25
			Bromoform	2016/06/20	NC		%	25
			Bromodichloromethane	2016/06/20	NC		%	25
			Dibromochloromethane	2016/06/20	NC		%	25
			Trichloroethylene	2016/06/20	NC		%	25
			Tetrachloroethylene	2016/06/20	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Benzene	2016/06/20	1.1		%	25
			Toluene	2016/06/20	0.82		%	25
			Ethylbenzene	2016/06/20	3.5		%	25
			p+m-Xylene	2016/06/20	0.50		%	25
			o-Xylene	2016/06/20	4.4		%	25
			Styrene	2016/06/20	NC		%	25
			4-ethyltoluene	2016/06/20	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/20	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/20	NC		%	25
			Chlorobenzene	2016/06/20	NC		%	25
			Benzyl chloride	2016/06/20	NC		%	25
			1,3-Dichlorobenzene	2016/06/20	NC		%	25
			1,4-Dichlorobenzene	2016/06/20	NC		%	25
			1,2-Dichlorobenzene	2016/06/20	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/20	NC		%	25
			Hexachlorobutadiene	2016/06/20	NC		%	25
			Hexane	2016/06/20	4.1		%	25
			Heptane	2016/06/20	3.9		%	25
			Cyclohexane	2016/06/20	7.2		%	25
			Tetrahydrofuran	2016/06/20	NC		%	25
			1,4-Dioxane	2016/06/20	NC		%	25
			Naphthalene	2016/06/20	NC		%	25
			Total Xylenes	2016/06/20	1.5		%	25
			1,1,1,2-Tetrachloroethane	2016/06/20	NC		%	25
			Vinyl Bromide	2016/06/20	NC		%	25
			Propene	2016/06/20	7.2		%	25
			2,2,4-Trimethylpentane	2016/06/20	0		%	25
			Carbon Disulfide	2016/06/20	4.7		%	25
			Vinyl Acetate	2016/06/20	NC		%	25
4536504	KM2	Spiked Blank	Bromochloromethane	2016/06/13		86	%	60 - 140
			D5-Chlorobenzene	2016/06/13		78	%	60 - 140
			Difluorobenzene	2016/06/13		84	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/13		101	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/13		82	%	70 - 130
			Chloromethane	2016/06/13		92	%	70 - 130
			Vinyl Chloride	2016/06/13		90	%	70 - 130
			Chloroethane	2016/06/13		85	%	70 - 130
			1,3-Butadiene	2016/06/13		93	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/13		94	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/13		83	%	70 - 130
			Trichlorotrifluoroethane	2016/06/13		102	%	70 - 130
			2-propanol	2016/06/13		97	%	70 - 130
			2-Propanone	2016/06/13		99	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13		97	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/13		106	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13		105	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/13		110	%	70 - 130
			Ethyl Acetate	2016/06/13		100	%	70 - 130
			1,1-Dichloroethylene	2016/06/13		104	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/13		100	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/13		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/13		88	%	70 - 130
			Chloroform	2016/06/13		101	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2016/06/13		98	%	70 - 130
			1,1-Dichloroethane	2016/06/13		98	%	70 - 130
			1,2-Dichloroethane	2016/06/13		107	%	70 - 130
			Ethylene Dibromide	2016/06/13		96	%	70 - 130
			1,1,1-Trichloroethane	2016/06/13		107	%	70 - 130
			1,1,2-Trichloroethane	2016/06/13		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/13		96	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/13		106	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/13		98	%	70 - 130
			1,2-Dichloropropane	2016/06/13		100	%	70 - 130
			Bromomethane	2016/06/13		96	%	70 - 130
			Bromoform	2016/06/13		109	%	70 - 130
			Bromodichloromethane	2016/06/13		114	%	70 - 130
			Dibromochloromethane	2016/06/13		118	%	70 - 130
			Trichloroethylene	2016/06/13		110	%	70 - 130
			Tetrachloroethylene	2016/06/13		114	%	70 - 130
			Benzene	2016/06/13		102	%	70 - 130
			Toluene	2016/06/13		109	%	70 - 130
			Ethylbenzene	2016/06/13		107	%	70 - 130
			p+m-Xylene	2016/06/13		103	%	70 - 130
			o-Xylene	2016/06/13		106	%	70 - 130
			Styrene	2016/06/13		92	%	70 - 130
			4-ethyltoluene	2016/06/13		100	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/13		101	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/13		95	%	70 - 130
			Chlorobenzene	2016/06/13		104	%	70 - 130
			Benzyl chloride	2016/06/13		70	%	70 - 130
			1,3-Dichlorobenzene	2016/06/13		86	%	70 - 130
			1,4-Dichlorobenzene	2016/06/13		77	%	70 - 130
			1,2-Dichlorobenzene	2016/06/13		83	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/13		90	%	70 - 130
			Hexachlorobutadiene	2016/06/13		102	%	70 - 130
			Hexane	2016/06/13		97	%	70 - 130
			Heptane	2016/06/13		105	%	70 - 130
			Cyclohexane	2016/06/13		104	%	70 - 130
			Tetrahydrofuran	2016/06/13		99	%	70 - 130
			1,4-Dioxane	2016/06/13		104	%	70 - 130
			Naphthalene	2016/06/13		82	%	70 - 130
			Total Xylenes	2016/06/13		104	%	70 - 130
			Vinyl Bromide	2016/06/13		95	%	70 - 130
			Propene	2016/06/13		102	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/13		109	%	70 - 130
			Carbon Disulfide	2016/06/13		113	%	70 - 130
			Vinyl Acetate	2016/06/13		86	%	70 - 130
4536504	KM2	Method Blank	Bromochloromethane	2016/06/13		88	%	60 - 140
			D5-Chlorobenzene	2016/06/13		85	%	60 - 140
			Difluorobenzene	2016/06/13		89	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/13	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/13	<0.17		ppbv	
			Chloromethane	2016/06/13	<0.30		ppbv	
			Vinyl Chloride	2016/06/13	<0.10		ppbv	
			Chloroethane	2016/06/13	<0.30		ppbv	
			1,3-Butadiene	2016/06/13	<0.50		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2016/06/13	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/13	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/13	<0.15		ppbv	
			2-propanol	2016/06/13	<1.0		ppbv	
			2-Propanone	2016/06/13	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/13	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/13	<0.20		ppbv	
			Ethyl Acetate	2016/06/13	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/13	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/13	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/13	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/13	<0.80		ppbv	
			Chloroform	2016/06/13	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/13	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/13	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/13	<0.10		ppbv	
			Ethylene Dibromide	2016/06/13	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/13	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/13	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/13	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/13	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/13	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/13	<0.10		ppbv	
			Bromomethane	2016/06/13	<0.10		ppbv	
			Bromoform	2016/06/13	<0.20		ppbv	
			Bromodichloromethane	2016/06/13	<0.20		ppbv	
			Dibromochloromethane	2016/06/13	<0.20		ppbv	
			Trichloroethylene	2016/06/13	<0.10		ppbv	
			Tetrachloroethylene	2016/06/13	<0.10		ppbv	
			Benzene	2016/06/13	<0.10		ppbv	
			Toluene	2016/06/13	<0.10		ppbv	
			Ethylbenzene	2016/06/13	<0.10		ppbv	
			p+m-Xylene	2016/06/13	<0.20		ppbv	
			o-Xylene	2016/06/13	<0.10		ppbv	
			Styrene	2016/06/13	<0.10		ppbv	
			4-ethyltoluene	2016/06/13	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/13	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/13	<0.50		ppbv	
			Chlorobenzene	2016/06/13	<0.10		ppbv	
			Benzyl chloride	2016/06/13	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/13	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/13	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/13	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/13	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/13	<0.50		ppbv	
			Hexane	2016/06/13	<0.30		ppbv	
			Heptane	2016/06/13	<0.30		ppbv	
			Cyclohexane	2016/06/13	<0.20		ppbv	
			Tetrahydrofuran	2016/06/13	<0.40		ppbv	
			1,4-Dioxane	2016/06/13	<1.0		ppbv	
			Naphthalene	2016/06/13	<0.50		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2016/06/13	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/13	<0.10		ppbv	
			Vinyl Bromide	2016/06/13	<0.20		ppbv	
			Propene	2016/06/13	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/13	<0.20		ppbv	
			Carbon Disulfide	2016/06/13	<0.50		ppbv	
			Vinyl Acetate	2016/06/13	<0.20		ppbv	
4536504	KM2	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/13	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/13	NC		%	25
			Chloromethane	2016/06/13	NC		%	25
			Vinyl Chloride	2016/06/13	NC		%	25
			Chloroethane	2016/06/13	NC		%	25
			1,3-Butadiene	2016/06/13	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/13	NC		%	25
			Ethanol (ethyl alcohol)	2016/06/13	1.6		%	25
			Trichlorotrifluoroethane	2016/06/13	NC		%	25
			2-propanol	2016/06/13	NC		%	25
			2-Propanone	2016/06/13	1.4		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13	NC		%	25
			Methyl Isobutyl Ketone	2016/06/13	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/13	NC		%	25
			Ethyl Acetate	2016/06/13	NC		%	25
			1,1-Dichloroethylene	2016/06/13	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/13	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/13	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/13	NC		%	25
			Chloroform	2016/06/13	NC		%	25
			Carbon Tetrachloride	2016/06/13	NC		%	25
			1,1-Dichloroethane	2016/06/13	NC		%	25
			1,2-Dichloroethane	2016/06/13	NC		%	25
			Ethylene Dibromide	2016/06/13	NC		%	25
			1,1,1-Trichloroethane	2016/06/13	NC		%	25
			1,1,2-Trichloroethane	2016/06/13	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/13	NC		%	25
			cis-1,3-Dichloropropene	2016/06/13	NC		%	25
			trans-1,3-Dichloropropene	2016/06/13	NC		%	25
			1,2-Dichloropropane	2016/06/13	NC		%	25
			Bromomethane	2016/06/13	NC		%	25
			Bromoform	2016/06/13	NC		%	25
			Bromodichloromethane	2016/06/13	NC		%	25
			Dibromochloromethane	2016/06/13	NC		%	25
			Trichloroethylene	2016/06/13	NC		%	25
			Tetrachloroethylene	2016/06/13	NC		%	25
			Benzene	2016/06/13	NC		%	25
			Toluene	2016/06/13	2.0		%	25
			Ethylbenzene	2016/06/13	NC		%	25
			p+m-Xylene	2016/06/13	NC		%	25
			o-Xylene	2016/06/13	NC		%	25
			Styrene	2016/06/13	NC		%	25
			4-ethyltoluene	2016/06/13	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/13	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/13	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Chlorobenzene	2016/06/13	NC		%	25
			Benzyl chloride	2016/06/13	NC		%	25
			1,3-Dichlorobenzene	2016/06/13	NC		%	25
			1,4-Dichlorobenzene	2016/06/13	5.4		%	25
			1,2-Dichlorobenzene	2016/06/13	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/13	NC		%	25
			Hexachlorobutadiene	2016/06/13	NC		%	25
			Hexane	2016/06/13	NC		%	25
			Heptane	2016/06/13	NC		%	25
			Cyclohexane	2016/06/13	NC		%	25
			Tetrahydrofuran	2016/06/13	NC		%	25
			1,4-Dioxane	2016/06/13	NC		%	25
			Naphthalene	2016/06/13	NC		%	25
			Total Xylenes	2016/06/13	NC		%	25
			1,1,1,2-Tetrachloroethane	2016/06/13	NC		%	25
			Vinyl Bromide	2016/06/13	NC		%	25
			Propene	2016/06/13	NC		%	25
			2,2,4-Trimethylpentane	2016/06/13	NC		%	25
			Carbon Disulfide	2016/06/13	NC		%	25
			Vinyl Acetate	2016/06/13	NC		%	25
4536843	MR2	Spiked Blank	Bromochloromethane	2016/06/13		89	%	60 - 140
			D5-Chlorobenzene	2016/06/13		93	%	60 - 140
			Difluorobenzene	2016/06/13		91	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/13		91	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/13		79	%	70 - 130
			Chloromethane	2016/06/13		98	%	70 - 130
			Vinyl Chloride	2016/06/13		95	%	70 - 130
			Chloroethane	2016/06/13		92	%	70 - 130
			1,3-Butadiene	2016/06/13		100	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/13		84	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/13		98	%	70 - 130
			Trichlorotrifluoroethane	2016/06/13		93	%	70 - 130
			2-propanol	2016/06/13		114	%	70 - 130
			2-Propanone	2016/06/13		102	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13		113	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/13		108	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13		112	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/13		106	%	70 - 130
			Ethyl Acetate	2016/06/13		109	%	70 - 130
			1,1-Dichloroethylene	2016/06/13		103	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/13		100	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/13		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/13		95	%	70 - 130
			Chloroform	2016/06/13		92	%	70 - 130
			Carbon Tetrachloride	2016/06/13		93	%	70 - 130
			1,1-Dichloroethane	2016/06/13		96	%	70 - 130
			1,2-Dichloroethane	2016/06/13		101	%	70 - 130
			Ethylene Dibromide	2016/06/13		90	%	70 - 130
			1,1,1-Trichloroethane	2016/06/13		87	%	70 - 130
			1,1,2-Trichloroethane	2016/06/13		91	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/13		90	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/13		99	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/13		101	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2016/06/13		93	%	70 - 130
			Bromomethane	2016/06/13		91	%	70 - 130
			Bromoform	2016/06/13		95	%	70 - 130
			Bromodichloromethane	2016/06/13		97	%	70 - 130
			Dibromochloromethane	2016/06/13		101	%	70 - 130
			Trichloroethylene	2016/06/13		94	%	70 - 130
			Tetrachloroethylene	2016/06/13		93	%	70 - 130
			Benzene	2016/06/13		95	%	70 - 130
			Toluene	2016/06/13		99	%	70 - 130
			Ethylbenzene	2016/06/13		97	%	70 - 130
			p+m-Xylene	2016/06/13		93	%	70 - 130
			o-Xylene	2016/06/13		96	%	70 - 130
			Styrene	2016/06/13		101	%	70 - 130
			4-ethyltoluene	2016/06/13		99	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/13		94	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/13		96	%	70 - 130
			Chlorobenzene	2016/06/13		92	%	70 - 130
			Benzyl chloride	2016/06/13		97	%	70 - 130
			1,3-Dichlorobenzene	2016/06/13		95	%	70 - 130
			1,4-Dichlorobenzene	2016/06/13		93	%	70 - 130
			1,2-Dichlorobenzene	2016/06/13		92	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/13		90	%	70 - 130
			Hexachlorobutadiene	2016/06/13		92	%	70 - 130
			Hexane	2016/06/13		99	%	70 - 130
			Heptane	2016/06/13		103	%	70 - 130
			Cyclohexane	2016/06/13		101	%	70 - 130
			Tetrahydrofuran	2016/06/13		109	%	70 - 130
			1,4-Dioxane	2016/06/13		96	%	70 - 130
			Naphthalene	2016/06/13		95	%	70 - 130
			Total Xylenes	2016/06/13		94	%	70 - 130
			Vinyl Bromide	2016/06/13		88	%	70 - 130
			Propene	2016/06/13		112	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/13		104	%	70 - 130
			Carbon Disulfide	2016/06/13		111	%	70 - 130
			Vinyl Acetate	2016/06/13		106	%	70 - 130
4536843	MR2	Method Blank	Bromochloromethane	2016/06/13		87	%	60 - 140
			D5-Chlorobenzene	2016/06/13		85	%	60 - 140
			Difluorobenzene	2016/06/13		88	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/13	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/13	<0.17		ppbv	
			Chloromethane	2016/06/13	<0.30		ppbv	
			Vinyl Chloride	2016/06/13	<0.10		ppbv	
			Chloroethane	2016/06/13	<0.30		ppbv	
			1,3-Butadiene	2016/06/13	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/13	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/13	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/13	<0.15		ppbv	
			2-propanol	2016/06/13	<1.0		ppbv	
			2-Propanone	2016/06/13	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/13	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/13	<0.20		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Ethyl Acetate	2016/06/13	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/13	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/13	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/13	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/13	<0.80		ppbv	
			Chloroform	2016/06/13	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/13	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/13	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/13	<0.10		ppbv	
			Ethylene Dibromide	2016/06/13	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/13	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/13	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/13	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/13	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/13	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/13	<0.10		ppbv	
			Bromomethane	2016/06/13	<0.10		ppbv	
			Bromoform	2016/06/13	<0.20		ppbv	
			Bromodichloromethane	2016/06/13	<0.20		ppbv	
			Dibromochloromethane	2016/06/13	<0.20		ppbv	
			Trichloroethylene	2016/06/13	<0.10		ppbv	
			Tetrachloroethylene	2016/06/13	<0.10		ppbv	
			Benzene	2016/06/13	<0.10		ppbv	
			Toluene	2016/06/13	<0.10		ppbv	
			Ethylbenzene	2016/06/13	<0.10		ppbv	
			p+m-Xylene	2016/06/13	<0.20		ppbv	
			o-Xylene	2016/06/13	<0.10		ppbv	
			Styrene	2016/06/13	<0.10		ppbv	
			4-ethyltoluene	2016/06/13	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/13	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/13	<0.50		ppbv	
			Chlorobenzene	2016/06/13	<0.10		ppbv	
			Benzyl chloride	2016/06/13	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/13	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/13	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/13	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/13	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/13	<0.50		ppbv	
			Hexane	2016/06/13	<0.30		ppbv	
			Heptane	2016/06/13	<0.30		ppbv	
			Cyclohexane	2016/06/13	<0.20		ppbv	
			Tetrahydrofuran	2016/06/13	<0.40		ppbv	
			1,4-Dioxane	2016/06/13	<1.0		ppbv	
			Naphthalene	2016/06/13	<0.50		ppbv	
			Total Xylenes	2016/06/13	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/13	<0.10		ppbv	
			Vinyl Bromide	2016/06/13	<0.20		ppbv	
			Propene	2016/06/13	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/13	<0.20		ppbv	
			Carbon Disulfide	2016/06/13	<0.50		ppbv	
			Vinyl Acetate	2016/06/13	<0.20		ppbv	
4536843	MR2	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/13	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/13	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Chloromethane	2016/06/13	NC		%	25
			Vinyl Chloride	2016/06/13	NC		%	25
			Chloroethane	2016/06/13	NC		%	25
			1,3-Butadiene	2016/06/13	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/13	0.00042		%	25
			Ethanol (ethyl alcohol)	2016/06/13	8.3		%	25
			Trichlorotrifluoroethane	2016/06/13	NC		%	25
			2-propanol	2016/06/13	NC		%	25
			2-Propanone	2016/06/13	19		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/13	24		%	25
			Methyl Isobutyl Ketone	2016/06/13	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/13	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/13	NC		%	25
			Ethyl Acetate	2016/06/13	NC		%	25
			1,1-Dichloroethylene	2016/06/13	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/13	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/13	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/13	NC		%	25
			Chloroform	2016/06/13	0.31		%	25
			Carbon Tetrachloride	2016/06/13	NC		%	25
			1,1-Dichloroethane	2016/06/13	NC		%	25
			1,2-Dichloroethane	2016/06/13	NC		%	25
			Ethylene Dibromide	2016/06/13	NC		%	25
			1,1,1-Trichloroethane	2016/06/13	NC		%	25
			1,1,2-Trichloroethane	2016/06/13	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/13	NC		%	25
			cis-1,3-Dichloropropene	2016/06/13	NC		%	25
			trans-1,3-Dichloropropene	2016/06/13	NC		%	25
			1,2-Dichloropropane	2016/06/13	NC		%	25
			Bromomethane	2016/06/13	NC		%	25
			Bromoform	2016/06/13	NC		%	25
			Bromodichloromethane	2016/06/13	NC		%	25
			Dibromochloromethane	2016/06/13	NC		%	25
			Trichloroethylene	2016/06/13	NC		%	25
			Tetrachloroethylene	2016/06/13	NC		%	25
			Benzene	2016/06/13	3.0		%	25
			Toluene	2016/06/13	3.7		%	25
			Ethylbenzene	2016/06/13	0.68		%	25
			p+m-Xylene	2016/06/13	0.73		%	25
			o-Xylene	2016/06/13	1.6		%	25
			Styrene	2016/06/13	NC		%	25
			4-ethyltoluene	2016/06/13	0.32		%	25
			1,3,5-Trimethylbenzene	2016/06/13	0.48		%	25
			1,2,4-Trimethylbenzene	2016/06/13	0.66		%	25
			Chlorobenzene	2016/06/13	NC		%	25
			Benzyl chloride	2016/06/13	NC		%	25
			1,3-Dichlorobenzene	2016/06/13	NC		%	25
			1,4-Dichlorobenzene	2016/06/13	NC		%	25
			1,2-Dichlorobenzene	2016/06/13	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/13	NC		%	25
			Hexachlorobutadiene	2016/06/13	NC		%	25
			Hexane	2016/06/13	NC		%	25
			Heptane	2016/06/13	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Cyclohexane	2016/06/13	NC		%	25
			Tetrahydrofuran	2016/06/13	NC		%	25
			1,4-Dioxane	2016/06/13	NC		%	25
			Naphthalene	2016/06/13	NC		%	25
			Total Xylenes	2016/06/13	0.99		%	25
			1,1,1,2-Tetrachloroethane	2016/06/13	NC		%	25
			Vinyl Bromide	2016/06/13	NC		%	25
			Propene	2016/06/13	NC		%	25
			2,2,4-Trimethylpentane	2016/06/13	NC		%	25
			Carbon Disulfide	2016/06/13	0.96		%	25
			Vinyl Acetate	2016/06/13	NC		%	25
4537125	KM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/13	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/13	<5.0		ug/m3	
4537129	KM2	Method Blank	Aliphatic >C5-C6	2016/06/13	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/13	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/13	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/13	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/13	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/13	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/13	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/13	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/13	<5.0		ug/m3	
4537990	MR2	Method Blank	Aliphatic >C5-C6	2016/06/14	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/14	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/14	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/14	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/14	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/14	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/14	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/14	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/14	<5.0		ug/m3	
4537990	MR2	RPD - Sample/Sample Dup	Aliphatic >C5-C6	2016/06/14	NC		%	25
			Aliphatic >C6-C8	2016/06/14	1.8		%	25
			Aliphatic >C8-C10	2016/06/14	8.8		%	25
			Aliphatic >C10-C12	2016/06/14	3.3		%	25
			Aliphatic >C12-C16	2016/06/14	4.1		%	25
			Aromatic >C7-C8 (TEX Excluded)	2016/06/14	NC		%	25
			Aromatic >C8-C10	2016/06/14	0.79		%	25
			Aromatic >C10-C12	2016/06/14	2.2		%	25
			Aromatic >C12-C16	2016/06/14	NC		%	25
4537991	MR2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/13	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/13	<5.0		ug/m3	
4537991	MR2	RPD - Sample/Sample Dup	F1-BTEX, C6-C10 (as Toluene)	2016/06/13	7.1		%	25
			F2, C10-C16 (as Decane)	2016/06/13	1.6		%	25

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

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

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

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B8657
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VALIDATION SIGNATURE PAGE

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

Maureen Smith, Supervisor, Volatiles

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: CG2430.1E06
Your C.O.C. #: na

Attention:Daniel Budai

Clifton Associates Ltd.
2222 30 Ave. NE
Calgary, AB
CANADA T2E 7K9

Report Date: 2016/06/23
Report #: R4039057
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6B9876
Received: 2016/06/11, 12:03

Sample Matrix: AIR
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
BTEX and CCME Compounds in Air(TO-15mod)	9	N/A	2016/06/14	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	9	N/A	2016/06/14	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	9	N/A	2016/06/14	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	9	N/A	2016/06/14	BRL SOP-00304	EPA TO-15 m

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

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Marinela Sim
Project Manager
24 Jun 2016 15:13:21 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina Bacchus, Project Manager
Email: CBacchus@maxxam.ca
Phone# (905) 817-5700

==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

RESULTS OF ANALYSES OF AIR

Maxxam ID		CNC097	CNC098	CNC099	CNC100	CNC101	CNC102	CNC104		
Sampling Date		2016/06/09	2016/06/09	2016/06/09	2016/06/09	2016/06/09	2016/06/09	2016/06/10		
COC Number		na	na	na	na	na	na	na		
	UNITS	40 / 206	11 / 1391	31 / 2074	21 / 1780	34 / 269	39 / 1484	17 / 1760	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-2.7)	(-3.0)	(-2.9)	(-3.3)	(-2.7)	(-2.7)	(-2.0)	4540120	
QC Batch = Quality Control Batch										

Maxxam ID		CNC105	CNC106		
Sampling Date		2016/06/10	2016/06/10		
COC Number		na	na		
	UNITS	16 / 1427	916 / 3004	QC Batch	MDL
Volatile Organics					
Pressure on Receipt	psig	(-2.0)	(-2.0)	4540120	
QC Batch = Quality Control Batch					

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CNC097	CNC098	CNC099	CNC100	CNC101	CNC102			
Sampling Date		2016/06/09	2016/06/09	2016/06/09	2016/06/09	2016/06/09	2016/06/09			
COC Number		na	na	na	na	na	na			
	UNITS	40 / 206	11 / 1391	31 / 2074	21 / 1780	34 / 269	39 / 1484	RDL	QC Batch	MDL
Volatile Organics										
F1-BTEX, C6-C10 (as Toluene)	ug/m3	1960	1160	527	255	1390	901	5.0	4540123	1.0
F2, C10-C16 (as Decane)	ug/m3	1490	1600	992	589	1200	1110	5.0	4540123	1.0
Aliphatic >C5-C6	ug/m3	84.7	16.5	<5.0	<5.0	90.3	212	5.0	4540121	1.0
Aliphatic >C6-C8	ug/m3	461	94.8	15.9	14.5	444	199	5.0	4540121	1.0
Aliphatic >C8-C10	ug/m3	353	224	67.1	63.3	300	113	5.0	4540121	1.0
Aliphatic >C10-C12	ug/m3	215	213	160	147	382	183	5.0	4540121	1.0
Aliphatic >C12-C16	ug/m3	53.8	59.5	79.7	47.6	50.8	47.1	5.0	4540121	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4540121	1.0
Aromatic >C8-C10	ug/m3	161	104	91.9	84.0	159	121	5.0	4540121	1.0
Aromatic >C10-C12	ug/m3	123	112	108	63.2	117	97.6	5.0	4540121	1.0
Aromatic >C12-C16	ug/m3	22.0	21.4	14.4	<5.0	9.4	11.5	5.0	4540121	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		CNC104	CNC105	CNC106			
Sampling Date		2016/06/10	2016/06/10	2016/06/10			
COC Number		na	na	na			
	UNITS	17 / 1760	16 / 1427	916 / 3004	RDL	QC Batch	MDL
Volatile Organics							
F1-BTEX, C6-C10 (as Toluene)	ug/m3	43.8	1640	1570	5.0	4540123	1.0
F2, C10-C16 (as Decane)	ug/m3	139	7030	6340	5.0	4540123	1.0
Aliphatic >C5-C6	ug/m3	<5.0	12.1	11.6	5.0	4540121	1.0
Aliphatic >C6-C8	ug/m3	14.3	144	134	5.0	4540121	1.0
Aliphatic >C8-C10	ug/m3	5.4	296	288	5.0	4540121	1.0
Aliphatic >C10-C12	ug/m3	21.4	1290	1170	5.0	4540121	1.0
Aliphatic >C12-C16	ug/m3	11.6	281	248	5.0	4540121	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	5.0	4540121	1.0
Aromatic >C8-C10	ug/m3	<5.0	715	654	5.0	4540121	1.0
Aromatic >C10-C12	ug/m3	<5.0	575	521	5.0	4540121	1.0
Aromatic >C12-C16	ug/m3	<5.0	56.1	49.7	5.0	4540121	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC097			CNC098					
Sampling Date		2016/06/09			2016/06/09					
COC Number		na			na					
	UNITS	40 / 206	ug/m3	DL (ug/m3)	11 / 1391	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics										
Dichlorodifluoromethane (FREON 12)	ppbv	0.89	4.41	0.989	2.27	0.20	11.2	0.989	4538221	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4538221	0.10
Chloromethane	ppbv	<0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4538221	0.10
Vinyl Chloride	ppbv	<0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4538221	0.10
Chloroethane	ppbv	<0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4538221	0.10
1,3-Butadiene	ppbv	<0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4538221	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.49	2.74	1.12	5.04	0.20	28.3	1.12	4538221	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	<1.88	1.88	<1.0	1.0	<1.88	1.88	4538221	0.50
Trichlorotrifluoroethane	ppbv	0.15	1.16	1.15	0.17	0.15	1.27	1.15	4538221	0.10
2-propanol	ppbv	<1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4538221	0.60
2-Propanone	ppbv	4.89	11.6	1.90	17.7	0.80	42.0	1.90	4538221	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.6	4.70	2.95	<1.0	1.0	<2.95	2.95	4538221	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4538221	0.10
Ethyl Acetate	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.50
1,1-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
Methylene Chloride(Dichloromethane)	ppbv	3.30	11.5	2.78	3.26	0.80	11.3	2.78	4538221	0.10
Chloroform	ppbv	0.39	1.91	0.488	2.26	0.10	11.1	0.488	4538221	0.10
Carbon Tetrachloride	ppbv	<0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4538221	0.10
1,1-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
1,2-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
Ethylene Dibromide	ppbv	<0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4538221	0.10
1,1,1-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
1,2-Dichloropropane	ppbv	<0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4538221	0.10
Bromomethane	ppbv	<0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4538221	0.10
Bromoform	ppbv	<0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4538221	0.10
Bromodichloromethane	ppbv	<0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4538221	0.10
Dibromochloromethane	ppbv	<0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4538221	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC097			CNC098					
Sampling Date		2016/06/09			2016/06/09					
COC Number		na			na					
	UNITS	40 / 206	ug/m3	DL (ug/m3)	11 / 1391	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Trichloroethylene	ppbv	<0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4538221	0.10
Tetrachloroethylene	ppbv	0.36	2.44	0.678	0.34	0.10	2.29	0.678	4538221	0.10
Benzene	ppbv	0.53	1.69	0.319	0.55	0.10	1.77	0.319	4538221	0.10
Toluene	ppbv	3.72	14.0	0.376	4.33	0.10	16.3	0.376	4538221	0.10
Ethylbenzene	ppbv	8.79	38.2	0.434	3.80	0.10	16.5	0.434	4538221	0.10
p+m-Xylene	ppbv	25.9	112	0.868	8.52	0.20	37.0	0.868	4538221	0.10
o-Xylene	ppbv	12.4	54.0	0.434	4.87	0.10	21.1	0.434	4538221	0.10
Styrene	ppbv	0.34	1.47	0.426	0.28	0.10	1.17	0.426	4538221	0.10
4-ethyltoluene	ppbv	4.72	23.2	2.46	3.25	0.50	16.0	2.46	4538221	0.50
1,3,5-Trimethylbenzene	ppbv	3.55	17.5	2.46	2.37	0.50	11.7	2.46	4538221	0.10
1,2,4-Trimethylbenzene	ppbv	10.2	50.1	2.46	5.71	0.50	28.1	2.46	4538221	0.10
Chlorobenzene	ppbv	<0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4538221	0.10
Benzyl chloride	ppbv	<0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4538221	0.20
1,3-Dichlorobenzene	ppbv	<0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4538221	0.10
1,4-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4538221	0.40
Hexachlorobutadiene	ppbv	<0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4538221	0.50
Hexane	ppbv	40.4	142	1.06	4.70	0.30	16.6	1.06	4538221	0.10
Heptane	ppbv	16.5	67.4	1.23	1.46	0.30	5.99	1.23	4538221	0.10
Cyclohexane	ppbv	7.91	27.2	0.688	2.21	0.20	7.60	0.688	4538221	0.10
Tetrahydrofuran	ppbv	<0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4538221	0.10
1,4-Dioxane	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.40
Naphthalene	ppbv	<0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4538221	N/A
Total Xylenes	ppbv	38.3	166	1.30	13.4	0.30	58.2	1.30	4538221	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	N/A
Vinyl Bromide	ppbv	<0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4538221	0.10
Propene	ppbv	62.7	108	0.861	41.8	0.50	71.9	0.861	4538221	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4538221	0.10
Carbon Disulfide	ppbv	13.6	42.3	1.56	8.40	0.50	26.1	1.56	4538221	0.10
Vinyl Acetate	ppbv	<0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4538221	0.10
Surrogate Recovery (%)										
Bromochloromethane	%	92	N/A	N/A	97		N/A	N/A	4538221	
D5-Chlorobenzene	%	83	N/A	N/A	90		N/A	N/A	4538221	
Difluorobenzene	%	91	N/A	N/A	97		N/A	N/A	4538221	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC099				CNC100					
Sampling Date		2016/06/09				2016/06/09					
COC Number		na				na					
	UNITS	31 / 2074	RDL	ug/m3	DL (ug/m3)	21 / 1780	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	1.55	0.20	7.66	0.989	0.80	0.20	3.95	0.989	4538221	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4538221	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4538221	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4538221	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4538221	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4538221	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.48	0.20	2.69	1.12	0.29	0.20	1.62	1.12	4538221	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	<1.0	1.0	<1.88	1.88	4538221	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4538221	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4538221	0.60
2-Propanone	ppbv	6.37	0.80	15.1	1.90	3.60	0.80	8.55	1.90	4538221	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4538221	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4538221	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.95	0.80	6.77	2.78	2.36	0.80	8.20	2.78	4538221	0.10
Chloroform	ppbv	0.77	0.10	3.76	0.488	0.26	0.10	1.27	0.488	4538221	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4538221	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4538221	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4538221	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4538221	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4538221	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4538221	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4538221	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC099				CNC100					
Sampling Date		2016/06/09				2016/06/09					
COC Number		na				na					
	UNITS	31 / 2074	RDL	ug/m3	DL (ug/m3)	21 / 1780	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4538221	0.10
Tetrachloroethylene	ppbv	0.69	0.10	4.71	0.678	<0.10	0.10	<0.678	0.678	4538221	0.10
Benzene	ppbv	2.02	0.10	6.45	0.319	0.69	0.10	2.21	0.319	4538221	0.10
Toluene	ppbv	14.3	0.10	53.7	0.376	5.16	0.10	19.4	0.376	4538221	0.10
Ethylbenzene	ppbv	3.52	0.10	15.3	0.434	2.71	0.10	11.8	0.434	4538221	0.10
p+m-Xylene	ppbv	9.69	0.20	42.1	0.868	12.7	0.20	55.1	0.868	4538221	0.10
o-Xylene	ppbv	5.00	0.10	21.7	0.434	5.73	0.10	24.9	0.434	4538221	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	0.15	0.10	0.633	0.426	4538221	0.10
4-ethyltoluene	ppbv	3.44	0.50	16.9	2.46	1.97	0.50	9.67	2.46	4538221	0.50
1,3,5-Trimethylbenzene	ppbv	2.35	0.50	11.6	2.46	2.37	0.50	11.7	2.46	4538221	0.10
1,2,4-Trimethylbenzene	ppbv	7.86	0.50	38.6	2.46	6.00	0.50	29.5	2.46	4538221	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4538221	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4538221	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4538221	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4538221	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4538221	0.50
Hexane	ppbv	0.62	0.30	2.18	1.06	0.45	0.30	1.60	1.06	4538221	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	0.56	0.30	2.30	1.23	4538221	0.10
Cyclohexane	ppbv	0.61	0.20	2.10	0.688	<0.20	0.20	<0.688	0.688	4538221	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4538221	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.40
Naphthalene	ppbv	0.52	0.50	2.75	2.62	<0.50	0.50	<2.62	2.62	4538221	N/A
Total Xylenes	ppbv	14.7	0.30	63.8	1.30	18.4	0.30	80.0	1.30	4538221	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4538221	0.10
Propene	ppbv	17.0	0.50	29.2	0.861	<0.80	0.80	<1.38	1.38	4538221	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4538221	0.10
Carbon Disulfide	ppbv	11.4	0.50	35.4	1.56	3.93	0.50	12.2	1.56	4538221	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4538221	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	97		N/A	N/A	96		N/A	N/A	4538221	
D5-Chlorobenzene	%	89		N/A	N/A	89		N/A	N/A	4538221	
Difluorobenzene	%	95		N/A	N/A	95		N/A	N/A	4538221	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC101				CNC102					
Sampling Date		2016/06/09				2016/06/09					
COC Number		na				na					
	UNITS	34 / 269	RDL	ug/m3	DL (ug/m3)	39 / 1484	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	3.83	0.20	18.9	0.989	0.66	0.20	3.26	0.989	4538221	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4538221	0.10
Chloromethane	ppbv	0.40	0.30	0.829	0.620	0.36	0.30	0.754	0.620	4538221	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4538221	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4538221	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4538221	0.10
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	0.20	<1.12	1.12	0.27	0.20	1.52	1.12	4538221	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	1.2	1.0	2.18	1.88	4538221	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4538221	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4538221	0.60
2-Propanone	ppbv	6.12	0.80	14.5	1.90	4.34	0.80	10.3	1.90	4538221	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4538221	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4538221	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
Methylene Chloride(Dichloromethane)	ppbv	2.68	0.80	9.31	2.78	1.21	0.80	4.20	2.78	4538221	0.10
Chloroform	ppbv	0.50	0.10	2.45	0.488	1.02	0.10	5.00	0.488	4538221	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4538221	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4538221	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4538221	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4538221	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4538221	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4538221	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4538221	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC101				CNC102					
Sampling Date		2016/06/09				2016/06/09					
COC Number		na				na					
	UNITS	34 / 269	RDL	ug/m3	DL (ug/m3)	39 / 1484	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Trichloroethylene	ppbv	0.67	0.10	3.58	0.537	<0.10	0.10	<0.537	0.537	4538221	0.10
Tetrachloroethylene	ppbv	0.43	0.10	2.95	0.678	<0.10	0.10	<0.678	0.678	4538221	0.10
Benzene	ppbv	0.32	0.10	1.01	0.319	0.21	0.10	0.656	0.319	4538221	0.10
Toluene	ppbv	3.94	0.10	14.8	0.376	5.14	0.10	19.4	0.376	4538221	0.10
Ethylbenzene	ppbv	6.58	0.10	28.6	0.434	6.98	0.10	30.3	0.434	4538221	0.10
p+m-Xylene	ppbv	10.4	0.20	45.1	0.868	21.1	0.20	91.7	0.868	4538221	0.10
o-Xylene	ppbv	10.9	0.10	47.4	0.434	7.78	0.10	33.8	0.434	4538221	0.10
Styrene	ppbv	0.17	0.10	0.714	0.426	0.19	0.10	0.796	0.426	4538221	0.10
4-ethyltoluene	ppbv	4.98	0.50	24.5	2.46	3.62	0.50	17.8	2.46	4538221	0.50
1,3,5-Trimethylbenzene	ppbv	4.35	0.50	21.4	2.46	2.69	0.50	13.2	2.46	4538221	0.10
1,2,4-Trimethylbenzene	ppbv	6.26	0.50	30.8	2.46	7.95	0.50	39.1	2.46	4538221	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4538221	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4538221	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4538221	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4538221	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4538221	0.50
Hexane	ppbv	18.8	0.30	66.1	1.06	12.8	0.30	45.0	1.06	4538221	0.10
Heptane	ppbv	17.3	0.30	70.8	1.23	0.46	0.30	1.87	1.23	4538221	0.10
Cyclohexane	ppbv	4.87	0.20	16.8	0.688	4.76	0.20	16.4	0.688	4538221	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4538221	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4538221	N/A
Total Xylenes	ppbv	21.3	0.30	92.6	1.30	28.9	0.30	125	1.30	4538221	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4538221	0.10
Propene	ppbv	349	1.3	600	2.15	144	0.50	248	0.861	4538221	0.30
2,2,4-Trimethylpentane	ppbv	3.13	0.20	14.6	0.934	5.83	0.20	27.3	0.934	4538221	0.10
Carbon Disulfide	ppbv	7.60	0.50	23.7	1.56	17.3	0.50	53.8	1.56	4538221	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4538221	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	96		N/A	N/A	98		N/A	N/A	4538221	
D5-Chlorobenzene	%	91		N/A	N/A	89		N/A	N/A	4538221	
Difluorobenzene	%	90		N/A	N/A	98		N/A	N/A	4538221	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC104				CNC105					
Sampling Date		2016/06/10				2016/06/10					
COC Number		na				na					
	UNITS	17 / 1760	RDL	ug/m3	DL (ug/m3)	16 / 1427	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.54	0.20	2.69	0.989	0.65	0.20	3.19	0.989	4538221	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4538221	0.10
Chloromethane	ppbv	0.51	0.30	1.05	0.620	<0.30	0.30	<0.620	0.620	4538221	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4538221	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4538221	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	0.91	0.50	2.01	1.11	4538221	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.21	0.20	1.16	1.12	0.71	0.20	3.96	1.12	4538221	0.10
Ethanol (ethyl alcohol)	ppbv	1.7	1.0	3.13	1.88	1.2	1.0	2.30	1.88	4538221	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4538221	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4538221	0.60
2-Propanone	ppbv	5.48	0.80	13.0	1.90	6.29	0.80	15.0	1.90	4538221	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4538221	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4538221	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4538221	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4538221	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4538221	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	1.15	0.10	5.63	0.488	4538221	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4538221	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4538221	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4538221	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4538221	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4538221	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4538221	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4538221	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4538221	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4538221	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC104				CNC105					
Sampling Date		2016/06/10				2016/06/10					
COC Number		na				na					
	UNITS	17 / 1760	RDL	ug/m3	DL (ug/m3)	16 / 1427	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4538221	0.10
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4538221	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	3.09	0.10	9.87	0.319	4538221	0.10
Toluene	ppbv	0.78	0.10	2.94	0.376	17.0	0.10	64.1	0.376	4538221	0.10
Ethylbenzene	ppbv	0.12	0.10	0.541	0.434	18.5	0.10	80.5	0.434	4538221	0.10
p+m-Xylene	ppbv	0.49	0.20	2.13	0.868	83.7	0.20	364	0.868	4538221	0.10
o-Xylene	ppbv	0.21	0.10	0.908	0.434	35.3	0.10	153	0.434	4538221	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	0.30	0.10	1.26	0.426	4538221	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	17.8	0.50	87.3	2.46	4538221	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	16.7	0.50	82.3	2.46	4538221	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	53.9	0.50	265	2.46	4538221	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4538221	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4538221	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4538221	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4538221	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4538221	0.50
Hexane	ppbv	<0.30	0.30	<1.06	1.06	3.37	0.30	11.9	1.06	4538221	0.10
Heptane	ppbv	0.38	0.30	1.54	1.23	4.97	0.30	20.4	1.23	4538221	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	1.74	0.20	6.00	0.688	4538221	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4538221	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4538221	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4538221	N/A
Total Xylenes	ppbv	0.70	0.30	3.04	1.30	119	0.30	517	1.30	4538221	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4538221	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4538221	0.10
Propene	ppbv	<0.70	0.70	<1.20	1.20	4.24	0.50	7.30	0.861	4538221	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	0.93	0.20	4.36	0.934	4538221	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	8.39	0.50	26.1	1.56	4538221	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4538221	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	100		N/A	N/A	99		N/A	N/A	4538221	
D5-Chlorobenzene	%	93		N/A	N/A	94		N/A	N/A	4538221	
Difluorobenzene	%	100		N/A	N/A	99		N/A	N/A	4538221	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC106					
Sampling Date		2016/06/10					
COC Number		na					
	UNITS	916 / 3004	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	0.60	0.20	2.96	0.989	4538221	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4538221	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	4538221	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4538221	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4538221	0.10
1,3-Butadiene	ppbv	0.83	0.50	1.83	1.11	4538221	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.65	0.20	3.67	1.12	4538221	0.10
Ethanol (ethyl alcohol)	ppbv	1.3	1.0	2.45	1.88	4538221	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4538221	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4538221	0.60
2-Propanone	ppbv	6.12	0.80	14.5	1.90	4538221	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	4538221	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4538221	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4538221	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4538221	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4538221	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4538221	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4538221	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4538221	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	4538221	0.10
Chloroform	ppbv	1.10	0.10	5.35	0.488	4538221	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4538221	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4538221	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4538221	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4538221	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4538221	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4538221	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4538221	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4538221	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4538221	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4538221	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4538221	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4538221	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4538221	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNC106					
Sampling Date		2016/06/10					
COC Number		na					
	UNITS	916 / 3004	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4538221	0.10
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4538221	0.10
Benzene	ppbv	2.82	0.10	9.01	0.319	4538221	0.10
Toluene	ppbv	15.7	0.10	59.0	0.376	4538221	0.10
Ethylbenzene	ppbv	16.5	0.10	71.8	0.434	4538221	0.10
p+m-Xylene	ppbv	74.0	0.20	322	0.868	4538221	0.10
o-Xylene	ppbv	31.3	0.10	136	0.434	4538221	0.10
Styrene	ppbv	0.28	0.10	1.18	0.426	4538221	0.10
4-ethyltoluene	ppbv	15.9	0.50	78.1	2.46	4538221	0.50
1,3,5-Trimethylbenzene	ppbv	15.0	0.50	73.6	2.46	4538221	0.10
1,2,4-Trimethylbenzene	ppbv	47.9	0.50	235	2.46	4538221	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4538221	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4538221	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4538221	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4538221	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4538221	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4538221	0.50
Hexane	ppbv	3.18	0.30	11.2	1.06	4538221	0.10
Heptane	ppbv	4.56	0.30	18.7	1.23	4538221	0.10
Cyclohexane	ppbv	1.62	0.20	5.57	0.688	4538221	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4538221	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4538221	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4538221	N/A
Total Xylenes	ppbv	105	0.30	457	1.30	4538221	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4538221	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4538221	0.10
Propene	ppbv	3.99	0.50	6.86	0.861	4538221	0.30
2,2,4-Trimethylpentane	ppbv	0.87	0.20	4.04	0.934	4538221	0.10
Carbon Disulfide	ppbv	7.66	0.50	23.9	1.56	4538221	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4538221	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	102		N/A	N/A	4538221	
D5-Chlorobenzene	%	100		N/A	N/A	4538221	
Difluorobenzene	%	102		N/A	N/A	4538221	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNC097
Sample ID: 40 / 206
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC098
Sample ID: 11 / 1391
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC099
Sample ID: 31 / 2074
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC100
Sample ID: 21 / 1780
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC101
Sample ID: 34 / 269
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNC102
Sample ID: 39 / 1484
Matrix: AIR

Collected: 2016/06/09
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC104
Sample ID: 17 / 1760
Matrix: AIR

Collected: 2016/06/10
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC105
Sample ID: 16 / 1427
Matrix: AIR

Collected: 2016/06/10
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam ID: CNC106
Sample ID: 916 / 3004
Matrix: AIR

Collected: 2016/06/10
Shipped:
Received: 2016/06/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4540123	N/A	2016/06/14	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4540121	N/A	2016/06/14	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4540120	N/A	2016/06/14	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4538221	N/A	2016/06/14	Yao Liang Sun

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

GENERAL COMMENTS

Sample CNC097-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNC098-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNC100-01 : Increased DL for propene due to interference from propane.

Sample CNC101-01 : Propene was analyzed at a 2.5X dilution. The DL was adjusted accordingly.

Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNC102-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNC104-01 : Increased DL for propene due to interference from propane.

Sample CNC105-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNC106-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4538221	LSY	Spiked Blank	Bromochloromethane	2016/06/14		101	%	60 - 140
			D5-Chlorobenzene	2016/06/14		102	%	60 - 140
			Difluorobenzene	2016/06/14		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/14		102	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/14		77	%	70 - 130
			Chloromethane	2016/06/14		88	%	70 - 130
			Vinyl Chloride	2016/06/14		89	%	70 - 130
			Chloroethane	2016/06/14		86	%	70 - 130
			1,3-Butadiene	2016/06/14		91	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/14		86	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/14		90	%	70 - 130
			Trichlorotrifluoroethane	2016/06/14		108	%	70 - 130
			2-propanol	2016/06/14		110	%	70 - 130
			2-Propanone	2016/06/14		98	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/14		111	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/14		114	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/14		119	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/14		107	%	70 - 130
			Ethyl Acetate	2016/06/14		114	%	70 - 130
			1,1-Dichloroethylene	2016/06/14		108	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/14		108	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/14		112	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/14		99	%	70 - 130
			Chloroform	2016/06/14		103	%	70 - 130
			Carbon Tetrachloride	2016/06/14		107	%	70 - 130
			1,1-Dichloroethane	2016/06/14		103	%	70 - 130
			1,2-Dichloroethane	2016/06/14		109	%	70 - 130
			Ethylene Dibromide	2016/06/14		110	%	70 - 130
			1,1,1-Trichloroethane	2016/06/14		101	%	70 - 130
			1,1,2-Trichloroethane	2016/06/14		107	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/14		101	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/14		113	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/14		116	%	70 - 130
			1,2-Dichloropropane	2016/06/14		105	%	70 - 130
			Bromomethane	2016/06/14		91	%	70 - 130
			Bromoform	2016/06/14		119	%	70 - 130
			Bromodichloromethane	2016/06/14		116	%	70 - 130
			Dibromochloromethane	2016/06/14		131 (1)	%	70 - 130
			Trichloroethylene	2016/06/14		109	%	70 - 130
			Tetrachloroethylene	2016/06/14		107	%	70 - 130
			Benzene	2016/06/14		107	%	70 - 130
			Toluene	2016/06/14		115	%	70 - 130
			Ethylbenzene	2016/06/14		108	%	70 - 130
			p+m-Xylene	2016/06/14		104	%	70 - 130
			o-Xylene	2016/06/14		104	%	70 - 130
			Styrene	2016/06/14		105	%	70 - 130
			4-ethyltoluene	2016/06/14		114	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/14		105	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/14		106	%	70 - 130
			Chlorobenzene	2016/06/14		106	%	70 - 130
			Benzyl chloride	2016/06/14		113	%	70 - 130
			1,3-Dichlorobenzene	2016/06/14		104	%	70 - 130
			1,4-Dichlorobenzene	2016/06/14		101	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2016/06/14		101	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/14		96	%	70 - 130
			Hexachlorobutadiene	2016/06/14		102	%	70 - 130
			Hexane	2016/06/14		105	%	70 - 130
			Heptane	2016/06/14		111	%	70 - 130
			Cyclohexane	2016/06/14		109	%	70 - 130
			Tetrahydrofuran	2016/06/14		110	%	70 - 130
			1,4-Dioxane	2016/06/14		106	%	70 - 130
			Naphthalene	2016/06/14		100	%	70 - 130
			Total Xylenes	2016/06/14		104	%	70 - 130
			Vinyl Bromide	2016/06/14		90	%	70 - 130
			Propene	2016/06/14		115	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/14		119	%	70 - 130
			Carbon Disulfide	2016/06/14		122	%	70 - 130
			Vinyl Acetate	2016/06/14		105	%	70 - 130
4538221	LSY	Method Blank	Bromochloromethane	2016/06/14		95	%	60 - 140
			D5-Chlorobenzene	2016/06/14		94	%	60 - 140
			Difluorobenzene	2016/06/14		98	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/14	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/14	<0.17		ppbv	
			Chloromethane	2016/06/14	<0.30		ppbv	
			Vinyl Chloride	2016/06/14	<0.10		ppbv	
			Chloroethane	2016/06/14	<0.30		ppbv	
			1,3-Butadiene	2016/06/14	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/14	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/14	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/14	<0.15		ppbv	
			2-propanol	2016/06/14	<1.0		ppbv	
			2-Propanone	2016/06/14	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/14	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/14	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/14	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/14	<0.20		ppbv	
			Ethyl Acetate	2016/06/14	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/14	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/14	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/14	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/14	<0.80		ppbv	
			Chloroform	2016/06/14	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/14	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/14	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/14	<0.10		ppbv	
			Ethylene Dibromide	2016/06/14	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/14	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/14	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/14	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/14	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/14	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/14	<0.10		ppbv	
			Bromomethane	2016/06/14	<0.10		ppbv	
			Bromoform	2016/06/14	<0.20		ppbv	
			Bromodichloromethane	2016/06/14	<0.20		ppbv	
			Dibromochloromethane	2016/06/14	<0.20		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichloroethylene	2016/06/14	<0.10		ppbv	
			Tetrachloroethylene	2016/06/14	<0.10		ppbv	
			Benzene	2016/06/14	<0.10		ppbv	
			Toluene	2016/06/14	<0.10		ppbv	
			Ethylbenzene	2016/06/14	<0.10		ppbv	
			p+m-Xylene	2016/06/14	<0.20		ppbv	
			o-Xylene	2016/06/14	<0.10		ppbv	
			Styrene	2016/06/14	<0.10		ppbv	
			4-ethyltoluene	2016/06/14	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/14	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/14	<0.50		ppbv	
			Chlorobenzene	2016/06/14	<0.10		ppbv	
			Benzyl chloride	2016/06/14	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/14	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/14	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/14	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/14	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/14	<0.50		ppbv	
			Hexane	2016/06/14	<0.30		ppbv	
			Heptane	2016/06/14	<0.30		ppbv	
			Cyclohexane	2016/06/14	<0.20		ppbv	
			Tetrahydrofuran	2016/06/14	<0.40		ppbv	
			1,4-Dioxane	2016/06/14	<1.0		ppbv	
			Naphthalene	2016/06/14	<0.50		ppbv	
			Total Xylenes	2016/06/14	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/14	<0.10		ppbv	
			Vinyl Bromide	2016/06/14	<0.20		ppbv	
			Propene	2016/06/14	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/14	<0.20		ppbv	
			Carbon Disulfide	2016/06/14	<0.50		ppbv	
			Vinyl Acetate	2016/06/14	<0.20		ppbv	
4538221	LSY	RPD - Sample/Sample Dup	Benzene	2016/06/14	NC		%	25
			Toluene	2016/06/14	1.6		%	25
			Ethylbenzene	2016/06/14	NC		%	25
			p+m-Xylene	2016/06/14	NC		%	25
			o-Xylene	2016/06/14	NC		%	25
			Naphthalene	2016/06/14	NC		%	25
			Total Xylenes	2016/06/14	NC		%	25
4540121	LSY	Method Blank	Aliphatic >C5-C6	2016/06/14	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/14	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/14	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/14	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/14	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/14	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/14	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/14	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/14	<5.0		ug/m3	
4540123	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/14	<5.0		ug/m3	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			F2, C10-C16 (as Decane)	2016/06/14	<5.0		ug/m3	

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

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

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

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B9876
Report Date: 2016/06/23

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VALIDATION SIGNATURE PAGE

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

Maureen Smith, Supervisor, Volatiles

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Your Project #: CG2430.1E06
Your C.O.C. #: na

Attention:Daniel Budai

Clifton Associates Ltd.
2222 30 Ave. NE
Calgary, AB
CANADA T2E 7K9

Report Date: 2016/06/27
Report #: R4042633
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6C3505
Received: 2016/06/16, 11:30

Sample Matrix: AIR
Samples Received: 17

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
BTEX and CCME Compounds in Air(TO-15mod)	8	N/A	2016/06/20	BRL SOP-00304	EPA TO-15 m
BTEX and CCME Compounds in Air(TO-15mod)	7	N/A	2016/06/21	BRL SOP-00304	EPA TO-15 m
BTEX and CCME Compounds in Air(TO-15mod)	2	N/A	2016/06/22	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	9	N/A	2016/06/20	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	7	N/A	2016/06/21	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	1	N/A	2016/06/22	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	9	N/A	2016/06/20	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	7	N/A	2016/06/21	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	N/A	2016/06/22	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	9	N/A	2016/06/20	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	7	N/A	2016/06/21	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	N/A	2016/06/22	BRL SOP-00304	EPA TO-15 m

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

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Cristina Bacchus
Project Manager
27 Jun 2016 12:11:01 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina Bacchus, Project Manager
Email: CBacchus@maxxam.ca
Phone# (905) 817-5700

==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

RESULTS OF ANALYSES OF AIR

Maxxam ID		CNV327	CNV328	CNV329	CNV330		CNV331	CNV332		
Sampling Date		2016/06/13	2016/06/13	2016/06/13	2016/06/13		2016/06/13	2016/06/13		
COC Number		na	na	na	na		na	na		
	UNITS	35/2239	5/1928	1/1197	91/1430	QC Batch	2/1480	4/1014	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-2.5)	(-3.1)	(-2.5)	(-2.5)	4547975	(-2.9)	(-1.9)	4547764	
QC Batch = Quality Control Batch										

Maxxam ID		CNV333	CNV334	CNV335		CNV336	CNV337	CNV341		
Sampling Date		2016/06/13	2016/06/14	2016/06/14		2016/06/14	2016/06/14	2016/06/14		
COC Number		na	na	na		na	na	na		
	UNITS	3/1195	12/1763	13A/2236	QC Batch	13B/2076	13C/3017	14/2510	QC Batch	MDL
Volatile Organics										
Pressure on Receipt	psig	(-2.3)	(-2.0)	(-3.9)	4547764	(-2.7)	(-3.1)	(-2.9)	4552514	
QC Batch = Quality Control Batch										

Maxxam ID		CNV342		CNV343	CNV344	CNV345	CNV346		
Sampling Date		2016/06/15		2016/06/15	2016/06/15	2016/06/15	2016/06/15		
COC Number		na		na	na	na	na		
	UNITS	37/1160	QC Batch	937/2523	18A/2486	18B/1400	18C/1362	QC Batch	MDL
Volatile Organics									
Pressure on Receipt	psig	(-3.1)	4552532	(-6.2)	(-3.1)	(-2.6)	(-2.2)	4552514	
QC Batch = Quality Control Batch									

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CNV327	CNV328		CNV329		CNV330			
Sampling Date		2016/06/13	2016/06/13		2016/06/13		2016/06/13			
COC Number		na	na		na		na			
	UNITS	35/2239	5/1928	RDL	1/1197	RDL	91/1430	RDL	QC Batch	MDL
Volatile Organics										
F1-BTEX, C6-C10 (as Toluene)	ug/m3	921	259	5.0	40100000	190000	42800000	70000	4549924	1.0
F2, C10-C16 (as Decane)	ug/m3	805	191	5.0	904000	19000	699000	70000	4549924	1.0
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	5.0	9160000	19000	10400000	70000	4550167	1.0
Aliphatic >C6-C8	ug/m3	15.0	15.8	5.0	31200000	190000	33300000	70000	4550167	1.0
Aliphatic >C8-C10	ug/m3	165	38.3	5.0	1860000	19000	1730000	70000	4550167	1.0
Aliphatic >C10-C12	ug/m3	164	39.7	5.0	105000	19000	72400	70000	4550167	1.0
Aliphatic >C12-C16	ug/m3	55.2	13.5	5.0	<19000	19000	<70000	70000	4550167	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	5.0	<19000	19000	<70000	70000	4550167	1.0
Aromatic >C8-C10	ug/m3	169	33.7	5.0	1360000	19000	1220000	70000	4550167	1.0
Aromatic >C10-C12	ug/m3	158	28.1	5.0	587000	19000	469000	70000	4550167	1.0
Aromatic >C12-C16	ug/m3	11.7	<5.0	5.0	<19000	19000	<70000	70000	4550167	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		CNV331	CNV332	CNV333	CNV334	CNV335			
Sampling Date		2016/06/13	2016/06/13	2016/06/13	2016/06/14	2016/06/14			
COC Number		na	na	na	na	na			
	UNITS	2/1480	4/1014	3/1195	12/1763	13A/2236	RDL	QC Batch	MDL
Volatile Organics									
F1-BTEX, C6-C10 (as Toluene)	ug/m3	146	67.3	141	21.5	18.9	5.0	4547778	1.0
F2, C10-C16 (as Decane)	ug/m3	10.9	74.0	248	206	45.5	5.0	4547778	1.0
Aliphatic >C5-C6	ug/m3	7.4	<5.0	<5.0	<5.0	<5.0	5.0	4547770	1.0
Aliphatic >C6-C8	ug/m3	133	<5.0	7.1	6.9	8.6	5.0	4547770	1.0
Aliphatic >C8-C10	ug/m3	12.2	<5.0	25.5	5.3	<5.0	5.0	4547770	1.0
Aliphatic >C10-C12	ug/m3	6.8	9.2	30.1	28.5	12.2	5.0	4547770	1.0
Aliphatic >C12-C16	ug/m3	<5.0	<5.0	12.4	19.5	<5.0	5.0	4547770	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4547770	1.0
Aromatic >C8-C10	ug/m3	<5.0	15.3	20.8	<5.0	<5.0	5.0	4547770	1.0
Aromatic >C10-C12	ug/m3	<5.0	18.1	26.7	<5.0	<5.0	5.0	4547770	1.0
Aromatic >C12-C16	ug/m3	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4547770	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		CNV336	CNV337	CNV341		CNV342		CNV343			
Sampling Date		2016/06/14	2016/06/14	2016/06/14		2016/06/15		2016/06/15			
COC Number		na	na	na		na		na			
	UNITS	13B/2076	13C/3017	14/2510	QC Batch	37/1160	QC Batch	937/2523	RDL	QC Batch	MDL
Volatile Organics											
F1-BTEX, C6-C10 (as Toluene)	ug/m3	435	1000	1890	4553647	182	4553762	119	5.0	4553647	1.0
F2, C10-C16 (as Decane)	ug/m3	1240	1740	1460	4553647	221	4553762	150	5.0	4553647	1.0
Aliphatic >C5-C6	ug/m3	8.8	<5.0	116	4553613	<5.0	4553788	<5.0	5.0	4553613	1.0
Aliphatic >C6-C8	ug/m3	40.5	33.1	412	4553613	13.3	4553788	22.3	5.0	4553613	1.0
Aliphatic >C8-C10	ug/m3	39.9	114	321	4553613	29.6	4553788	24.3	5.0	4553613	1.0
Aliphatic >C10-C12	ug/m3	181	339	431	4553613	44.1	4553788	36.4	5.0	4553613	1.0
Aliphatic >C12-C16	ug/m3	481	174	192	4553613	26.8	4553788	21.9	5.0	4553613	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	4553613	<5.0	4553788	<5.0	5.0	4553613	1.0
Aromatic >C8-C10	ug/m3	179	429	62.4	4553613	32.5	4553788	23.7	5.0	4553613	1.0
Aromatic >C10-C12	ug/m3	217	473	110	4553613	39.5	4553788	26.3	5.0	4553613	1.0
Aromatic >C12-C16	ug/m3	22.4	17.7	36.6	4553613	<5.0	4553788	<5.0	5.0	4553613	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		CNV344	CNV345			CNV346			
Sampling Date		2016/06/15	2016/06/15			2016/06/15			
COC Number		na	na			na			
	UNITS	18A/2486	18B/1400	RDL	QC Batch	18C/1362	RDL	QC Batch	MDL
Volatile Organics									
F1-BTEX, C6-C10 (as Toluene)	ug/m3	743	727	5.0	4553647	77500	50	4553762	1.0
F2, C10-C16 (as Decane)	ug/m3	497	483	5.0	4553647	52000	50	4553762	1.0
Aliphatic >C5-C6	ug/m3	5.7	36.2	5.0	4553613	24	10	4553613	1.0
Aliphatic >C6-C8	ug/m3	214	105	5.0	4553613	225	10	4553613	1.0
Aliphatic >C8-C10	ug/m3	72.3	86.8	5.0	4553613	14000	10	4553613	1.0
Aliphatic >C10-C12	ug/m3	89.6	204	5.0	4553613	9590	10	4553613	1.0
Aliphatic >C12-C16	ug/m3	18.9	14.0	5.0	4553613	161	10	4553613	1.0
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	5.0	4553613	<10	10	4553613	1.0
Aromatic >C8-C10	ug/m3	14.3	28.4	5.0	4553613	445	10	4553613	1.0
Aromatic >C10-C12	ug/m3	27.3	39.3	5.0	4553613	956	10	4553613	1.0
Aromatic >C12-C16	ug/m3	<5.0	<5.0	5.0	4553613	62	10	4553613	1.0

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV327			CNV328					
Sampling Date		2016/06/13			2016/06/13					
COC Number		na			na					
	UNITS	35/2239	ug/m3	DL (ug/m3)	5/1928	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics										
Dichlorodifluoromethane (FREON 12)	ppbv	1.81	8.95	0.989	2.44	0.20	12.1	0.989	4546687	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4546687	0.10
Chloromethane	ppbv	<0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4546687	0.10
Vinyl Chloride	ppbv	<0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4546687	0.10
Chloroethane	ppbv	<0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4546687	0.10
1,3-Butadiene	ppbv	<0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4546687	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.22	1.22	1.12	<0.20	0.20	<1.12	1.12	4546687	0.10
Ethanol (ethyl alcohol)	ppbv	1.2	2.24	1.88	<1.0	1.0	<1.88	1.88	4546687	0.50
Trichlorotrifluoroethane	ppbv	<0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4546687	0.10
2-propanol	ppbv	<1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4546687	0.60
2-Propanone	ppbv	5.88	14.0	1.90	1.80	0.80	4.28	1.90	4546687	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4546687	0.60
Methyl Isobutyl Ketone	ppbv	1.5	6.30	4.10	<1.0	1.0	<4.10	4.10	4546687	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4546687	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4546687	0.10
Ethyl Acetate	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546687	0.50
1,1-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546687	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546687	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546687	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4546687	0.10
Chloroform	ppbv	74.6	364	0.488	8.29	0.10	40.5	0.488	4546687	0.10
Carbon Tetrachloride	ppbv	<0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4546687	0.10
1,1-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546687	0.10
1,2-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546687	0.10
Ethylene Dibromide	ppbv	<0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4546687	0.10
1,1,1-Trichloroethane	ppbv	<0.10	<0.546	0.546	0.76	0.10	4.17	0.546	4546687	0.10
1,1,2-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4546687	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546687	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546687	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546687	0.10
1,2-Dichloropropane	ppbv	<0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4546687	0.10
Bromomethane	ppbv	<0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4546687	0.10
Bromoform	ppbv	<0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4546687	0.10
Bromodichloromethane	ppbv	0.66	4.42	1.34	<0.20	0.20	<1.34	1.34	4546687	0.10
Dibromochloromethane	ppbv	<0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4546687	0.10
Trichloroethylene	ppbv	<0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4546687	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV327			CNV328					
Sampling Date		2016/06/13			2016/06/13					
COC Number		na			na					
	UNITS	35/2239	ug/m3	DL (ug/m3)	5/1928	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4546687	0.10
Benzene	ppbv	1.41	4.51	0.319	0.34	0.10	1.10	0.319	4546687	0.10
Toluene	ppbv	11.0	41.5	0.376	1.19	0.10	4.46	0.376	4546687	0.10
Ethylbenzene	ppbv	4.80	20.9	0.434	0.93	0.10	4.04	0.434	4546687	0.10
p+m-Xylene	ppbv	20.6	89.3	0.868	3.85	0.20	16.7	0.868	4546687	0.10
o-Xylene	ppbv	8.98	39.0	0.434	2.01	0.10	8.73	0.434	4546687	0.10
Styrene	ppbv	0.10	0.433	0.426	<0.10	0.10	<0.426	0.426	4546687	0.10
4-ethyltoluene	ppbv	3.89	19.1	2.46	0.71	0.50	3.50	2.46	4546687	0.50
1,3,5-Trimethylbenzene	ppbv	3.90	19.2	2.46	0.99	0.50	4.85	2.46	4546687	0.10
1,2,4-Trimethylbenzene	ppbv	13.8	67.9	2.46	2.24	0.50	11.0	2.46	4546687	0.10
Chlorobenzene	ppbv	<0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4546687	0.10
Benzyl chloride	ppbv	<0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4546687	0.20
1,3-Dichlorobenzene	ppbv	<0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4546687	0.10
1,4-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546687	0.10
1,2-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546687	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4546687	0.40
Hexachlorobutadiene	ppbv	<0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4546687	0.50
Hexane	ppbv	0.48	1.69	1.06	1.14	0.30	4.00	1.06	4546687	0.10
Heptane	ppbv	0.77	3.14	1.23	0.34	0.30	1.38	1.23	4546687	0.10
Cyclohexane	ppbv	0.22	0.746	0.688	0.51	0.20	1.74	0.688	4546687	0.10
Tetrahydrofuran	ppbv	<0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4546687	0.10
1,4-Dioxane	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546687	0.40
Naphthalene	ppbv	<0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4546687	N/A
Total Xylenes	ppbv	29.6	128	1.30	5.86	0.30	25.5	1.30	4546687	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546687	N/A
Vinyl Bromide	ppbv	<0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4546687	0.10
Propene	ppbv	1.41	2.42	0.861	3.04	0.50	5.24	0.861	4546687	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	<0.934	0.934	0.32	0.20	1.52	0.934	4546687	0.10
Carbon Disulfide	ppbv	1.91	5.95	1.56	2.82	0.50	8.78	1.56	4546687	0.10
Vinyl Acetate	ppbv	<0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4546687	0.10
Surrogate Recovery (%)										
Bromochloromethane	%	100	N/A	N/A	99		N/A	N/A	4546687	
D5-Chlorobenzene	%	97	N/A	N/A	95		N/A	N/A	4546687	
Difluorobenzene	%	100	N/A	N/A	100		N/A	N/A	4546687	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV329					
Sampling Date		2016/06/13					
COC Number		na					
	UNITS	1/1197	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	<740	740	<3660	3660	4546687	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<630	630	<4400	4400	4546687	0.10
Chloromethane	ppbv	<1100	1100	<2290	2290	4546687	0.10
Vinyl Chloride	ppbv	<370	370	<946	946	4546687	0.10
Chloroethane	ppbv	<1100	1100	<2930	2930	4546687	0.10
1,3-Butadiene	ppbv	<1900	1900	<4090	4090	4546687	0.10
Trichlorofluoromethane (FREON 11)	ppbv	<740	740	<4160	4160	4546687	0.10
Ethanol (ethyl alcohol)	ppbv	<3700	3700	<6970	6970	4546687	0.50
Trichlorotrifluoroethane	ppbv	<560	560	<4250	4250	4546687	0.10
2-propanol	ppbv	<3700	3700	<9100	9100	4546687	0.60
2-Propanone	ppbv	<4700000	4700000	<11300000	11300000	4546687	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1400000	1400000	<4040000	4040000	4546687	0.60
Methyl Isobutyl Ketone	ppbv	<3700	3700	<15200	15200	4546687	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<3700	3700	<15200	15200	4546687	0.40
Methyl t-butyl ether (MTBE)	ppbv	<740	740	<2670	2670	4546687	0.10
Ethyl Acetate	ppbv	<3700	3700	<13300	13300	4546687	0.50
1,1-Dichloroethylene	ppbv	<370	370	<1470	1470	4546687	0.10
cis-1,2-Dichloroethylene	ppbv	<370	370	<1470	1470	4546687	0.10
trans-1,2-Dichloroethylene	ppbv	<370	370	<1470	1470	4546687	0.10
Methylene Chloride(Dichloromethane)	ppbv	<3000	3000	<10300	10300	4546687	0.10
Chloroform	ppbv	<370	370	<1810	1810	4546687	0.10
Carbon Tetrachloride	ppbv	<370	370	<2330	2330	4546687	0.10
1,1-Dichloroethane	ppbv	<370	370	<1500	1500	4546687	0.10
1,2-Dichloroethane	ppbv	<370	370	<1500	1500	4546687	0.10
Ethylene Dibromide	ppbv	<370	370	<2840	2840	4546687	0.10
1,1,1-Trichloroethane	ppbv	<370	370	<2020	2020	4546687	0.10
1,1,2-Trichloroethane	ppbv	<370	370	<2020	2020	4546687	0.10
1,1,2,2-Tetrachloroethane	ppbv	<370	370	<2540	2540	4546687	0.10
cis-1,3-Dichloropropene	ppbv	<370	370	<1680	1680	4546687	0.10
trans-1,3-Dichloropropene	ppbv	<370	370	<1680	1680	4546687	0.10
1,2-Dichloropropane	ppbv	<370	370	<1710	1710	4546687	0.10
Bromomethane	ppbv	<370	370	<1440	1440	4546687	0.10
Bromoform	ppbv	<740	740	<7650	7650	4546687	0.10
Bromodichloromethane	ppbv	<740	740	<4960	4960	4546687	0.10
Dibromochloromethane	ppbv	<740	740	<6310	6310	4546687	0.10
Trichloroethylene	ppbv	<370	370	<1990	1990	4546687	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV329					
Sampling Date		2016/06/13					
COC Number		na					
	UNITS	1/1197	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<370	370	<2510	2510	4546687	0.10
Benzene	ppbv	178000	370	570000	1180	4546687	0.10
Toluene	ppbv	227000	370	855000	1390	4546687	0.10
Ethylbenzene	ppbv	62600	370	272000	1610	4546687	0.10
p+m-Xylene	ppbv	332000	740	1440000	3210	4546687	0.10
o-Xylene	ppbv	106000	370	462000	1610	4546687	0.10
Styrene	ppbv	<370	370	<1580	1580	4546687	0.10
4-ethyltoluene	ppbv	20100	1900	98800	9100	4546687	0.50
1,3,5-Trimethylbenzene	ppbv	28600	1900	141000	9100	4546687	0.10
1,2,4-Trimethylbenzene	ppbv	59600	1900	293000	9100	4546687	0.10
Chlorobenzene	ppbv	<370	370	<1700	1700	4546687	0.10
Benzyl chloride	ppbv	<1900	1900	<9580	9580	4546687	0.20
1,3-Dichlorobenzene	ppbv	<1500	1500	<8900	8900	4546687	0.10
1,4-Dichlorobenzene	ppbv	<370	370	<2230	2230	4546687	0.10
1,2-Dichlorobenzene	ppbv	<370	370	<2230	2230	4546687	0.10
1,2,4-Trichlorobenzene	ppbv	<1900	1900	<13700	13700	4546687	0.40
Hexachlorobutadiene	ppbv	<1900	1900	<19700	19700	4546687	0.50
Hexane	ppbv	2180000	11000	7690000	39100	4546687	0.10
Heptane	ppbv	537000	1100	2200000	4550	4546687	0.10
Cyclohexane	ppbv	481000	740	1660000	2550	4546687	0.10
Tetrahydrofuran	ppbv	<1500	1500	<4370	4370	4546687	0.10
1,4-Dioxane	ppbv	<3700	3700	<13300	13300	4546687	0.40
Naphthalene	ppbv	<1900	1900	<9700	9700	4546687	N/A
Total Xylenes	ppbv	438000	1100	1900000	4820	4546687	0.10
1,1,1,2-Tetrachloroethane	ppbv	<370	370	<2540	2540	4546687	N/A
Vinyl Bromide	ppbv	<740	740	<3240	3240	4546687	0.10
Propene	ppbv	6050	1900	10400	3180	4546687	0.30
2,2,4-Trimethylpentane	ppbv	1090000	7400	5110000	34600	4546687	0.10
Carbon Disulfide	ppbv	<1900	1900	<5760	5760	4546687	0.10
Vinyl Acetate	ppbv	<240000	240000	<847000	847000	4546687	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	93		N/A	N/A	4546687	
D5-Chlorobenzene	%	100		N/A	N/A	4546687	
Difluorobenzene	%	95		N/A	N/A	4546687	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV330					
Sampling Date		2016/06/13					
COC Number		na					
	UNITS	91/1430	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	<2800	2800	<13900	13900	4546687	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<2400	2400	<16700	16700	4546687	0.10
Chloromethane	ppbv	<4200	4200	<8710	8710	4546687	0.10
Vinyl Chloride	ppbv	<1400	1400	<3590	3590	4546687	0.10
Chloroethane	ppbv	<4200	4200	<11100	11100	4546687	0.10
1,3-Butadiene	ppbv	<7000	7000	<15600	15600	4546687	0.10
Trichlorofluoromethane (FREON 11)	ppbv	<2800	2800	<15800	15800	4546687	0.10
Ethanol (ethyl alcohol)	ppbv	<14000	14000	<26500	26500	4546687	0.50
Trichlorotrifluoroethane	ppbv	<2100	2100	<16200	16200	4546687	0.10
2-propanol	ppbv	<14000	14000	<34600	34600	4546687	0.60
2-Propanone	ppbv	<4300000	4300000	<10300000	10300000	4546687	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1300000	1300000	<3980000	3980000	4546687	0.60
Methyl Isobutyl Ketone	ppbv	<14000	14000	<57600	57600	4546687	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<14000	14000	<57600	57600	4546687	0.40
Methyl t-butyl ether (MTBE)	ppbv	<2800	2800	<10100	10100	4546687	0.10
Ethyl Acetate	ppbv	<14000	14000	<50700	50700	4546687	0.50
1,1-Dichloroethylene	ppbv	<1400	1400	<5580	5580	4546687	0.10
cis-1,2-Dichloroethylene	ppbv	<1400	1400	<5580	5580	4546687	0.10
trans-1,2-Dichloroethylene	ppbv	<1400	1400	<5580	5580	4546687	0.10
Methylene Chloride(Dichloromethane)	ppbv	<11000	11000	<39100	39100	4546687	0.10
Chloroform	ppbv	<1400	1400	<6870	6870	4546687	0.10
Carbon Tetrachloride	ppbv	<1400	1400	<8850	8850	4546687	0.10
1,1-Dichloroethane	ppbv	<4200	4200	<17100	17100	4546687	0.10
1,2-Dichloroethane	ppbv	<1400	1400	<5690	5690	4546687	0.10
Ethylene Dibromide	ppbv	<1400	1400	<10800	10800	4546687	0.10
1,1,1-Trichloroethane	ppbv	<1400	1400	<7670	7670	4546687	0.10
1,1,2-Trichloroethane	ppbv	<1400	1400	<7670	7670	4546687	0.10
1,1,2,2-Tetrachloroethane	ppbv	<1400	1400	<9650	9650	4546687	0.10
cis-1,3-Dichloropropene	ppbv	<1400	1400	<6380	6380	4546687	0.10
trans-1,3-Dichloropropene	ppbv	<1400	1400	<6380	6380	4546687	0.10
1,2-Dichloropropane	ppbv	<1400	1400	<6500	6500	4546687	0.10
Bromomethane	ppbv	<1400	1400	<5460	5460	4546687	0.10
Bromoform	ppbv	<2800	2800	<29100	29100	4546687	0.10
Bromodichloromethane	ppbv	<2800	2800	<18800	18800	4546687	0.10
Dibromochloromethane	ppbv	<2800	2800	<24000	24000	4546687	0.10
Trichloroethylene	ppbv	<1400	1400	<7560	7560	4546687	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV330					
Sampling Date		2016/06/13					
COC Number		na					
	UNITS	91/1430	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<1400	1400	<9540	9540	4546687	0.10
Benzene	ppbv	178000	1400	570000	4490	4546687	0.10
Toluene	ppbv	223000	1400	839000	5290	4546687	0.10
Ethylbenzene	ppbv	60800	1400	264000	6110	4546687	0.10
p+m-Xylene	ppbv	330000	2800	1430000	12200	4546687	0.10
o-Xylene	ppbv	102000	1400	445000	6110	4546687	0.10
Styrene	ppbv	<1400	1400	<5990	5990	4546687	0.10
4-ethyltoluene	ppbv	18200	7000	89600	34600	4546687	0.50
1,3,5-Trimethylbenzene	ppbv	26200	7000	129000	34600	4546687	0.10
1,2,4-Trimethylbenzene	ppbv	52700	7000	259000	34600	4546687	0.10
Chlorobenzene	ppbv	<1400	1400	<6470	6470	4546687	0.10
Benzyl chloride	ppbv	<7000	7000	<36400	36400	4546687	0.20
1,3-Dichlorobenzene	ppbv	<5600	5600	<33800	33800	4546687	0.10
1,4-Dichlorobenzene	ppbv	<1400	1400	<8450	8450	4546687	0.10
1,2-Dichlorobenzene	ppbv	<1400	1400	<8450	8450	4546687	0.10
1,2,4-Trichlorobenzene	ppbv	<7000	7000	<52200	52200	4546687	0.40
Hexachlorobutadiene	ppbv	<7000	7000	<75000	75000	4546687	0.50
Hexane	ppbv	2280000	4200	8030000	14900	4546687	0.10
Heptane	ppbv	567000	4200	2320000	17300	4546687	0.10
Cyclohexane	ppbv	457000	2800	1570000	9680	4546687	0.10
Tetrahydrofuran	ppbv	<5600	5600	<16600	16600	4546687	0.10
1,4-Dioxane	ppbv	<14000	14000	<50700	50700	4546687	0.40
Naphthalene	ppbv	<7000	7000	<36900	36900	4546687	N/A
Total Xylenes	ppbv	433000	4200	1880000	18300	4546687	0.10
1,1,1,2-Tetrachloroethane	ppbv	<1400	1400	<9650	9650	4546687	N/A
Vinyl Bromide	ppbv	<2800	2800	<12300	12300	4546687	0.10
Propene	ppbv	<9800	9800	<16900	16900	4546687	0.30
2,2,4-Trimethylpentane	ppbv	1150000	2800	5350000	13100	4546687	0.10
Carbon Disulfide	ppbv	<7000	7000	<21900	21900	4546687	0.10
Vinyl Acetate	ppbv	<280000	280000	<990000	990000	4546687	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	112		N/A	N/A	4546687	
D5-Chlorobenzene	%	113		N/A	N/A	4546687	
Difluorobenzene	%	112		N/A	N/A	4546687	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV331				CNV332					
Sampling Date		2016/06/13				2016/06/13					
COC Number		na				na					
	UNITS	2/1480	RDL	ug/m3	DL (ug/m3)	4/1014	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	2.86	0.20	14.1	0.989	4.68	0.20	23.2	0.989	4546379	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4546379	0.10
Chloromethane	ppbv	0.49	0.30	1.02	0.620	<0.30	0.30	<0.620	0.620	4546379	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4546379	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4546379	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4546379	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.20	0.20	1.14	1.12	1.21	0.20	6.80	1.12	4546379	0.10
Ethanol (ethyl alcohol)	ppbv	1.3	1.0	2.37	1.88	<1.0	1.0	<1.88	1.88	4546379	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4546379	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	1.3	1.0	3.29	2.46	4546379	0.60
2-Propanone	ppbv	5.36	0.80	12.7	1.90	2.10	0.80	4.98	1.90	4546379	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4546379	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4546379	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4546379	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4546379	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546379	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4546379	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	1.51	0.10	7.35	0.488	4546379	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4546379	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546379	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546379	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4546379	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546379	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546379	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546379	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4546379	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4546379	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4546379	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4546379	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4546379	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4546379	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV331				CNV332					
Sampling Date		2016/06/13				2016/06/13					
COC Number		na				na					
	UNITS	2/1480	RDL	ug/m3	DL (ug/m3)	4/1014	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4546379	0.10
Benzene	ppbv	0.12	0.10	0.386	0.319	0.16	0.10	0.512	0.319	4546379	0.10
Toluene	ppbv	0.57	0.10	2.13	0.376	0.89	0.10	3.35	0.376	4546379	0.10
Ethylbenzene	ppbv	0.11	0.10	0.494	0.434	0.33	0.10	1.43	0.434	4546379	0.10
p+m-Xylene	ppbv	0.41	0.20	1.79	0.868	1.53	0.20	6.66	0.868	4546379	0.10
o-Xylene	ppbv	0.15	0.10	0.663	0.434	0.82	0.10	3.56	0.434	4546379	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	<0.10	0.10	<0.426	0.426	4546379	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4546379	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4546379	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	1.95	0.50	9.58	2.46	4546379	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4546379	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4546379	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4546379	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4546379	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4546379	0.50
Hexane	ppbv	1.77	0.30	6.23	1.06	<0.30	0.30	<1.06	1.06	4546379	0.10
Heptane	ppbv	1.33	0.30	5.46	1.23	0.30	0.30	1.24	1.23	4546379	0.10
Cyclohexane	ppbv	0.36	0.20	1.23	0.688	<0.20	0.20	<0.688	0.688	4546379	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4546379	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546379	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4546379	N/A
Total Xylenes	ppbv	0.57	0.30	2.46	1.30	2.35	0.30	10.2	1.30	4546379	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546379	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4546379	0.10
Propene	ppbv	<0.60	0.60	<1.03	1.03	<0.70	0.70	<1.20	1.20	4546379	0.30
2,2,4-Trimethylpentane	ppbv	5.89	0.20	27.5	0.934	<0.20	0.20	<0.934	0.934	4546379	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	0.64	0.50	2.01	1.56	4546379	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4546379	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	85		N/A	N/A	83		N/A	N/A	4546379	
D5-Chlorobenzene	%	80		N/A	N/A	79		N/A	N/A	4546379	
Difluorobenzene	%	85		N/A	N/A	83		N/A	N/A	4546379	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV333				CNV334					
Sampling Date		2016/06/13				2016/06/14					
COC Number		na				na					
	UNITS	3/1195	RDL	ug/m3	DL (ug/m3)	12/1763	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	1.47	0.20	7.29	0.989	0.60	0.20	2.97	0.989	4546379	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4546379	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	0.50	0.30	1.03	0.620	4546379	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4546379	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4546379	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4546379	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.41	0.20	2.30	1.12	0.21	0.20	1.16	1.12	4546379	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	1.6	1.0	3.04	1.88	4546379	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4546379	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4546379	0.60
2-Propanone	ppbv	5.28	0.80	12.6	1.90	4.60	0.80	10.9	1.90	4546379	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<1.0	1.0	<2.95	2.95	4546379	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4546379	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4546379	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4546379	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546379	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4546379	0.10
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	<2.78	2.78	<0.80	0.80	<2.78	2.78	4546379	0.10
Chloroform	ppbv	2.62	0.10	12.8	0.488	<0.10	0.10	<0.488	0.488	4546379	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4546379	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546379	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4546379	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4546379	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546379	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546379	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4546379	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4546379	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4546379	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4546379	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4546379	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4546379	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4546379	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV333				CNV334					
Sampling Date		2016/06/13				2016/06/14					
COC Number		na				na					
	UNITS	3/1195	RDL	ug/m3	DL (ug/m3)	12/1763	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	0.12	0.10	0.812	0.678	<0.10	0.10	<0.678	0.678	4546379	0.10
Benzene	ppbv	0.17	0.10	0.534	0.319	0.13	0.10	0.411	0.319	4546379	0.10
Toluene	ppbv	26.0	0.10	98.0	0.376	0.74	0.10	2.79	0.376	4546379	0.10
Ethylbenzene	ppbv	0.59	0.10	2.57	0.434	0.12	0.10	0.526	0.434	4546379	0.10
p+m-Xylene	ppbv	2.68	0.20	11.6	0.868	0.45	0.20	1.96	0.868	4546379	0.10
o-Xylene	ppbv	1.30	0.10	5.63	0.434	0.18	0.10	0.800	0.434	4546379	0.10
Styrene	ppbv	0.16	0.10	0.666	0.426	<0.10	0.10	<0.426	0.426	4546379	0.10
4-ethyltoluene	ppbv	0.51	0.50	2.52	2.46	<0.50	0.50	<2.46	2.46	4546379	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	<0.50	0.50	<2.46	2.46	4546379	0.10
1,2,4-Trimethylbenzene	ppbv	1.90	0.50	9.36	2.46	<0.50	0.50	<2.46	2.46	4546379	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4546379	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4546379	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4546379	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4546379	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4546379	0.50
Hexane	ppbv	<0.30	0.30	<1.06	1.06	<0.30	0.30	<1.06	1.06	4546379	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	<0.30	0.30	<1.23	1.23	4546379	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	<0.20	0.20	<0.688	0.688	4546379	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4546379	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4546379	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4546379	N/A
Total Xylenes	ppbv	3.98	0.30	17.3	1.30	0.64	0.30	2.76	1.30	4546379	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4546379	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4546379	0.10
Propene	ppbv	<0.50	0.50	<0.861	0.861	<0.80	0.80	<1.38	1.38	4546379	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4546379	0.10
Carbon Disulfide	ppbv	0.57	0.50	1.78	1.56	<0.50	0.50	<1.56	1.56	4546379	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4546379	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	84		N/A	N/A	84		N/A	N/A	4546379	
D5-Chlorobenzene	%	82		N/A	N/A	79		N/A	N/A	4546379	
Difluorobenzene	%	84		N/A	N/A	84		N/A	N/A	4546379	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV335					
Sampling Date		2016/06/14					
COC Number		na					
	UNITS	13A/2236	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	0.56	0.20	2.76	0.989	4546379	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4546379	0.10
Chloromethane	ppbv	0.51	0.30	1.06	0.620	4546379	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4546379	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4546379	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4546379	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.21	0.20	1.17	1.12	4546379	0.10
Ethanol (ethyl alcohol)	ppbv	3.4	1.0	6.45	1.88	4546379	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4546379	0.10
2-propanol	ppbv	1.6	1.0	3.87	2.46	4546379	0.60
2-Propanone	ppbv	4.58	0.80	10.9	1.90	4546379	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	4546379	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4546379	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4546379	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4546379	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4546379	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4546379	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4546379	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4546379	0.10
Methylene Chloride(Dichloromethane)	ppbv	0.99	0.80	3.45	2.78	4546379	0.10
Chloroform	ppbv	<0.10	0.10	<0.488	0.488	4546379	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4546379	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4546379	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4546379	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4546379	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4546379	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4546379	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4546379	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4546379	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4546379	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4546379	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4546379	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4546379	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4546379	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4546379	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV335					
Sampling Date		2016/06/14					
COC Number		na					
	UNITS	13A/2236	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	0.10	0.10	0.680	0.678	4546379	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	4546379	0.10
Toluene	ppbv	0.41	0.10	1.55	0.376	4546379	0.10
Ethylbenzene	ppbv	<0.10	0.10	<0.434	0.434	4546379	0.10
p+m-Xylene	ppbv	0.23	0.20	0.996	0.868	4546379	0.10
o-Xylene	ppbv	<0.10	0.10	<0.434	0.434	4546379	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	4546379	0.10
4-ethyltoluene	ppbv	<0.50	0.50	<2.46	2.46	4546379	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4546379	0.10
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	4546379	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4546379	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4546379	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4546379	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4546379	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4546379	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4546379	0.50
Hexane	ppbv	0.69	0.30	2.42	1.06	4546379	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	4546379	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4546379	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4546379	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4546379	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4546379	N/A
Total Xylenes	ppbv	<0.30	0.30	<1.30	1.30	4546379	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4546379	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4546379	0.10
Propene	ppbv	<0.60	0.60	<1.03	1.03	4546379	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4546379	0.10
Carbon Disulfide	ppbv	<0.50	0.50	<1.56	1.56	4546379	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4546379	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	84		N/A	N/A	4546379	
D5-Chlorobenzene	%	82		N/A	N/A	4546379	
Difluorobenzene	%	84		N/A	N/A	4546379	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV336				CNV337					
Sampling Date		2016/06/14				2016/06/14					
COC Number		na				na					
	UNITS	13B/2076	RDL	ug/m3	DL (ug/m3)	13C/3017	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.72	0.20	3.55	0.989	0.69	0.20	3.43	0.989	4548097	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4548097	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	<0.30	0.30	<0.620	0.620	4548097	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4548097	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4548097	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4548097	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.32	0.20	1.80	1.12	0.36	0.20	2.02	1.12	4548097	0.10
Ethanol (ethyl alcohol)	ppbv	1.4	1.0	2.70	1.88	1.1	1.0	2.02	1.88	4548097	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4548097	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	2.9	1.0	7.05	2.46	4548097	0.60
2-Propanone	ppbv	3.42	0.80	8.13	1.90	4.09	0.80	9.71	1.90	4548097	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.3	1.0	3.81	2.95	1.1	1.0	3.14	2.95	4548097	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4548097	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4548097	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4548097	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4548097	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.03	0.80	3.59	2.78	<0.80	0.80	<2.78	2.78	4548097	0.10
Chloroform	ppbv	18.3	0.10	89.6	0.488	14.9	0.10	72.9	0.488	4548097	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4548097	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4548097	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4548097	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4548097	0.10
1,1,1-Trichloroethane	ppbv	0.20	0.10	1.10	0.546	0.10	0.10	0.573	0.546	4548097	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4548097	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4548097	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4548097	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4548097	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4548097	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4548097	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4548097	0.10
Bromodichloromethane	ppbv	0.67	0.20	4.46	1.34	0.36	0.20	2.42	1.34	4548097	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4548097	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	0.11	0.10	0.585	0.537	4548097	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV336				CNV337					
Sampling Date		2016/06/14				2016/06/14					
COC Number		na				na					
	UNITS	13B/2076	RDL	ug/m3	DL (ug/m3)	13C/3017	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	0.22	0.10	1.50	0.678	0.60	0.10	4.07	0.678	4548097	0.10
Benzene	ppbv	<0.10	0.10	<0.319	0.319	0.17	0.10	0.552	0.319	4548097	0.10
Toluene	ppbv	1.01	0.10	3.81	0.376	1.59	0.10	5.98	0.376	4548097	0.10
Ethylbenzene	ppbv	5.23	0.10	22.7	0.434	9.37	0.10	40.7	0.434	4548097	0.10
p+m-Xylene	ppbv	8.46	0.20	36.7	0.868	21.6	0.20	93.9	0.868	4548097	0.10
o-Xylene	ppbv	3.85	0.10	16.7	0.434	11.9	0.10	51.7	0.434	4548097	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	0.23	0.10	0.992	0.426	4548097	0.10
4-ethyltoluene	ppbv	3.86	0.50	19.0	2.46	14.2	0.50	69.6	2.46	4548097	0.50
1,3,5-Trimethylbenzene	ppbv	6.81	0.50	33.5	2.46	14.2	0.50	69.9	2.46	4548097	0.10
1,2,4-Trimethylbenzene	ppbv	6.31	0.50	31.0	2.46	27.0	0.50	132	2.46	4548097	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4548097	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4548097	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4548097	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4548097	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4548097	0.50
Hexane	ppbv	1.37	0.30	4.82	1.06	0.81	0.30	2.84	1.06	4548097	0.10
Heptane	ppbv	1.01	0.30	4.13	1.23	0.67	0.30	2.77	1.23	4548097	0.10
Cyclohexane	ppbv	0.33	0.20	1.14	0.688	0.21	0.20	0.706	0.688	4548097	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4548097	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4548097	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4548097	N/A
Total Xylenes	ppbv	12.3	0.30	53.4	1.30	33.5	0.30	146	1.30	4548097	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4548097	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4548097	0.10
Propene	ppbv	<2.5	2.5	<4.30	4.30	3.01	0.50	5.18	0.861	4548097	0.30
2,2,4-Trimethylpentane	ppbv	0.25	0.20	1.16	0.934	<0.20	0.20	<0.934	0.934	4548097	0.10
Carbon Disulfide	ppbv	7.39	0.50	23.0	1.56	9.42	0.50	29.3	1.56	4548097	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4548097	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	86		N/A	N/A	99		N/A	N/A	4548097	
D5-Chlorobenzene	%	79		N/A	N/A	86		N/A	N/A	4548097	
Difluorobenzene	%	84		N/A	N/A	93		N/A	N/A	4548097	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV341					
Sampling Date		2016/06/14					
COC Number		na					
	UNITS	14/2510	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	1.03	0.20	5.11	0.989	4548097	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4548097	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	4548097	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4548097	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4548097	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4548097	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.25	0.20	1.42	1.12	4548097	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	4548097	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4548097	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4548097	0.60
2-Propanone	ppbv	<0.80	0.80	<1.90	1.90	4548097	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	4548097	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4548097	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4548097	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4548097	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4548097	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4548097	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4548097	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4548097	0.10
Methylene Chloride(Dichloromethane)	ppbv	0.97	0.80	3.38	2.78	4548097	0.10
Chloroform	ppbv	2.50	0.10	12.2	0.488	4548097	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4548097	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4548097	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4548097	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4548097	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4548097	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4548097	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4548097	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4548097	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4548097	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4548097	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4548097	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4548097	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4548097	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4548097	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4548097	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV341					
Sampling Date		2016/06/14					
COC Number		na					
	UNITS	14/2510	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	0.10	0.10	0.702	0.678	4548097	0.10
Benzene	ppbv	0.38	0.10	1.20	0.319	4548097	0.10
Toluene	ppbv	3.55	0.10	13.3	0.376	4548097	0.10
Ethylbenzene	ppbv	4.96	0.10	21.6	0.434	4548097	0.10
p+m-Xylene	ppbv	3.77	0.20	16.4	0.868	4548097	0.10
o-Xylene	ppbv	7.26	0.10	31.5	0.434	4548097	0.10
Styrene	ppbv	0.36	0.10	1.54	0.426	4548097	0.10
4-ethyltoluene	ppbv	2.25	0.50	11.1	2.46	4548097	0.50
1,3,5-Trimethylbenzene	ppbv	1.54	0.50	7.55	2.46	4548097	0.10
1,2,4-Trimethylbenzene	ppbv	2.84	0.50	14.0	2.46	4548097	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4548097	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4548097	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4548097	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4548097	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4548097	0.50
Hexane	ppbv	23.1	0.30	81.4	1.06	4548097	0.10
Heptane	ppbv	13.1	0.30	53.6	1.23	4548097	0.10
Cyclohexane	ppbv	6.36	0.20	21.9	0.688	4548097	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4548097	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4548097	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4548097	N/A
Total Xylenes	ppbv	11.0	0.30	47.9	1.30	4548097	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4548097	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4548097	0.10
Propene	ppbv	448	2.3	772	3.96	4548097	0.30
2,2,4-Trimethylpentane	ppbv	1.41	0.20	6.59	0.934	4548097	0.10
Carbon Disulfide	ppbv	27.4	0.50	85.4	1.56	4548097	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4548097	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	131		N/A	N/A	4548097	
D5-Chlorobenzene	%	123		N/A	N/A	4548097	
Difluorobenzene	%	130		N/A	N/A	4548097	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV342					
Sampling Date		2016/06/15					
COC Number		na					
	UNITS	37/1160	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics							
Dichlorodifluoromethane (FREON 12)	ppbv	0.68	0.20	3.36	0.989	4549967	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	4549967	0.10
Chloromethane	ppbv	<0.30	0.30	<0.620	0.620	4549967	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	4549967	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	4549967	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	4549967	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.41	0.20	2.30	1.12	4549967	0.10
Ethanol (ethyl alcohol)	ppbv	1.4	1.0	2.59	1.88	4549967	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	4549967	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	4549967	0.60
2-Propanone	ppbv	3.65	0.80	8.67	1.90	4549967	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.2	1.0	3.48	2.95	4549967	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	4549967	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	4549967	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	4549967	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	4549967	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4549967	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4549967	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	4549967	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.20	0.80	4.17	2.78	4549967	0.10
Chloroform	ppbv	0.75	0.10	3.66	0.488	4549967	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	4549967	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4549967	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	4549967	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	4549967	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4549967	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	4549967	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4549967	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4549967	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	4549967	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	4549967	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	4549967	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	4549967	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	4549967	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	4549967	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	4549967	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV342					
Sampling Date		2016/06/15					
COC Number		na					
	UNITS	37/1160	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	4549967	0.10
Benzene	ppbv	0.21	0.10	0.686	0.319	4549967	0.10
Toluene	ppbv	4.79	0.10	18.0	0.376	4549967	0.10
Ethylbenzene	ppbv	1.08	0.10	4.67	0.434	4549967	0.10
p+m-Xylene	ppbv	4.10	0.20	17.8	0.868	4549967	0.10
o-Xylene	ppbv	1.94	0.10	8.41	0.434	4549967	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	4549967	0.10
4-ethyltoluene	ppbv	0.95	0.50	4.66	2.46	4549967	0.50
1,3,5-Trimethylbenzene	ppbv	0.86	0.50	4.23	2.46	4549967	0.10
1,2,4-Trimethylbenzene	ppbv	2.79	0.50	13.7	2.46	4549967	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	4549967	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	4549967	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	4549967	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4549967	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	4549967	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	4549967	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	4549967	0.50
Hexane	ppbv	0.81	0.30	2.84	1.06	4549967	0.10
Heptane	ppbv	<0.30	0.30	<1.23	1.23	4549967	0.10
Cyclohexane	ppbv	<0.20	0.20	<0.688	0.688	4549967	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	4549967	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	4549967	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	4549967	N/A
Total Xylenes	ppbv	6.03	0.30	26.2	1.30	4549967	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	4549967	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	4549967	0.10
Propene	ppbv	<2.0	2.0	<3.44	3.44	4549967	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.934	0.934	4549967	0.10
Carbon Disulfide	ppbv	2.44	0.50	7.60	1.56	4549967	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	4549967	0.10
Surrogate Recovery (%)							
Bromochloromethane	%	85		N/A	N/A	4549967	
D5-Chlorobenzene	%	76		N/A	N/A	4549967	
Difluorobenzene	%	83		N/A	N/A	4549967	

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

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV343			CNV344					
Sampling Date		2016/06/15			2016/06/15					
COC Number		na			na					
	UNITS	937/2523	ug/m3	DL (ug/m3)	18A/2486	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics										
Dichlorodifluoromethane (FREON 12)	ppbv	0.64	3.19	0.989	1.56	0.20	7.71	0.989	4548097	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<1.19	1.19	<0.17	0.17	<1.19	1.19	4548097	0.10
Chloromethane	ppbv	<0.30	<0.620	0.620	0.77	0.30	1.58	0.620	4548097	0.10
Vinyl Chloride	ppbv	<0.10	<0.256	0.256	<0.10	0.10	<0.256	0.256	4548097	0.10
Chloroethane	ppbv	<0.30	<0.792	0.792	<0.30	0.30	<0.792	0.792	4548097	0.10
1,3-Butadiene	ppbv	<0.50	<1.11	1.11	<0.50	0.50	<1.11	1.11	4548097	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.34	1.89	1.12	0.32	0.20	1.79	1.12	4548097	0.10
Ethanol (ethyl alcohol)	ppbv	2.2	4.06	1.88	1.0	1.0	1.93	1.88	4548097	0.50
Trichlorotrifluoroethane	ppbv	<0.15	<1.15	1.15	<0.15	0.15	<1.15	1.15	4548097	0.10
2-propanol	ppbv	<1.0	<2.46	2.46	<1.0	1.0	<2.46	2.46	4548097	0.60
2-Propanone	ppbv	3.42	8.12	1.90	10.4	0.80	24.7	1.90	4548097	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.3	3.94	2.95	2.1	1.0	6.08	2.95	4548097	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4548097	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<4.10	4.10	<1.0	1.0	<4.10	4.10	4548097	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.721	0.721	<0.20	0.20	<0.721	0.721	4548097	0.10
Ethyl Acetate	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4548097	0.50
1,1-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.396	0.396	<0.10	0.10	<0.396	0.396	4548097	0.10
Methylene Chloride(Dichloromethane)	ppbv	1.38	4.79	2.78	1.01	0.80	3.50	2.78	4548097	0.10
Chloroform	ppbv	0.63	3.09	0.488	0.54	0.10	2.63	0.488	4548097	0.10
Carbon Tetrachloride	ppbv	<0.10	<0.629	0.629	<0.10	0.10	<0.629	0.629	4548097	0.10
1,1-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4548097	0.10
1,2-Dichloroethane	ppbv	<0.10	<0.405	0.405	<0.10	0.10	<0.405	0.405	4548097	0.10
Ethylene Dibromide	ppbv	<0.10	<0.768	0.768	<0.10	0.10	<0.768	0.768	4548097	0.10
1,1,1-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4548097	0.10
1,1,2-Trichloroethane	ppbv	<0.10	<0.546	0.546	<0.10	0.10	<0.546	0.546	4548097	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4548097	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4548097	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	<0.454	0.454	<0.10	0.10	<0.454	0.454	4548097	0.10
1,2-Dichloropropane	ppbv	<0.10	<0.462	0.462	<0.10	0.10	<0.462	0.462	4548097	0.10
Bromomethane	ppbv	<0.10	<0.388	0.388	<0.10	0.10	<0.388	0.388	4548097	0.10
Bromoform	ppbv	<0.20	<2.07	2.07	<0.20	0.20	<2.07	2.07	4548097	0.10
Bromodichloromethane	ppbv	<0.20	<1.34	1.34	<0.20	0.20	<1.34	1.34	4548097	0.10
Dibromochloromethane	ppbv	<0.20	<1.70	1.70	<0.20	0.20	<1.70	1.70	4548097	0.10
Trichloroethylene	ppbv	<0.10	<0.537	0.537	<0.10	0.10	<0.537	0.537	4548097	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV343			CNV344					
Sampling Date		2016/06/15			2016/06/15					
COC Number		na			na					
	UNITS	937/2523	ug/m3	DL (ug/m3)	18A/2486	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	<0.678	0.678	<0.10	0.10	<0.678	0.678	4548097	0.10
Benzene	ppbv	0.20	0.630	0.319	0.31	0.10	0.978	0.319	4548097	0.10
Toluene	ppbv	3.82	14.4	0.376	4.97	0.10	18.7	0.376	4548097	0.10
Ethylbenzene	ppbv	0.88	3.83	0.434	0.50	0.10	2.16	0.434	4548097	0.10
p+m-Xylene	ppbv	3.18	13.8	0.868	1.86	0.20	8.06	0.868	4548097	0.10
o-Xylene	ppbv	1.47	6.38	0.434	1.02	0.10	4.43	0.434	4548097	0.10
Styrene	ppbv	<0.10	<0.426	0.426	<0.10	0.10	<0.426	0.426	4548097	0.10
4-ethyltoluene	ppbv	0.67	3.29	2.46	<0.50	0.50	<2.46	2.46	4548097	0.50
1,3,5-Trimethylbenzene	ppbv	0.60	2.96	2.46	<0.50	0.50	<2.46	2.46	4548097	0.10
1,2,4-Trimethylbenzene	ppbv	1.98	9.73	2.46	0.72	0.50	3.52	2.46	4548097	0.10
Chlorobenzene	ppbv	<0.10	<0.460	0.460	<0.10	0.10	<0.460	0.460	4548097	0.10
Benzyl chloride	ppbv	<0.50	<2.59	2.59	<0.50	0.50	<2.59	2.59	4548097	0.20
1,3-Dichlorobenzene	ppbv	<0.40	<2.40	2.40	<0.40	0.40	<2.40	2.40	4548097	0.10
1,4-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2-Dichlorobenzene	ppbv	<0.10	<0.601	0.601	<0.10	0.10	<0.601	0.601	4548097	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	<3.71	3.71	<0.50	0.50	<3.71	3.71	4548097	0.40
Hexachlorobutadiene	ppbv	<0.50	<5.33	5.33	<0.50	0.50	<5.33	5.33	4548097	0.50
Hexane	ppbv	1.10	3.88	1.06	1.19	0.30	4.18	1.06	4548097	0.10
Heptane	ppbv	<0.30	<1.23	1.23	4.27	0.30	17.5	1.23	4548097	0.10
Cyclohexane	ppbv	<0.20	<0.688	0.688	0.82	0.20	2.82	0.688	4548097	0.10
Tetrahydrofuran	ppbv	<0.40	<1.18	1.18	<0.40	0.40	<1.18	1.18	4548097	0.10
1,4-Dioxane	ppbv	<1.0	<3.60	3.60	<1.0	1.0	<3.60	3.60	4548097	0.40
Naphthalene	ppbv	<0.50	<2.62	2.62	<0.50	0.50	<2.62	2.62	4548097	N/A
Total Xylenes	ppbv	4.65	20.2	1.30	2.88	0.30	12.5	1.30	4548097	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.687	0.687	<0.10	0.10	<0.687	0.687	4548097	N/A
Vinyl Bromide	ppbv	<0.20	<0.875	0.875	<0.20	0.20	<0.875	0.875	4548097	0.10
Propene	ppbv	1.93	3.32	0.861	3.77	0.50	6.49	0.861	4548097	0.30
2,2,4-Trimethylpentane	ppbv	<0.20	<0.934	0.934	<0.20	0.20	<0.934	0.934	4548097	0.10
Carbon Disulfide	ppbv	2.11	6.58	1.56	<0.50	0.50	<1.56	1.56	4548097	0.10
Vinyl Acetate	ppbv	<0.20	<0.704	0.704	<0.20	0.20	<0.704	0.704	4548097	0.10
Surrogate Recovery (%)										
Bromochloromethane	%	134	N/A	N/A	112		N/A	N/A	4548097	
D5-Chlorobenzene	%	122	N/A	N/A	101		N/A	N/A	4548097	
Difluorobenzene	%	132	N/A	N/A	109		N/A	N/A	4548097	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV345				CNV346					
Sampling Date		2016/06/15				2016/06/15					
COC Number		na				na					
	UNITS	18B/1400	RDL	ug/m3	DL (ug/m3)	18C/1362	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Volatile Organics											
Dichlorodifluoromethane (FREON 12)	ppbv	0.75	0.20	3.72	0.989	1.06	0.40	5.22	1.98	4548097	0.10
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<1.19	1.19	<0.34	0.34	<2.38	2.38	4548097	0.10
Chloromethane	ppbv	0.54	0.30	1.11	0.620	<0.60	0.60	<1.24	1.24	4548097	0.10
Vinyl Chloride	ppbv	<0.10	0.10	<0.256	0.256	<0.20	0.20	<0.511	0.511	4548097	0.10
Chloroethane	ppbv	<0.30	0.30	<0.792	0.792	<0.60	0.60	<1.58	1.58	4548097	0.10
1,3-Butadiene	ppbv	<0.50	0.50	<1.11	1.11	<1.0	1.0	<2.21	2.21	4548097	0.10
Trichlorofluoromethane (FREON 11)	ppbv	0.24	0.20	1.34	1.12	<0.40	0.40	<2.25	2.25	4548097	0.10
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	<1.88	1.88	<2.0	2.0	<3.77	3.77	4548097	0.50
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<1.15	1.15	<0.30	0.30	<2.30	2.30	4548097	0.10
2-propanol	ppbv	<1.0	1.0	<2.46	2.46	<2.0	2.0	<4.92	4.92	4548097	0.60
2-Propanone	ppbv	<0.80	0.80	<1.90	1.90	2.8	1.6	6.75	3.80	4548097	0.20
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	<2.95	2.95	<2.0	2.0	<5.90	5.90	4548097	0.60
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	<4.10	4.10	<2.0	2.0	<8.19	8.19	4548097	0.70
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<4.10	4.10	<2.0	2.0	<8.19	8.19	4548097	0.40
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.721	0.721	<0.40	0.40	<1.44	1.44	4548097	0.10
Ethyl Acetate	ppbv	<1.0	1.0	<3.60	3.60	<2.0	2.0	<7.21	7.21	4548097	0.50
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.20	0.20	<0.793	0.793	4548097	0.10
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.20	0.20	<0.793	0.793	4548097	0.10
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.396	0.396	<0.20	0.20	<0.793	0.793	4548097	0.10
Methylene Chloride(Dichloromethane)	ppbv	0.93	0.80	3.22	2.78	<1.6	1.6	<5.56	5.56	4548097	0.10
Chloroform	ppbv	1.77	0.10	8.63	0.488	13.6	0.20	66.5	0.977	4548097	0.10
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.629	0.629	<0.20	0.20	<1.26	1.26	4548097	0.10
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.20	0.20	<0.809	0.809	4548097	0.10
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.405	0.405	<0.20	0.20	<0.809	0.809	4548097	0.10
Ethylene Dibromide	ppbv	<0.10	0.10	<0.768	0.768	<0.20	0.20	<1.54	1.54	4548097	0.10
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.20	0.20	<1.09	1.09	4548097	0.10
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.546	0.546	<0.20	0.20	<1.09	1.09	4548097	0.10
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.20	0.20	<1.37	1.37	4548097	0.10
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.20	0.20	<0.908	0.908	4548097	0.10
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.454	0.454	<0.20	0.20	<0.908	0.908	4548097	0.10
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.462	0.462	<0.20	0.20	<0.924	0.924	4548097	0.10
Bromomethane	ppbv	<0.10	0.10	<0.388	0.388	<0.20	0.20	<0.777	0.777	4548097	0.10
Bromoform	ppbv	<0.20	0.20	<2.07	2.07	<0.40	0.40	<4.13	4.13	4548097	0.10
Bromodichloromethane	ppbv	<0.20	0.20	<1.34	1.34	0.45	0.40	3.05	2.68	4548097	0.10
Dibromochloromethane	ppbv	<0.20	0.20	<1.70	1.70	<0.40	0.40	<3.41	3.41	4548097	0.10
Trichloroethylene	ppbv	<0.10	0.10	<0.537	0.537	<0.20	0.20	<1.07	1.07	4548097	0.10

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		CNV345				CNV346					
Sampling Date		2016/06/15				2016/06/15					
COC Number		na				na					
	UNITS	18B/1400	RDL	ug/m3	DL (ug/m3)	18C/1362	RDL	ug/m3	DL (ug/m3)	QC Batch	MDL
Tetrachloroethylene	ppbv	<0.10	0.10	<0.678	0.678	<0.20	0.20	<1.36	1.36	4548097	0.10
Benzene	ppbv	0.71	0.10	2.27	0.319	0.90	0.20	2.88	0.639	4548097	0.10
Toluene	ppbv	3.47	0.10	13.0	0.376	3.07	0.20	11.5	0.753	4548097	0.10
Ethylbenzene	ppbv	1.03	0.10	4.48	0.434	1.79	0.20	7.79	0.868	4548097	0.10
p+m-Xylene	ppbv	1.93	0.20	8.39	0.868	2.08	0.40	9.02	1.74	4548097	0.10
o-Xylene	ppbv	0.96	0.10	4.18	0.434	2.82	0.20	12.2	0.868	4548097	0.10
Styrene	ppbv	<0.10	0.10	<0.426	0.426	<0.20	0.20	<0.852	0.852	4548097	0.10
4-ethyltoluene	ppbv	0.96	0.50	4.72	2.46	<1.0	1.0	<4.92	4.92	4548097	0.50
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<2.46	2.46	<1.0	1.0	<4.92	4.92	4548097	0.10
1,2,4-Trimethylbenzene	ppbv	0.69	0.50	3.39	2.46	<1.0	1.0	<4.92	4.92	4548097	0.10
Chlorobenzene	ppbv	<0.10	0.10	<0.460	0.460	<0.20	0.20	<0.921	0.921	4548097	0.10
Benzyl chloride	ppbv	<0.50	0.50	<2.59	2.59	<1.0	1.0	<5.18	5.18	4548097	0.20
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<2.40	2.40	<0.80	0.80	<4.81	4.81	4548097	0.10
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.20	0.20	<1.20	1.20	4548097	0.10
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.601	0.601	<0.20	0.20	<1.20	1.20	4548097	0.10
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<3.71	3.71	<1.0	1.0	<7.42	7.42	4548097	0.40
Hexachlorobutadiene	ppbv	<0.50	0.50	<5.33	5.33	<1.0	1.0	<10.7	10.7	4548097	0.50
Hexane	ppbv	0.96	0.30	3.39	1.06	1.57	0.60	5.54	2.11	4548097	0.10
Heptane	ppbv	0.69	0.30	2.84	1.23	1.70	0.60	6.97	2.46	4548097	0.10
Cyclohexane	ppbv	1.60	0.20	5.50	0.688	5.96	0.40	20.5	1.38	4548097	0.10
Tetrahydrofuran	ppbv	<0.40	0.40	<1.18	1.18	<0.80	0.80	<2.36	2.36	4548097	0.10
1,4-Dioxane	ppbv	<1.0	1.0	<3.60	3.60	<2.0	2.0	<7.21	7.21	4548097	0.40
Naphthalene	ppbv	<0.50	0.50	<2.62	2.62	<1.0	1.0	<5.24	5.24	4548097	N/A
Total Xylenes	ppbv	2.90	0.30	12.6	1.30	4.90	0.60	21.3	2.61	4548097	0.10
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.687	0.687	<0.20	0.20	<1.37	1.37	4548097	N/A
Vinyl Bromide	ppbv	<0.20	0.20	<0.875	0.875	<0.40	0.40	<1.75	1.75	4548097	0.10
Propene	ppbv	37.2	0.50	64.1	0.861	68.6	1.0	118	1.72	4548097	0.30
2,2,4-Trimethylpentane	ppbv	1.27	0.20	5.94	0.934	1.45	0.40	6.80	1.87	4548097	0.10
Carbon Disulfide	ppbv	3.85	0.50	12.0	1.56	15.0	1.0	46.8	3.11	4548097	0.10
Vinyl Acetate	ppbv	<0.20	0.20	<0.704	0.704	<0.40	0.40	<1.41	1.41	4548097	0.10
Surrogate Recovery (%)											
Bromochloromethane	%	105		N/A	N/A	102		N/A	N/A	4548097	
D5-Chlorobenzene	%	96		N/A	N/A	94		N/A	N/A	4548097	
Difluorobenzene	%	102		N/A	N/A	100		N/A	N/A	4548097	

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNV327
Sample ID: 35/2239
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4549924	N/A	2016/06/21	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4550167	N/A	2016/06/20	Diane Temniuk
Canister Pressure (TO-15)	PRES	4547975	N/A	2016/06/20	Diane Temniuk
Volatile Organics in Air (TO-15)	GC/MS	4546687	N/A	2016/06/20	Diane Temniuk

Maxxam ID: CNV328
Sample ID: 5/1928
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4549924	N/A	2016/06/20	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4550167	N/A	2016/06/20	Diane Temniuk
Canister Pressure (TO-15)	PRES	4547975	N/A	2016/06/20	Diane Temniuk
Volatile Organics in Air (TO-15)	GC/MS	4546687	N/A	2016/06/20	Diane Temniuk

Maxxam ID: CNV329
Sample ID: 1/1197
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4549924	N/A	2016/06/20	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4550167	N/A	2016/06/20	Diane Temniuk
Canister Pressure (TO-15)	PRES	4547975	N/A	2016/06/20	Diane Temniuk
Volatile Organics in Air (TO-15)	GC/MS	4546687	N/A	2016/06/20	Diane Temniuk

Maxxam ID: CNV330
Sample ID: 91/1430
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4549924	N/A	2016/06/20	Diane Temniuk
BTEX Fractionation in Air (TO-15mod)	GC/MS	4550167	N/A	2016/06/20	Diane Temniuk
Canister Pressure (TO-15)	PRES	4547975	N/A	2016/06/20	Diane Temniuk
Volatile Organics in Air (TO-15)	GC/MS	4546687	N/A	2016/06/20	Diane Temniuk

Maxxam ID: CNV331
Sample ID: 2/1480
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4547764	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNV331 Dup
Sample ID: 2/1480
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam ID: CNV332
Sample ID: 4/1014
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4547764	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam ID: CNV333
Sample ID: 3/1195
Matrix: AIR

Collected: 2016/06/13
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4547764	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam ID: CNV334
Sample ID: 12/1763
Matrix: AIR

Collected: 2016/06/14
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4547764	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam ID: CNV335
Sample ID: 13A/2236
Matrix: AIR

Collected: 2016/06/14
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4547778	N/A	2016/06/20	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	4547770	N/A	2016/06/20	Yao Liang Sun
Canister Pressure (TO-15)	PRES	4547764	N/A	2016/06/20	Yao Liang Sun
Volatile Organics in Air (TO-15)	GC/MS	4546379	N/A	2016/06/20	Yao Liang Sun

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNV336
Sample ID: 13B/2076
Matrix: AIR

Collected: 2016/06/14
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam ID: CNV337
Sample ID: 13C/3017
Matrix: AIR

Collected: 2016/06/14
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam ID: CNV341
Sample ID: 14/2510
Matrix: AIR

Collected: 2016/06/14
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam ID: CNV342
Sample ID: 37/1160
Matrix: AIR

Collected: 2016/06/15
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553762	N/A	2016/06/22	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553788	N/A	2016/06/22	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552532	N/A	2016/06/22	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4549967	N/A	2016/06/22	Nicholas Smith

Maxxam ID: CNV343
Sample ID: 937/2523
Matrix: AIR

Collected: 2016/06/15
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

TEST SUMMARY

Maxxam ID: CNV344
Sample ID: 18A/2486
Matrix: AIR

Collected: 2016/06/15
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam ID: CNV345
Sample ID: 18B/1400
Matrix: AIR

Collected: 2016/06/15
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553647	N/A	2016/06/21	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam ID: CNV346
Sample ID: 18C/1362
Matrix: AIR

Collected: 2016/06/15
Shipped:
Received: 2016/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4553762	N/A	2016/06/22	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	4553613	N/A	2016/06/21	Nicholas Smith
Canister Pressure (TO-15)	PRES	4552514	N/A	2016/06/21	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	4548097	N/A	2016/06/21	Nicholas Smith

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

Sample CNV327-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNV328-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNV329-01 : Sample was analyzed at a 3701X dilution. The DL's were adjusted accordingly.
The Aliphatic >C6-C8 fraction, CCME F1, Hexane and 2,2,4-trimethylpentane were above calibration range and reanalyzed at a 37010X dilution.
Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
Increased DL for 2-propanone due to interference from pentane
Increased DL for 2-butanone due to interference from hexane
Increased DL for vinyl acetate due to matrix interference

Sample CNV330-01 : Sample was analyzed at a 14062X dilution. The DL's were adjusted accordingly.
Increased DL for propene due to interference from propane
Increased DL for 2-propanone due to interference from pentane
Increased DL for 2-butanone due to interference from hexane
Increased DL for 1,1-dichloroethane and vinyl acetate due to matrix interference

Sample CNV331-01 : Increased DL for propene due to interference from propane.

Sample CNV332-01 : Increased DL for propene due to interference from propane.

Sample CNV334-01 : Increased DL for propene due to interference from propane.

Sample CNV335-01 : Increased DL for propene due to interference from propane.

Sample CNV336-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CNV337-01 : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CNV341-01 : Propene was analyzed at a 4.6X dilution. The DL was adjusted accordingly.
Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNV342-01 : Increased DL for propene due to interference from propane.
2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CNV343-01 : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample CNV344-01 : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.
Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNV345-01 : Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Sample CNV346-01 : Sample was analyzed at a 2X dilution. The DL's were adjusted accordingly.
Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.
F1/F2 CCME was analyzed at a 10X dilution. The DL's were adjusted accordingly.

VOLATILE ORGANICS BY GC/MS (AIR)

Volatile Organics in Air (TO-15): Naphthalene was less than 60% recovery in the continuing calibration standard. The reference standard was acceptable therefore there should be no effect on the data.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4546379	LSY	Spiked Blank	Bromochloromethane	2016/06/20		99	%	60 - 140
			D5-Chlorobenzene	2016/06/20		100	%	60 - 140
			Difluorobenzene	2016/06/20		100	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/20		91	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/20		69 (1)	%	70 - 130
			Chloromethane	2016/06/20		77	%	70 - 130
			Vinyl Chloride	2016/06/20		79	%	70 - 130
			Chloroethane	2016/06/20		77	%	70 - 130
			1,3-Butadiene	2016/06/20		80	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/20		77	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/20		75	%	70 - 130
			Trichlorotrifluoroethane	2016/06/20		100	%	70 - 130
			2-propanol	2016/06/20		92	%	70 - 130
			2-Propanone	2016/06/20		86	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20		100	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/20		100	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20		106	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/20		100	%	70 - 130
			Ethyl Acetate	2016/06/20		103	%	70 - 130
			1,1-Dichloroethylene	2016/06/20		97	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/20		98	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/20		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/20		90	%	70 - 130
			Chloroform	2016/06/20		95	%	70 - 130
			Carbon Tetrachloride	2016/06/20		104	%	70 - 130
			1,1-Dichloroethane	2016/06/20		94	%	70 - 130
			1,2-Dichloroethane	2016/06/20		98	%	70 - 130
			Ethylene Dibromide	2016/06/20		101	%	70 - 130
			1,1,1-Trichloroethane	2016/06/20		95	%	70 - 130
			1,1,2-Trichloroethane	2016/06/20		99	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/20		94	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/20		105	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/20		107	%	70 - 130
			1,2-Dichloropropane	2016/06/20		96	%	70 - 130
			Bromomethane	2016/06/20		82	%	70 - 130
			Bromoform	2016/06/20		116	%	70 - 130
			Bromodichloromethane	2016/06/20		107	%	70 - 130
			Dibromochloromethane	2016/06/20		124	%	70 - 130
			Trichloroethylene	2016/06/20		101	%	70 - 130
			Tetrachloroethylene	2016/06/20		101	%	70 - 130
			Benzene	2016/06/20		97	%	70 - 130
			Toluene	2016/06/20		107	%	70 - 130
			Ethylbenzene	2016/06/20		101	%	70 - 130
			p+m-Xylene	2016/06/20		96	%	70 - 130
			o-Xylene	2016/06/20		97	%	70 - 130
			Styrene	2016/06/20		96	%	70 - 130
			4-ethyltoluene	2016/06/20		106	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/20		98	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/20		99	%	70 - 130
			Chlorobenzene	2016/06/20		99	%	70 - 130
			Benzyl chloride	2016/06/20		108	%	70 - 130
			1,3-Dichlorobenzene	2016/06/20		98	%	70 - 130
			1,4-Dichlorobenzene	2016/06/20		95	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2016/06/20		96	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/20		94	%	70 - 130
			Hexachlorobutadiene	2016/06/20		98	%	70 - 130
			Hexane	2016/06/20		95	%	70 - 130
			Heptane	2016/06/20		99	%	70 - 130
			Cyclohexane	2016/06/20		99	%	70 - 130
			Tetrahydrofuran	2016/06/20		98	%	70 - 130
			1,4-Dioxane	2016/06/20		97	%	70 - 130
			Naphthalene	2016/06/20		95	%	70 - 130
			Total Xylenes	2016/06/20		96	%	70 - 130
			Vinyl Bromide	2016/06/20		83	%	70 - 130
			Propene	2016/06/20		102	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/20		107	%	70 - 130
			Carbon Disulfide	2016/06/20		112	%	70 - 130
			Vinyl Acetate	2016/06/20		96	%	70 - 130
4546379	LSY	Method Blank	Bromochloromethane	2016/06/20		90	%	60 - 140
			D5-Chlorobenzene	2016/06/20		91	%	60 - 140
			Difluorobenzene	2016/06/20		93	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/20	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/20	<0.17		ppbv	
			Chloromethane	2016/06/20	<0.30		ppbv	
			Vinyl Chloride	2016/06/20	<0.10		ppbv	
			Chloroethane	2016/06/20	<0.30		ppbv	
			1,3-Butadiene	2016/06/20	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/20	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/20	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/20	<0.15		ppbv	
			2-propanol	2016/06/20	<1.0		ppbv	
			2-Propanone	2016/06/20	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/20	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/20	<0.20		ppbv	
			Ethyl Acetate	2016/06/20	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/20	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/20	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/20	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/20	<0.80		ppbv	
			Chloroform	2016/06/20	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/20	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/20	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/20	<0.10		ppbv	
			Ethylene Dibromide	2016/06/20	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/20	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/20	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/20	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/20	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/20	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/20	<0.10		ppbv	
			Bromomethane	2016/06/20	<0.10		ppbv	
			Bromoform	2016/06/20	<0.20		ppbv	
			Bromodichloromethane	2016/06/20	<0.20		ppbv	
			Dibromochloromethane	2016/06/20	<0.20		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichloroethylene	2016/06/20	<0.10		ppbv	
			Tetrachloroethylene	2016/06/20	<0.10		ppbv	
			Benzene	2016/06/20	<0.10		ppbv	
			Toluene	2016/06/20	<0.10		ppbv	
			Ethylbenzene	2016/06/20	<0.10		ppbv	
			p+m-Xylene	2016/06/20	<0.20		ppbv	
			o-Xylene	2016/06/20	<0.10		ppbv	
			Styrene	2016/06/20	<0.10		ppbv	
			4-ethyltoluene	2016/06/20	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/20	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/20	<0.50		ppbv	
			Chlorobenzene	2016/06/20	<0.10		ppbv	
			Benzyl chloride	2016/06/20	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/20	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/20	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/20	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/20	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/20	<0.50		ppbv	
			Hexane	2016/06/20	<0.30		ppbv	
			Heptane	2016/06/20	<0.30		ppbv	
			Cyclohexane	2016/06/20	<0.20		ppbv	
			Tetrahydrofuran	2016/06/20	<0.40		ppbv	
			1,4-Dioxane	2016/06/20	<1.0		ppbv	
			Naphthalene	2016/06/20	<0.50		ppbv	
			Total Xylenes	2016/06/20	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/20	<0.10		ppbv	
			Vinyl Bromide	2016/06/20	<0.20		ppbv	
			Propene	2016/06/20	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/20	<0.20		ppbv	
			Carbon Disulfide	2016/06/20	<0.50		ppbv	
			Vinyl Acetate	2016/06/20	<0.20		ppbv	
4546379	LSY	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/20	2.1		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/20	NC		%	25
			Chloromethane	2016/06/20	NC		%	25
			Vinyl Chloride	2016/06/20	NC		%	25
			Chloroethane	2016/06/20	NC		%	25
			1,3-Butadiene	2016/06/20	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/20	NC		%	25
			Ethanol (ethyl alcohol)	2016/06/20	NC		%	25
			Trichlorotrifluoroethane	2016/06/20	NC		%	25
			2-propanol	2016/06/20	NC		%	25
			2-Propanone	2016/06/20	1.2		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20	NC		%	25
			Methyl Isobutyl Ketone	2016/06/20	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/20	NC		%	25
			Ethyl Acetate	2016/06/20	NC		%	25
			1,1-Dichloroethylene	2016/06/20	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/20	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/20	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/20	NC		%	25
			Chloroform	2016/06/20	NC		%	25
			Carbon Tetrachloride	2016/06/20	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,1-Dichloroethane	2016/06/20	NC		%	25
			1,2-Dichloroethane	2016/06/20	NC		%	25
			Ethylene Dibromide	2016/06/20	NC		%	25
			1,1,1-Trichloroethane	2016/06/20	NC		%	25
			1,1,2-Trichloroethane	2016/06/20	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/20	NC		%	25
			cis-1,3-Dichloropropene	2016/06/20	NC		%	25
			trans-1,3-Dichloropropene	2016/06/20	NC		%	25
			1,2-Dichloropropane	2016/06/20	NC		%	25
			Bromomethane	2016/06/20	NC		%	25
			Bromoform	2016/06/20	NC		%	25
			Bromodichloromethane	2016/06/20	NC		%	25
			Dibromochloromethane	2016/06/20	NC		%	25
			Trichloroethylene	2016/06/20	NC		%	25
			Tetrachloroethylene	2016/06/20	NC		%	25
			Benzene	2016/06/20	NC		%	25
			Toluene	2016/06/20	0.31		%	25
			Ethylbenzene	2016/06/20	NC		%	25
			p+m-Xylene	2016/06/20	NC		%	25
			o-Xylene	2016/06/20	NC		%	25
			Styrene	2016/06/20	NC		%	25
			4-ethyltoluene	2016/06/20	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/20	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/20	NC		%	25
			Chlorobenzene	2016/06/20	NC		%	25
			Benzyl chloride	2016/06/20	NC		%	25
			1,3-Dichlorobenzene	2016/06/20	NC		%	25
			1,4-Dichlorobenzene	2016/06/20	NC		%	25
			1,2-Dichlorobenzene	2016/06/20	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/20	NC		%	25
			Hexachlorobutadiene	2016/06/20	NC		%	25
			Hexane	2016/06/20	0.46		%	25
			Heptane	2016/06/20	NC		%	25
			Cyclohexane	2016/06/20	NC		%	25
			Tetrahydrofuran	2016/06/20	NC		%	25
			1,4-Dioxane	2016/06/20	NC		%	25
			Naphthalene	2016/06/20	NC		%	25
			Total Xylenes	2016/06/20	NC		%	25
			1,1,1,2-Tetrachloroethane	2016/06/20	NC		%	25
			Vinyl Bromide	2016/06/20	NC		%	25
			Propene	2016/06/20	NC		%	25
			2,2,4-Trimethylpentane	2016/06/20	0.68		%	25
			Carbon Disulfide	2016/06/20	NC		%	25
			Vinyl Acetate	2016/06/20	NC		%	25
4546687	DVO	Spiked Blank	Bromochloromethane	2016/06/20		98	%	60 - 140
			D5-Chlorobenzene	2016/06/20		100	%	60 - 140
			Difluorobenzene	2016/06/20		99	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/20		99	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/20		85	%	70 - 130
			Chloromethane	2016/06/20		102	%	70 - 130
			Vinyl Chloride	2016/06/20		100	%	70 - 130
			Chloroethane	2016/06/20		99	%	70 - 130
			1,3-Butadiene	2016/06/20		104	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2016/06/20		93	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/20		92	%	70 - 130
			Trichlorotrifluoroethane	2016/06/20		105	%	70 - 130
			2-propanol	2016/06/20		103	%	70 - 130
			2-Propanone	2016/06/20		109	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20		118	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/20		105	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20		105	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/20		102	%	70 - 130
			Ethyl Acetate	2016/06/20		108	%	70 - 130
			1,1-Dichloroethylene	2016/06/20		108	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/20		103	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/20		107	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/20		100	%	70 - 130
			Chloroform	2016/06/20		99	%	70 - 130
			Carbon Tetrachloride	2016/06/20		99	%	70 - 130
			1,1-Dichloroethane	2016/06/20		103	%	70 - 130
			1,2-Dichloroethane	2016/06/20		103	%	70 - 130
			Ethylene Dibromide	2016/06/20		101	%	70 - 130
			1,1,1-Trichloroethane	2016/06/20		97	%	70 - 130
			1,1,2-Trichloroethane	2016/06/20		101	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/20		96	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/20		106	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/20		105	%	70 - 130
			1,2-Dichloropropane	2016/06/20		102	%	70 - 130
			Bromomethane	2016/06/20		102	%	70 - 130
			Bromoform	2016/06/20		96	%	70 - 130
			Bromodichloromethane	2016/06/20		105	%	70 - 130
			Dibromochloromethane	2016/06/20		111	%	70 - 130
			Trichloroethylene	2016/06/20		104	%	70 - 130
			Tetrachloroethylene	2016/06/20		101	%	70 - 130
			Benzene	2016/06/20		103	%	70 - 130
			Toluene	2016/06/20		104	%	70 - 130
			Ethylbenzene	2016/06/20		98	%	70 - 130
			p+m-Xylene	2016/06/20		92	%	70 - 130
			o-Xylene	2016/06/20		93	%	70 - 130
			Styrene	2016/06/20		95	%	70 - 130
			4-ethyltoluene	2016/06/20		98	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/20		88	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/20		91	%	70 - 130
			Chlorobenzene	2016/06/20		100	%	70 - 130
			Benzyl chloride	2016/06/20		91	%	70 - 130
			1,3-Dichlorobenzene	2016/06/20		96	%	70 - 130
			1,4-Dichlorobenzene	2016/06/20		91	%	70 - 130
			1,2-Dichlorobenzene	2016/06/20		91	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/20		87	%	70 - 130
			Hexachlorobutadiene	2016/06/20		97	%	70 - 130
			Hexane	2016/06/20		100	%	70 - 130
			Heptane	2016/06/20		102	%	70 - 130
			Cyclohexane	2016/06/20		99	%	70 - 130
			Tetrahydrofuran	2016/06/20		104	%	70 - 130
			1,4-Dioxane	2016/06/20		94	%	70 - 130
			Naphthalene	2016/06/20		90	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2016/06/20		92	%	70 - 130
			Vinyl Bromide	2016/06/20		97	%	70 - 130
			Propene	2016/06/20		113	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/20		111	%	70 - 130
			Carbon Disulfide	2016/06/20		121	%	70 - 130
			Vinyl Acetate	2016/06/20		98	%	70 - 130
4546687	DVO	Method Blank	Bromochloromethane	2016/06/20		108	%	60 - 140
			D5-Chlorobenzene	2016/06/20		109	%	60 - 140
			Difluorobenzene	2016/06/20		111	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/20	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/20	<0.17		ppbv	
			Chloromethane	2016/06/20	<0.30		ppbv	
			Vinyl Chloride	2016/06/20	<0.10		ppbv	
			Chloroethane	2016/06/20	<0.30		ppbv	
			1,3-Butadiene	2016/06/20	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/20	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/20	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/20	<0.15		ppbv	
			2-propanol	2016/06/20	<1.0		ppbv	
			2-Propanone	2016/06/20	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/20	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/20	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/20	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/20	<0.20		ppbv	
			Ethyl Acetate	2016/06/20	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/20	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/20	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/20	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/20	<0.80		ppbv	
			Chloroform	2016/06/20	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/20	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/20	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/20	<0.10		ppbv	
			Ethylene Dibromide	2016/06/20	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/20	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/20	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/20	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/20	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/20	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/20	<0.10		ppbv	
			Bromomethane	2016/06/20	<0.10		ppbv	
			Bromoform	2016/06/20	<0.20		ppbv	
			Bromodichloromethane	2016/06/20	<0.20		ppbv	
			Dibromochloromethane	2016/06/20	<0.20		ppbv	
			Trichloroethylene	2016/06/20	<0.10		ppbv	
			Tetrachloroethylene	2016/06/20	<0.10		ppbv	
			Benzene	2016/06/20	<0.10		ppbv	
			Toluene	2016/06/20	<0.10		ppbv	
			Ethylbenzene	2016/06/20	<0.10		ppbv	
			p+m-Xylene	2016/06/20	<0.20		ppbv	
			o-Xylene	2016/06/20	<0.10		ppbv	
			Styrene	2016/06/20	<0.10		ppbv	
			4-ethyltoluene	2016/06/20	<0.50		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,3,5-Trimethylbenzene	2016/06/20	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/20	<0.50		ppbv	
			Chlorobenzene	2016/06/20	<0.10		ppbv	
			Benzyl chloride	2016/06/20	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/20	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/20	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/20	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/20	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/20	<0.50		ppbv	
			Hexane	2016/06/20	<0.30		ppbv	
			Heptane	2016/06/20	<0.30		ppbv	
			Cyclohexane	2016/06/20	<0.20		ppbv	
			Tetrahydrofuran	2016/06/20	<0.40		ppbv	
			1,4-Dioxane	2016/06/20	<1.0		ppbv	
			Naphthalene	2016/06/20	<0.50		ppbv	
			Total Xylenes	2016/06/20	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/20	<0.10		ppbv	
			Vinyl Bromide	2016/06/20	<0.20		ppbv	
			Propene	2016/06/20	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/20	<0.20		ppbv	
			Carbon Disulfide	2016/06/20	<0.50		ppbv	
			Vinyl Acetate	2016/06/20	<0.20		ppbv	
4547770	LSY	Method Blank	Aliphatic >C5-C6	2016/06/20	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/20	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/20	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/20	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/20	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/20	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/20	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/20	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/20	<5.0		ug/m3	
4547770	LSY	RPD - Sample/Sample Dup	Aliphatic >C5-C6	2016/06/20	NC		%	25
			Aliphatic >C6-C8	2016/06/20	0.17		%	25
			Aliphatic >C8-C10	2016/06/20	NC		%	25
			Aliphatic >C10-C12	2016/06/20	NC		%	25
			Aliphatic >C12-C16	2016/06/20	NC		%	25
			Aromatic >C7-C8 (TEX Excluded)	2016/06/20	NC		%	25
			Aromatic >C8-C10	2016/06/20	NC		%	25
			Aromatic >C10-C12	2016/06/20	NC		%	25
			Aromatic >C12-C16	2016/06/20	NC		%	25
4547778	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/20	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/20	<5.0		ug/m3	
4547778	LSY	RPD - Sample/Sample Dup	F1-BTEX, C6-C10 (as Toluene)	2016/06/20	0.92		%	25
			F2, C10-C16 (as Decane)	2016/06/20	NC		%	25
4548097	NS2	Spiked Blank	Bromochloromethane	2016/06/21		103	%	60 - 140
			D5-Chlorobenzene	2016/06/21		103	%	60 - 140
			Difluorobenzene	2016/06/21		103	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/21		94	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/21		77	%	70 - 130
			Chloromethane	2016/06/21		90	%	70 - 130
			Vinyl Chloride	2016/06/21		89	%	70 - 130
			Chloroethane	2016/06/21		85	%	70 - 130
			1,3-Butadiene	2016/06/21		95	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2016/06/21		84	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/21		102	%	70 - 130
			Trichlorotrifluoroethane	2016/06/21		99	%	70 - 130
			2-propanol	2016/06/21		112	%	70 - 130
			2-Propanone	2016/06/21		95	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/21		119	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/21		120	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/21		126	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/21		103	%	70 - 130
			Ethyl Acetate	2016/06/21		116	%	70 - 130
			1,1-Dichloroethylene	2016/06/21		107	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/21		104	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/21		107	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/21		98	%	70 - 130
			Chloroform	2016/06/21		100	%	70 - 130
			Carbon Tetrachloride	2016/06/21		88	%	70 - 130
			1,1-Dichloroethane	2016/06/21		100	%	70 - 130
			1,2-Dichloroethane	2016/06/21		109	%	70 - 130
			Ethylene Dibromide	2016/06/21		99	%	70 - 130
			1,1,1-Trichloroethane	2016/06/21		92	%	70 - 130
			1,1,2-Trichloroethane	2016/06/21		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/21		105	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/21		108	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/21		104	%	70 - 130
			1,2-Dichloropropane	2016/06/21		107	%	70 - 130
			Bromomethane	2016/06/21		87	%	70 - 130
			Bromoform	2016/06/21		96	%	70 - 130
			Bromodichloromethane	2016/06/21		105	%	70 - 130
			Dibromochloromethane	2016/06/21		106	%	70 - 130
			Trichloroethylene	2016/06/21		98	%	70 - 130
			Tetrachloroethylene	2016/06/21		97	%	70 - 130
			Benzene	2016/06/21		104	%	70 - 130
			Toluene	2016/06/21		112	%	70 - 130
			Ethylbenzene	2016/06/21		110	%	70 - 130
			p+m-Xylene	2016/06/21		104	%	70 - 130
			o-Xylene	2016/06/21		108	%	70 - 130
			Styrene	2016/06/21		105	%	70 - 130
			4-ethyltoluene	2016/06/21		114	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/21		102	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/21		102	%	70 - 130
			Chlorobenzene	2016/06/21		102	%	70 - 130
			Benzyl chloride	2016/06/21		93	%	70 - 130
			1,3-Dichlorobenzene	2016/06/21		95	%	70 - 130
			1,4-Dichlorobenzene	2016/06/21		90	%	70 - 130
			1,2-Dichlorobenzene	2016/06/21		92	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/21		71	%	70 - 130
			Hexachlorobutadiene	2016/06/21		83	%	70 - 130
			Hexane	2016/06/21		101	%	70 - 130
			Heptane	2016/06/21		120	%	70 - 130
			Cyclohexane	2016/06/21		113	%	70 - 130
			Tetrahydrofuran	2016/06/21		125	%	70 - 130
			1,4-Dioxane	2016/06/21		102	%	70 - 130
			Naphthalene	2016/06/21		74	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2016/06/21		105	%	70 - 130
			Vinyl Bromide	2016/06/21		85	%	70 - 130
			Propene	2016/06/21		113	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/21		116	%	70 - 130
			Carbon Disulfide	2016/06/21		117	%	70 - 130
			Vinyl Acetate	2016/06/21		103	%	70 - 130
4548097	NS2	Method Blank	Bromochloromethane	2016/06/21		82	%	60 - 140
			D5-Chlorobenzene	2016/06/21		74	%	60 - 140
			Difluorobenzene	2016/06/21		80	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/21	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/21	<0.17		ppbv	
			Chloromethane	2016/06/21	<0.30		ppbv	
			Vinyl Chloride	2016/06/21	<0.10		ppbv	
			Chloroethane	2016/06/21	<0.30		ppbv	
			1,3-Butadiene	2016/06/21	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/21	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/21	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/21	<0.15		ppbv	
			2-propanol	2016/06/21	<1.0		ppbv	
			2-Propanone	2016/06/21	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/21	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/21	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/21	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/21	<0.20		ppbv	
			Ethyl Acetate	2016/06/21	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/21	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/21	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/21	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/21	<0.80		ppbv	
			Chloroform	2016/06/21	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/21	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/21	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/21	<0.10		ppbv	
			Ethylene Dibromide	2016/06/21	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/21	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/21	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/21	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/21	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/21	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/21	<0.10		ppbv	
			Bromomethane	2016/06/21	<0.10		ppbv	
			Bromoform	2016/06/21	<0.20		ppbv	
			Bromodichloromethane	2016/06/21	<0.20		ppbv	
			Dibromochloromethane	2016/06/21	<0.20		ppbv	
			Trichloroethylene	2016/06/21	<0.10		ppbv	
			Tetrachloroethylene	2016/06/21	<0.10		ppbv	
			Benzene	2016/06/21	<0.10		ppbv	
			Toluene	2016/06/21	<0.10		ppbv	
			Ethylbenzene	2016/06/21	<0.10		ppbv	
			p+m-Xylene	2016/06/21	<0.20		ppbv	
			o-Xylene	2016/06/21	<0.10		ppbv	
			Styrene	2016/06/21	<0.10		ppbv	
			4-ethyltoluene	2016/06/21	<0.50		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,3,5-Trimethylbenzene	2016/06/21	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/21	<0.50		ppbv	
			Chlorobenzene	2016/06/21	<0.10		ppbv	
			Benzyl chloride	2016/06/21	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/21	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/21	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/21	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/21	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/21	<0.50		ppbv	
			Hexane	2016/06/21	<0.30		ppbv	
			Heptane	2016/06/21	<0.30		ppbv	
			Cyclohexane	2016/06/21	<0.20		ppbv	
			Tetrahydrofuran	2016/06/21	<0.40		ppbv	
			1,4-Dioxane	2016/06/21	<1.0		ppbv	
			Naphthalene	2016/06/21	<0.50		ppbv	
			Total Xylenes	2016/06/21	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/21	<0.10		ppbv	
			Vinyl Bromide	2016/06/21	<0.20		ppbv	
			Propene	2016/06/21	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/21	<0.20		ppbv	
			Carbon Disulfide	2016/06/21	<0.50		ppbv	
			Vinyl Acetate	2016/06/21	<0.20		ppbv	
4549924	DVO	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/20	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/20	<5.0		ug/m3	
4549924	DVO	RPD - Sample/Sample Dup	F1-BTEX, C6-C10 (as Toluene)	2016/06/20	0.50		%	25
			F2, C10-C16 (as Decane)	2016/06/20	6.8		%	25
4549967	NS2	Spiked Blank	Bromochloromethane	2016/06/22		102	%	60 - 140
			D5-Chlorobenzene	2016/06/22		99	%	60 - 140
			Difluorobenzene	2016/06/22		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/22		91	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/06/22		74	%	70 - 130
			Chloromethane	2016/06/22		84	%	70 - 130
			Vinyl Chloride	2016/06/22		86	%	70 - 130
			Chloroethane	2016/06/22		82	%	70 - 130
			1,3-Butadiene	2016/06/22		89	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/06/22		85	%	70 - 130
			Ethanol (ethyl alcohol)	2016/06/22		95	%	70 - 130
			Trichlorotrifluoroethane	2016/06/22		98	%	70 - 130
			2-propanol	2016/06/22		108	%	70 - 130
			2-Propanone	2016/06/22		93	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/06/22		112	%	70 - 130
			Methyl Isobutyl Ketone	2016/06/22		116	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/06/22		122	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/06/22		106	%	70 - 130
			Ethyl Acetate	2016/06/22		111	%	70 - 130
			1,1-Dichloroethylene	2016/06/22		105	%	70 - 130
			cis-1,2-Dichloroethylene	2016/06/22		102	%	70 - 130
			trans-1,2-Dichloroethylene	2016/06/22		105	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/06/22		92	%	70 - 130
			Chloroform	2016/06/22		100	%	70 - 130
			Carbon Tetrachloride	2016/06/22		93	%	70 - 130
			1,1-Dichloroethane	2016/06/22		97	%	70 - 130
			1,2-Dichloroethane	2016/06/22		110	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Ethylene Dibromide	2016/06/22		99	%	70 - 130
			1,1,1-Trichloroethane	2016/06/22		95	%	70 - 130
			1,1,2-Trichloroethane	2016/06/22		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/06/22		101	%	70 - 130
			cis-1,3-Dichloropropene	2016/06/22		108	%	70 - 130
			trans-1,3-Dichloropropene	2016/06/22		106	%	70 - 130
			1,2-Dichloropropane	2016/06/22		103	%	70 - 130
			Bromomethane	2016/06/22		85	%	70 - 130
			Bromoform	2016/06/22		99	%	70 - 130
			Bromodichloromethane	2016/06/22		106	%	70 - 130
			Dibromochloromethane	2016/06/22		108	%	70 - 130
			Trichloroethylene	2016/06/22		100	%	70 - 130
			Tetrachloroethylene	2016/06/22		99	%	70 - 130
			Benzene	2016/06/22		101	%	70 - 130
			Toluene	2016/06/22		109	%	70 - 130
			Ethylbenzene	2016/06/22		109	%	70 - 130
			p+m-Xylene	2016/06/22		104	%	70 - 130
			o-Xylene	2016/06/22		106	%	70 - 130
			Styrene	2016/06/22		104	%	70 - 130
			4-ethyltoluene	2016/06/22		114	%	70 - 130
			1,3,5-Trimethylbenzene	2016/06/22		100	%	70 - 130
			1,2,4-Trimethylbenzene	2016/06/22		101	%	70 - 130
			Chlorobenzene	2016/06/22		102	%	70 - 130
			Benzyl chloride	2016/06/22		97	%	70 - 130
			1,3-Dichlorobenzene	2016/06/22		95	%	70 - 130
			1,4-Dichlorobenzene	2016/06/22		91	%	70 - 130
			1,2-Dichlorobenzene	2016/06/22		92	%	70 - 130
			1,2,4-Trichlorobenzene	2016/06/22		74	%	70 - 130
			Hexachlorobutadiene	2016/06/22		86	%	70 - 130
			Hexane	2016/06/22		97	%	70 - 130
			Heptane	2016/06/22		115	%	70 - 130
			Cyclohexane	2016/06/22		109	%	70 - 130
			Tetrahydrofuran	2016/06/22		118	%	70 - 130
			1,4-Dioxane	2016/06/22		102	%	70 - 130
			Naphthalene	2016/06/22		75	%	70 - 130
			Total Xylenes	2016/06/22		105	%	70 - 130
			Vinyl Bromide	2016/06/22		84	%	70 - 130
			Propene	2016/06/22		103	%	70 - 130
			2,2,4-Trimethylpentane	2016/06/22		111	%	70 - 130
			Carbon Disulfide	2016/06/22		113	%	70 - 130
			Vinyl Acetate	2016/06/22		100	%	70 - 130
4549967	NS2	Method Blank	Bromochloromethane	2016/06/22		89	%	60 - 140
			D5-Chlorobenzene	2016/06/22		80	%	60 - 140
			Difluorobenzene	2016/06/22		87	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/06/22	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/06/22	<0.17		ppbv	
			Chloromethane	2016/06/22	<0.30		ppbv	
			Vinyl Chloride	2016/06/22	<0.10		ppbv	
			Chloroethane	2016/06/22	<0.30		ppbv	
			1,3-Butadiene	2016/06/22	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/06/22	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/06/22	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/06/22	<0.15		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2-propanol	2016/06/22	<1.0		ppbv	
			2-Propanone	2016/06/22	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/06/22	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/06/22	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/06/22	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/06/22	<0.20		ppbv	
			Ethyl Acetate	2016/06/22	<1.0		ppbv	
			1,1-Dichloroethylene	2016/06/22	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/06/22	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/06/22	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/06/22	<0.80		ppbv	
			Chloroform	2016/06/22	<0.10		ppbv	
			Carbon Tetrachloride	2016/06/22	<0.10		ppbv	
			1,1-Dichloroethane	2016/06/22	<0.10		ppbv	
			1,2-Dichloroethane	2016/06/22	<0.10		ppbv	
			Ethylene Dibromide	2016/06/22	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/06/22	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/06/22	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/06/22	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/06/22	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/06/22	<0.10		ppbv	
			1,2-Dichloropropane	2016/06/22	<0.10		ppbv	
			Bromomethane	2016/06/22	<0.10		ppbv	
			Bromoform	2016/06/22	<0.20		ppbv	
			Bromodichloromethane	2016/06/22	<0.20		ppbv	
			Dibromochloromethane	2016/06/22	<0.20		ppbv	
			Trichloroethylene	2016/06/22	<0.10		ppbv	
			Tetrachloroethylene	2016/06/22	<0.10		ppbv	
			Benzene	2016/06/22	<0.10		ppbv	
			Toluene	2016/06/22	<0.10		ppbv	
			Ethylbenzene	2016/06/22	<0.10		ppbv	
			p+m-Xylene	2016/06/22	<0.20		ppbv	
			o-Xylene	2016/06/22	<0.10		ppbv	
			Styrene	2016/06/22	<0.10		ppbv	
			4-ethyltoluene	2016/06/22	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/06/22	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/06/22	<0.50		ppbv	
			Chlorobenzene	2016/06/22	<0.10		ppbv	
			Benzyl chloride	2016/06/22	<0.50		ppbv	
			1,3-Dichlorobenzene	2016/06/22	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/06/22	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/06/22	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/06/22	<0.50		ppbv	
			Hexachlorobutadiene	2016/06/22	<0.50		ppbv	
			Hexane	2016/06/22	<0.30		ppbv	
			Heptane	2016/06/22	<0.30		ppbv	
			Cyclohexane	2016/06/22	<0.20		ppbv	
			Tetrahydrofuran	2016/06/22	<0.40		ppbv	
			1,4-Dioxane	2016/06/22	<1.0		ppbv	
			Naphthalene	2016/06/22	<0.50		ppbv	
			Total Xylenes	2016/06/22	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/06/22	<0.10		ppbv	
			Vinyl Bromide	2016/06/22	<0.20		ppbv	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Propene	2016/06/22	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/06/22	<0.20		ppbv	
			Carbon Disulfide	2016/06/22	<0.50		ppbv	
			Vinyl Acetate	2016/06/22	<0.20		ppbv	
4549967	NS2	RPD - Sample/Sample Dup	Dichlorodifluoromethane (FREON 12)	2016/06/22	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/06/22	NC		%	25
			Chloromethane	2016/06/22	NC		%	25
			Vinyl Chloride	2016/06/22	NC		%	25
			Chloroethane	2016/06/22	NC		%	25
			1,3-Butadiene	2016/06/22	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/06/22	NC		%	25
			Ethanol (ethyl alcohol)	2016/06/22	NC		%	25
			Trichlorotrifluoroethane	2016/06/22	NC		%	25
			2-propanol	2016/06/22	NC		%	25
			2-Propanone	2016/06/22	NC		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/06/22	NC		%	25
			Methyl Isobutyl Ketone	2016/06/22	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/06/22	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/06/22	NC		%	25
			Ethyl Acetate	2016/06/22	NC		%	25
			1,1-Dichloroethylene	2016/06/22	NC		%	25
			cis-1,2-Dichloroethylene	2016/06/22	NC		%	25
			trans-1,2-Dichloroethylene	2016/06/22	NC		%	25
			Methylene Chloride(Dichloromethane)	2016/06/22	NC		%	25
			Chloroform	2016/06/22	NC		%	25
			Carbon Tetrachloride	2016/06/22	NC		%	25
			1,1-Dichloroethane	2016/06/22	NC		%	25
			1,2-Dichloroethane	2016/06/22	NC		%	25
			Ethylene Dibromide	2016/06/22	NC		%	25
			1,1,1-Trichloroethane	2016/06/22	NC		%	25
			1,1,2-Trichloroethane	2016/06/22	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/06/22	NC		%	25
			cis-1,3-Dichloropropene	2016/06/22	NC		%	25
			trans-1,3-Dichloropropene	2016/06/22	NC		%	25
			1,2-Dichloropropane	2016/06/22	NC		%	25
			Bromomethane	2016/06/22	NC		%	25
			Bromoform	2016/06/22	NC		%	25
			Bromodichloromethane	2016/06/22	NC		%	25
			Dibromochloromethane	2016/06/22	NC		%	25
			Trichloroethylene	2016/06/22	NC		%	25
			Tetrachloroethylene	2016/06/22	NC		%	25
			Benzene	2016/06/22	NC		%	25
			Toluene	2016/06/22	3.9		%	25
			Ethylbenzene	2016/06/22	NC		%	25
			p+m-Xylene	2016/06/22	NC		%	25
			o-Xylene	2016/06/22	NC		%	25
			Styrene	2016/06/22	NC		%	25
			4-ethyltoluene	2016/06/22	NC		%	25
			1,3,5-Trimethylbenzene	2016/06/22	NC		%	25
			1,2,4-Trimethylbenzene	2016/06/22	NC		%	25
			Chlorobenzene	2016/06/22	NC		%	25
			Benzyl chloride	2016/06/22	NC		%	25
			1,3-Dichlorobenzene	2016/06/22	NC		%	25

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2016/06/22	NC		%	25
			1,2-Dichlorobenzene	2016/06/22	NC		%	25
			1,2,4-Trichlorobenzene	2016/06/22	NC		%	25
			Hexachlorobutadiene	2016/06/22	NC		%	25
			Hexane	2016/06/22	1.3		%	25
			Heptane	2016/06/22	NC		%	25
			Cyclohexane	2016/06/22	NC		%	25
			Tetrahydrofuran	2016/06/22	NC		%	25
			1,4-Dioxane	2016/06/22	NC		%	25
			Naphthalene	2016/06/22	NC		%	25
			Total Xylenes	2016/06/22	NC		%	25
			1,1,1,2-Tetrachloroethane	2016/06/22	NC		%	25
			Vinyl Bromide	2016/06/22	NC		%	25
			Propene	2016/06/22	NC		%	25
			2,2,4-Trimethylpentane	2016/06/22	NC		%	25
			Carbon Disulfide	2016/06/22	NC		%	25
			Vinyl Acetate	2016/06/22	NC		%	25
4550167	DVO	Method Blank	Aliphatic >C5-C6	2016/06/20	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/20	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/20	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/20	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/20	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/20	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/20	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/20	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/20	<5.0		ug/m3	
4553613	NS2	Method Blank	Aliphatic >C5-C6	2016/06/21	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/21	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/21	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/21	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/21	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/21	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/21	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/21	<5.0		ug/m3	
			Aromatic >C12-C16	2016/06/21	<5.0		ug/m3	
4553613	NS2	RPD - Sample/Sample Dup	Aliphatic >C10-C12	2016/06/21	0.36		%	25
			Aliphatic >C12-C16	2016/06/21	3.0		%	25
			Aromatic >C10-C12	2016/06/21	NC		%	25
			Aromatic >C12-C16	2016/06/21	NC		%	25
4553647	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/21	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/21	<5.0		ug/m3	
4553762	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/06/22	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/06/22	<5.0		ug/m3	
4553788	NS2	Method Blank	Aliphatic >C5-C6	2016/06/22	<5.0		ug/m3	
			Aliphatic >C6-C8	2016/06/22	<5.0		ug/m3	
			Aliphatic >C8-C10	2016/06/22	<5.0		ug/m3	
			Aliphatic >C10-C12	2016/06/22	<5.0		ug/m3	
			Aliphatic >C12-C16	2016/06/22	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2016/06/22	<5.0		ug/m3	
			Aromatic >C8-C10	2016/06/22	<5.0		ug/m3	
			Aromatic >C10-C12	2016/06/22	<5.0		ug/m3	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Aromatic >C12-C16	2016/06/22	<5.0		ug/m3	

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

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

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

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

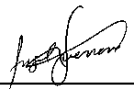
Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C3505
Report Date: 2016/06/27

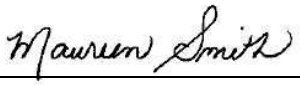
Clifton Associates Ltd.
Client Project #: CG2430.1E06
Sampler Initials: DB

VALIDATION SIGNATURE PAGE

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



Angel Guerrero, Team Leader, VOC Air



Maureen Smith, Supervisor, Volatiles

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Appendix E

Clifton Associates

Soil Vapour Quality Guidelines
Intrinsik Environmental Sciences
31 August 2016

Clifton Associates

Calgary Office
2222 – 30th Avenue NE
Calgary, Alberta T2E 7K9

T (403) 263-2556
F (403) 234-9033

calgary@clifton.ca
www.clifton.ca

Intrinsik Corp.
Suite 1060, 736 – 8th Avenue S.W.
Calgary, AB T2P 1H4
T 403.237.0275
F 403.237.0291

31 August 2016

Sears Canada Inc.
222 Jarvis Street
Toronto, ON, M5B 2B8

Dear Mr. Greg Paliouras and Mr. Wayne E. Prada

Subject: Soil Vapour Quality Guidelines for Hounsfield Heights and Mall Areas

On June 24 2016 the revised soil vapour monitoring program developed by Clifton Associates Ltd. (CAL 2016) was available on the Alberta Environment and Parks (AEP) Environmental Site Assessment Repository (ESAR). The report contained soil vapour quality guidelines (SVQG) that were developed by Intrinsik (2016a) and were presented in Appendix A of the CAL (2016) report. After the document was posted to the ESAR, Intrinsik identified errors and has revised the SVQG report for the Hounsfield Heights and Mall areas.

The following updates were incorporated in the revised report (Intrinsik 2016b):

- A number of SVQG were presented for certain chemicals and depths that were above maximum theoretical vapour concentrations and should have been reported as no guideline required (NGR).
- The exposure term of 0.27 (AEP 2016a) was not applied to the calculated SVQG for commercial land use and depths greater than 100 cm. The result was that calculated commercial land use SVQG for depths greater than 100 cm have increased.

- The SVQG have been presented in scientific notation with two significant digits.
- The revised report included a summary table of the most stringent SVQG for residential and commercial land use at the beginning of the report for quick reference.
- SVQG were developed using a specific set of assumptions and equations. In some cases, the assumptions used to derive SVQG may not be protective for particular sites. A number of conditions identified by the CCME (2014) and AEP (2016a,b) that may invalidate some of the assumptions used in the development of SVQG were discussed.

If further information is required or if you have any questions, please do not hesitate to contact the undersigned at kbresee@intrinsik.com or call me at 403-237-0275.

Yours truly,

Intrinsik

Karl E. Bresee, B.Sc., PBD, P.Biol., EP
Senior Scientist

Nino Devdariani, B.Sc., M.Env.Sc., EPt
Environmental Risk Analyst

References

AEP (Alberta Environment and Parks). 2016a. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

AEP (Alberta Environment and Parks). 2016b. Alberta Tier 2 Soil and Groundwater Remediation Guidelines.

CAL (Clifton Associates Ltd.). 2016. Soil Vapour Monitoring Program (Revised) for the Hounsfield Heights and North Hill Mall Calgary, Alberta. Prepared for Sears Canada Inc. CG2430.1E04. June 24 2016.

CCME (Canadian Council of Ministers of the Environment). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. PN 1531. ISBN 978-1-77202-013-7 PDF.

Intrinsik. 2016a. Development of Soil Vapour Quality Guidelines. Prepared for Sears Canada Inc. April 8 2016.

Intrinsik. 2016a. Development of Soil Vapour Quality Guidelines. Prepared for Sears Canada Inc. August 31 2016.

SCIENCE INTEGRITY KNOWLEDGE

FINAL REPORT

DEVELOPMENT OF SOIL VAPOUR QUALITY GUIDELINES

August 31, 2016

Prepared For:

Sears Canada Inc.
222 Jarvis Street
Toronto, ON
M5B 2B8
Attention: Mr. Greg Paliouras
Mr. Wayne E. Prada

736 8th Avenue SW, Calgary, AB, Canada T2P 1H4
Tel: 403-237-0275 ▪ www.intrinsik.com

DEVELOPMENT OF SOIL VAPOUR QUALITY GUIDELINES

Table of Contents

List of Tables

Appendices

Development of Soil Vapour Quality Guidelines

1.0 INTRODUCTION

Intrinsik Corp. (Intrinsik) followed the CCME protocol (2014) and AEP (2016a,b) guidance to calculate soil vapour quality guidelines (SVQG) for the protection of indoor and outdoor air vapour inhalation of benzene, toluene, ethylbenzene and xylenes (BTEX), 1,2-dichloroethane (1,2-DCA) and petroleum hydrocarbon (PHC) fractions 1 and 2. Naphthalene was also added as measured soil concentrations exceeded guidelines for the protection of vapour inhalation in the northern portion of the Hounsfield Heights area. These petroleum hydrocarbon constituents were identified as chemicals of potential concern (COPC) based on the human health and ecological risk assessment that was completed for the Hounsfield Heights and North Hill Mall areas (Intrinsik 2015).

The CCME (2014) protocol and AEP (2016a,b) guidance were also used to calculate SVQG for residential and commercial land use and for various depth intervals. The calculation of multiple SVQG is required for the soil vapour monitoring program that was proposed for Hounsfield Heights and North Hill Mall by Clifton Associates Ltd. (CAL 2016). The goal of the work was to calculate SVQG for comparison to measured soil vapour concentrations from the soil vapour monitoring program. In addition, fixed gas concentrations should be analyzed in the soil vapour samples (i.e., carbon dioxide-CO_2, oxygen-O_2 and methane-CH_4). According to US EPA (2015) and CCME (2014), when oxygen supply from the atmosphere is sufficient (>5%), biodegradation of PHC constituents can occur relatively quickly and can result in substantial attenuation of vapours over relatively short distances.

2.0 SOIL VAPOUR QUALITY GUIDELINES (DEPTH <100 CM)

Table 2-1 presents the SVQGs for residential and commercial buildings for a depth of <100 cm below the building foundation or surface for a slab-on-grade building. Guidelines have also been calculated for various depths below the building foundation ranging from <1 m (i.e., sub-slab) to a depth of 6 m by increments of 0.5 m. These guidelines for additional sampling depths are presented in Section 8.0.

Table 2-1 Soil Vapour Quality Guidelines Protective of Indoor Air Quality for Residential and Commercial Buildings for Samples Taken from a Depth of <100 cm [µg/m³]

Chemical	Residential	Commercial
	Fine and Coarse	Fine and Coarse
Benzene	3.0E+02	1.1E+03
Toluene	1.9E+05	6.8E+05
Ethylbenzene	5.0E+04	1.8E+05
Xylenes	8.9E+03	3.2E+04
1,2-DCA	4.0E+01	1.5E+02
Naphthalene	1.0E+02	3.7E+02
F1		
Aliphatic C6-C8	9.2E+05	3.3E+06
Aliphatic >C8-C10	4.8E+04	1.7E+05
Aromatic >C8-C10	8.1E+03	3.0E+04
F2		
Aliphatic >C10-C12	5.0E+04	1.8E+05
Aromatic >C10-C12	1.0E+04	3.6E+04
Aliphatic >C12-C16	5.0E+04	1.8E+05
Aromatic >C12-C16	1.0E+04	3.6E+04

3.0 METHODS

SVQG were calculated according to the methods and assumptions defined by CCME (2014) and AEP (2016a,b). The SVQG for the protection of indoor air quality are based on a combination of empirical data and the Johnson and Ettinger (1991) model that predicts the migration of soil vapours from the subsurface into buildings. The $SVQG_{IAQ}$ apply to soil vapour collected at a minimum distance of one metre from the building foundation, and assume that at least 1 m of clean soil is present immediately beneath the building. Therefore, SVQG were calculated for soil vapour measurements ranging in depth from one metre to six metres below the surface or building. In situations where the minimum separation distance is less than one metre it is recommended that the calculated $SVQG_{IAQ}$ are not based on the Johnson and Ettinger (1991) model. Instead the calculated $SVQG_{IAQ}$ should be based on the default attenuation factor of 0.01 (i.e., DF = 100) for a residential or commercial building (AEP 2016b). The Johnson and Ettinger (1991) model was used to predict $SVQG_{IAQ}$ for depths greater than one metre based on the assumptions and protocol recommended by CCME (2014).

SVQG were developed using a specific set of assumptions and equations. In some cases, the assumptions used to derive SVQGs may not be protective for particular sites. A number of conditions identified by the CCME (2014) and AEP (2016a,b) that may invalidate some of the assumptions used in the development of SVQGs are discussed below (Table 3-1).

Table 3-1 Interpretation of Conditions That May Invalidate Some Assumptions Used in Development of SVQGs

Condition	*Interpretation*
The water table is within 1 m of a building foundation (possible wet-basement scenario) or the source of vapours is in close proximity to the foundation (floor drains, or other sub-floor utilities) (CCME 2014).	In these cases, soil vapour screening may be done through shallow soil vapour samples (short distance below building foundation) or sub-slab samples (CCME 2014). It is recommended that the calculated SVQGs be based on the default attenuation coefficient of 0.01 (i.e., a dilution factor of 100) for residential and commercial buildings (AEP 2016b). Soil vapour remediation guidelines for a depth of <1 m, which are based on the recommended default attenuation coefficient of 0.01, are provided in Section 8.0.
The source-building separation distance is less than 1 m (e.g., shallow unsaturated soils with elevated volatile organic compound concentrations) (CCME 2014).	
The building is taller than four floors (possible enhanced stack effect resulting in greater pressure differential than typical default values) (CCME 2014). The “stack effect” can occur within a building, particularly during the heating season in the winter months as a result of hot air rising and leaving near the top of the building (e.g., through a chimney, leaky attic, exhaust vent), which creates a negative pressure in the building thereby drawing outdoor air and soil gas into the building through openings with the lower regions of the building (i.e., doors, windows, cracks and/or the building foundation) (OMOE 2010).	The model that was used to calculate the SVQGs, which is based on Johnson and Ettinger (1991), was developed for a typical residential or commercial building of specific dimensions. The inclusion of this condition in CCME (2014) is based on the possibility of the stack effect, which may occur in certain buildings taller than four floors. Although it is possible that the stack effect could occur in a tall building, it is expected to be offset by the effect of a larger building volume as well as the heating, ventilation and air conditioning (HVAC) system requirements of a larger building (Manitoba Sustainable Development [MSD] 2016). It should be noted that the buildings at the Site typically do not exceed four floors in height.

Condition	Interpretation
Preferential pathways are present in the subsurface that provide a direct conduit from the vapour source to the inside of the building over and above that of a typical residential building (e.g., wet basements, basements with a sump basin, highly permeable and atypical utility conduits, dirt floors, fractured media immediately below the building) (CCME 2014) and very coarse textured materials (i.e., gravel) that may enhance vapour transport (AEP 2016a,b). Additionally, unique building features, including earthen floors or unusually low air exchange rates (AEP 2016a,b). This condition refers to conduits located between the source of contamination and the building.	It is possible that some residences in the Hounsfield Heights Area and Mall Area (e.g., Kal Tire building) may have a sump basin and should be addressed on a site-specific basis. The primary concern with a sump is when water within the sump is impacted with COPCs due to groundwater infiltration. Sumps that are not impacted with COPCs in groundwater and have been installed properly would provide adequate protection from indoor vapour migration.
Methanogenic conditions, which are defined as environmental soil conditions that allow microorganisms to produce methane as a metabolic by-product in anoxic conditions, are observed in close proximity to the building foundation (possible gas pressure-driven flow and/or explosion risk) (CCME 2014).	Areas that are capable of producing methanogenic conditions (e.g., waste disposal or landfill areas) are unlikely to be found at the Site or in proximity to the Site.

The following equations were used to calculate $SVQG_{IAQ}$ for the indoor air inhalation pathway (CCME 2014):

Threshold chemical $$SVQG_{IAQ} = \frac{(TC - C_a) \times AF \times BAF}{\propto \times ET}$$ (Equation 1)

Non-threshold chemical $$SVQG_{IAQ} = \frac{(RsC) \times BAF}{\propto \times ET}$$ (Equation 2)

Similarly, the following equations were used to predict $SVQG_{OAQ}$ for the outdoor air inhalation pathway (CCME 2014):

Threshold chemical $$SVQG_{OAQ} = \frac{(TC - C_a) \times AF \times BAF}{VF_{sv,amb} \times ET}$$ (Equation 3)

Non-threshold chemical $$SVQG_{OAQ} = \frac{(RsC) \times BAF}{VF_{sv,amb} \times ET}$$ (Equation 4)

Where:

$SVQG_{IAQ}$	=	soil vapour quality guideline for the protection of indoor air quality [mg/m³]
$SVQG_{OAQ}$	=	soil vapour quality guideline for the protection of outdoor air quality [mg/m³]
TC	=	tolerable concentration or reference concentration [mg/m³]
C_a	=	background indoor air concentration [mg/m³]
AF	=	allocation factor [Unitless]
BAF	=	bioattenuation factor [Unitless]
α	=	attenuation factor calculated from Johnson and Ettinger (1991) model
ET	=	exposure term [Unitless]
RsC	=	risk-specific concentration [mg/m³]
$VF_{sv,amb}$	=	volatilization factor for subsurface soil to ambient air [Unitless]

Dilution factor from soil gas to indoor air ***(Equation 5)***

$$DF = \frac{1}{\alpha}$$

$$\alpha = \frac{\left(\frac{D_T^{eff} A_B}{Q_B L_T}\right) \exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right)}{exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{cract}}\right) + \left(\frac{D_T^{eff} A_B}{Q_B L_T}\right) + \left(\frac{D_T^{eff} A_B}{Q_{soil} L_T}\right)\left[exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right) - 1\right]}$$

Where:

DF	=	dilution factor [Unitless]
α	=	attenuation coefficient [Unitless]
D_T^{eff}	=	effective porous media diffusion coefficient [cm²/s]
A_B	=	building area [cm²]
Q_B	=	building ventilation rate [cm³/s]
L_T	=	distance from contaminant source to foundation [cm]
Q_{soil}	=	volumetric flow rate of soil gas into the building [cm³/s]
L_{crack}	=	thickness of the foundation [cm]
D_{crack}	=	effective vapour diffusion coefficient through the crack [cm²/s]
A_{crack}	=	area of cracks through which the contaminant vapours enter [cm²]

Calculation of D_T^{eff} ***(Equation 6)***

$$D_T^{eff} = D^{air} \times \left(\frac{\theta_a^{\frac{10}{3}}}{n^2}\right) + \left(\frac{D^{water}}{H'}\right) \times \left(\frac{\theta_w^{\frac{10}{3}}}{n^2}\right)$$

Where:

D_T^{eff}	=	overall effective porous media diffusion coefficient [cm²/s]
D^{air}	=	pure component molecular diffusivity in air [cm²/s]
θ_a	=	air filled porosity [Unitless]
n	=	total porosity [Unitless]
D^{water}	=	pure component molecular diffusivity in water [cm²/s]

H'	=	Dimensionless Henry's Law constant [Unitless] at soil temperature (e.g., 15°C)
θ_w	=	moisture/water filled porosity [Unitless]

Calculation of D_{crack} ***(Equation 7)***

$$D_{crack} \approx D_{air} \times \left(\frac{n^{10/3}}{n^2}\right)$$

Where:

D_{crack}	=	effective vapour diffusion coefficient through the crack [cm²/s]
D_{air}	=	diffusion coefficient in air [cm²/s]
n	=	total porosity [Unitless]

Volatilization Factor ***(Equation 8)***

$$VF_{sv,amb} = \left(1 + \frac{L_s \times U_{air} \times M_{air}}{D_T^{eff} \times W}\right)^{-1}$$

Where:

$VF_{sv,amb}$	=	volatilization factor, subsurface soil vapour to ambient air [dimensionless]
D_T^{eff}	=	overall effective porous media diffusion coefficient [cm²/s]
L_s	=	depth to subsurface soil vapour sample [cm]
U_{air}	=	ambient air velocity in mixing zone [cm/s]
W	=	width of source-zone area parallel to the wind direction [cm]
M_{air}	=	mixing zone height [cm]

Appendix A and B present the input values that were assumed for each model input variable and COPC required to calculate the indoor attenuation factor (α), volatilization factor (VF) and SVQG for residential and commercial land use, respectively.

4.0 TEMPERATURE ADJUSTED HENRY'S CONSTANT

The volatilization rate of a chemical from soil or water is dependent on the Henry's Law constant, which is dependent on system temperature. The value of Henry's Law constant is provided at a standard temperature of 25 degrees Celsius (AEP 2016a); however, the average groundwater temperature in the Hounsfield Heights area was measured to be 10.8 ± 2.7 degrees Celsius between February and September 2015 (n=174). Use of the Henry's Law constant at 25 degrees Celsius may over predict the volatility of the chemical such that the resulting SVQG may be artificially low. Therefore, Henry's constant can be adjusted for temperature based on the Clausius-Clapeyron relationship (US EPA 2001, Health Canada 2010). Henry's Law Constant can be adjusted based on temperature based on the following equation:

$$H_{TS} = \frac{EXP\left[-\frac{\Delta H_{v,TS}}{R_C}\left(\left(\frac{1}{T_S}\right)-\left(\frac{1}{T_R}\right)\right)\right]\times H_R}{RT_S} \qquad \text{(Equation 8)}$$

Where:

H_{TS}	=	corrected dimensionless Henry's law constant
$\Delta H_{v,TS}$	=	enthalpy of vaporization at soil temperature [cal/K]
T_S	=	average soil temperature [K]
T_R	=	Henry's Law Constant reference temperature [K]
H_R	=	Henry's Law Constant at reference temperature [atm-m³/mol]
R_C	=	gas constant [1.9872 cal/mol-K]
R	=	gas constant [8.205E-05 atm-m³/mol-K]

The above equation yields a corrected dimensionless Henry's Law Constant (i.e., H') for benzene at 15 degrees Celsius of 0.141, as opposed to the 'default' value of 0.225 at 25 degrees Celsius. Appendix A presents the input values that were assumed to calculate the dimensionless Henry's Law Constant for each COPC based on a system temperature of 15 degrees Celsius. The temperature adjusted Henry's Constants are presented in Appendix A for information purposes only and were not used to calculate SVQG.

5.0 BIO-ATTENUATION FACTOR

The CCME (2014) indicates that the bio-attenuation factor (BAF) can be adjusted for various depths when there is no non-aqueous phase liquid (NAPL) present, the total hydrocarbon vapour concentration is less than 10 mg/L and subsurface oxygen content is >5%. CCME (2014) recommends a BAF of 10 at >1 to 3m depth, a BAF of 100 at >3 to 5m depth and 1000 at >5m depth. Table 5-1 presents the BAF values that were used to calculate SVQG. Although greater BAF values are permitted at greater depths, the SVQG did not apply these adjustments to be conservative.

Table 5-1 Bio-Attenuation Factor Values Used to Calculate SVQG

Chemical	***Depth Specific Bio-Attenuation Factor (BAF) Values [Unitless]***	
	<1m	***≥1m***
Benzene	1	10
Toluene	1	10
Ethylbenzene	1	10
Xylenes	1	10
1,2-DCA	1	1
Naphthalene	1	1
F1 - Aliphatic C6-C8	1	10
F1 - Aliphatic C8-C10	1	10
F1 - Aromatic C8-C10	1	10
F2 - Aliphatic C10-C12	1	10
F2 - Aromatic C10-C12	1	10
F2 - Aliphatic C12-C16	1	10
F2 - Aromatic C12-C16	1	10

6.0 VOLUMETRIC FLOW RATE INTO BUILDING (Q_{SOIL})

The volumetric flow rate of soil gas into the building (Q_{soil}) is based on the "perimeter crack" equation, which is defined as follows:

$$Q_{soil} = \frac{2 \times \pi \times \Delta P \times K_v \times X_{crack}}{\mu \times ln\left[\frac{2 \times Z_{crack}}{r_{crack}}\right]}$$

Where:

Q_{soil}	=	volumetric flow rate of soil gas into the building [cm³/s]
ΔP	=	pressure differential [g/cm/s²]
k_v	=	soil permeability to vapour flow [cm²]
X_{crack}	=	length of idealized cylinder [cm]
μ	=	vapour viscosity [g/cm/s]
Z_{crack}	=	distance below grade to idealized cylinder [cm]
r_{crack}	=	radius of idealized cylinder [cm]

Under the guidance of AEP (2016a), the Q_{soil} variable is calculated based on default soil vapour permeability values that range from 1E-09 to 6E-08 cm^2 for fine and coarse textured soils. Under the CCME (2014) protocol, the Q_{soil} variable is fixed based on alternative approaches that have been adopted for estimating. The CCME (2014) recommends that the perimeter crack model should not be used but SVQG should be based on Q_{soil} values of 10 L/min (167 cm³/sec) for coarse textured soils and 1 L/min (16.7 cm³/sec) for fine and medium textured soils. The SVQG presented in Section 8.0 were based on the recommend CCME (2014) Q_{soil} values.

7.0 TOXICITY REFERENCE VALUES

The following two types of limits were used for the assessment of inhalation risks and development of SVQG:

1. Risk-specific concentration (RsC) is used for a carcinogenic chemical (i.e., benzene and 1,2-DCA) and is the concentration that one can breathe every day for a lifetime without exceeding the acceptable benchmark level of increased cancer risk. The acceptable benchmark level for cancer risk in Alberta is 1 in 100,000 or 0.00001 risk (AEP 2016a); and
2. Reference concentration (RfC) is used for a non-carcinogenic chemical and the toxicity reference value is the concentration of the chemical that one can breathe every day for a lifetime that is not anticipated to cause harmful non-carcinogenic health effects.

Table 7-1 presents the toxicity reference values that were used to develop the SVQG. The SVQG are based on chronic inhalation limits recommended by AEP (2016a) which are based on CCME (2008), Health Canada (2010) or US EPA (2016).

Table 7-1 Toxicity Reference Values Used to Derive Soil Vapour Inhalation Guidelines

Chemical	*Toxicity Reference Value [µg/m³]*	*Comment / Reference*
Benzene	3.0	Risk-specific concentration at 1 in 100,000 risk level (AEP 2016a)
Toluene	3,800	Reference concentration (AEP 2016a)
Ethylbenzene	1,000	Reference concentration (AEP 2016a)
Xylenes	180	Reference concentration (AEP 2016a)
1,2-DCA	0.4	Risk-specific concentration at 1 in 100,000 risk level (AEP 2016a)
Naphthalene	3.0	Reference concentration (AEP 2016a)
F1 - Aliphatic C6-C8	18,400	Reference concentration (AEP 2016a)
F1 - Aliphatic C8-C10	1,000	Reference concentration (AEP 2016a)
F1 - Aromatic C8-C10	200	Reference concentration (AEP 2016a)
F2 - Aliphatic C10-C12	1,000	Reference concentration (AEP 2016a)
F2 - Aromatic C10-C12	200	Reference concentration (AEP 2016a)
F2 - Aliphatic C12-C16	1,000	Reference concentration (AEP 2016a)
F2 - Aromatic C12-C16	200	Reference concentration (AEP 2016a)

8.0 SOIL VAPOUR QUALITY GUIDELINES (DEPTHS >100 CM)

Table 8-1 and Table 8-2 present SVQG that are protective of indoor air quality for a residential building on fine-textured soil and coarse-textured soil, respectively. Similarly, Table 8-3 and Table 8-4 present SVQG that are protective of indoor air quality for a commercial building on fine-textured soil and coarse-textured soil, respectively. Finally, Table 8-5 and Table 8-6 present the SVQG that are protective of outdoor air quality for fine and coarse textured soils, respectively.

Appendix A and B present the input values that were assumed for each model input variable and COPC required to calculate the indoor SVQG for residential and commercial land use, respectively. Finally, Appendix C presents a worked example for the SVQG for benzene at a depth of 100cm that is protective of indoor air quality in a residential building on fine-textured soil.

Table 8-1 Soil Vapour Quality Guidelines Protective of Indoor Air Quality for a Residential Building on Fine-textured Soil [µg/m³]

Depth (cm)	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	Naphtha-lene	F1			F2			
							Aliphatic C6-C8	Aliphatic >C8-C10	Aromatic >C8-C10	Aliphatic >C10-C12	Aromatic >C10-C12	Aliphatic >C12-C16	Aromatic >C12-C16
<100[(1)]	3.0E+02	1.9E+05	5.0E+04	8.9E+03	4.0E+01	1.0E+02	9.2E+05	4.8E+04	8.1E+03	5.0E+04	1.0E+04	5.0E+04	1.0E+04
100	1.5E+05	9.1E+07	2.4E+07	4.4E+06	1.8E+03	5.2E+03	NGR	2.5E+07	4.2E+06	NGR	NGR	NGR	NGR
150	1.5E+05	9.5E+07	2.6E+07	4.6E+06	1.9E+03	5.5E+03	NGR	2.6E+07	4.5E+06	NGR	NGR	NGR	NGR
200	1.6E+05	9.8E+07	2.7E+07	4.7E+06	1.9E+03	5.7E+03	NGR	2.8E+07	4.7E+06	NGR	NGR	NGR	NGR
250	1.6E+05	1.0E+08	2.8E+07	4.9E+06	2.0E+03	6.0E+03	NGR	2.9E+07	5.0E+06	NGR	NGR	NGR	NGR
300	1.7E+05	1.1E+08	2.9E+07	5.1E+06	2.0E+03	6.3E+03	NGR	3.1E+07	5.3E+06	NGR	NGR	NGR	NGR
350	1.8E+05	1.1E+08	3.0E+07	5.3E+06	2.1E+03	6.6E+03	NGR	3.3E+07	5.5E+06	NGR	NGR	NGR	NGR
400	1.8E+05	1.1E+08	3.1E+07	5.5E+06	2.2E+03	6.9E+03	NGR	3.4E+07	5.8E+06	NGR	NGR	NGR	NGR
450	1.9E+05	1.2E+08	3.2E+07	5.7E+06	2.2E+03	7.2E+03	NGR	NGR	6.1E+06	NGR	NGR	NGR	NGR
500	1.9E+05	1.2E+08	3.3E+07	5.9E+06	2.3E+03	7.5E+03	NGR	NGR	6.3E+06	NGR	NGR	NGR	NGR
550	2.0E+05	1.2E+08	3.4E+07	6.1E+06	2.3E+03	7.7E+03	NGR	NGR	6.6E+06	NGR	NGR	NGR	NGR
600	2.0E+05	1.3E+08	3.5E+07	6.2E+06	2.4E+03	8.0E+03	NGR	NGR	6.9E+06	NGR	NGR	NGR	NGR

Notes:

NGR No guideline required, as calculated guideline value results in a vapour concentration greater than the maximum possible vapour concentration for that chemical, assuming no NAPL is present. Maximum vapour concentration calculated according to Health Canada (2010) guidance.

(1) Based on default attenuation coefficient of 0.01 (AEP 2016b).

Table 8-2 Soil Vapour Quality Guidelines Protective of Indoor Air Quality for a Residential Building on Coarse-textured Soil [µg/m³]

Depth (cm)	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	Naphtha-lene	F1			F2			
							Aliphatic C6-C8	Aliphatic >C8-C10	Aromatic >C8-C10	Aliphatic >C10-C12	Aromatic >C10-C12	Aliphatic >C12-C16	Aromatic >C12-C16
<100[(1)]	3.0E+02	1.9E+05	5.0E+04	8.9E+03	4.0E+01	1.0E+02	9.2E+05	4.8E+04	8.1E+03	5.0E+04	1.0E+04	5.0E+04	1.0E+04
100	2.0E+04	1.2E+07	3.4E+06	6.0E+05	2.3E+02	7.7E+02	7.4E+07	3.9E+06	6.6E+05	4.0E+06	8.1E+05	NGR	NGR
150	2.3E+04	1.4E+07	4.0E+06	7.1E+05	2.7E+02	9.3E+02	9.0E+07	4.7E+06	8.0E+05	NGR	9.9E+05	NGR	NGR
200	2.6E+04	1.6E+07	4.6E+06	8.1E+05	3.0E+02	1.1E+03	1.1E+08	5.6E+06	9.5E+05	NGR	1.2E+06	NGR	NGR
250	2.9E+04	1.8E+07	5.2E+06	9.1E+05	3.3E+02	1.2E+03	1.2E+08	6.5E+06	1.1E+06	NGR	1.3E+06	NGR	NGR
300	3.2E+04	2.0E+07	5.8E+06	1.0E+06	3.6E+02	1.4E+03	1.4E+08	7.3E+06	1.2E+06	NGR	1.5E+06	NGR	NGR
350	3.5E+04	2.2E+07	6.4E+06	1.1E+06	4.0E+02	1.5E+03	1.6E+08	8.2E+06	1.4E+06	NGR	1.7E+06	NGR	NGR
400	3.8E+04	2.4E+07	7.0E+06	1.2E+06	4.3E+02	1.7E+03	1.7E+08	9.0E+06	1.5E+06	NGR	1.9E+06	NGR	NGR
450	4.1E+04	2.6E+07	7.5E+06	1.3E+06	4.6E+02	1.9E+03	1.9E+08	9.9E+06	1.7E+06	NGR	2.1E+06	NGR	NGR
500	4.4E+04	2.8E+07	8.1E+06	1.4E+06	4.9E+02	2.0E+03	2.0E+08	1.1E+07	1.8E+06	NGR	2.2E+06	NGR	NGR
550	4.7E+04	3.0E+07	8.7E+06	1.5E+06	5.3E+02	2.2E+03	2.2E+08	1.2E+07	2.0E+06	NGR	2.4E+06	NGR	NGR
600	5.1E+04	3.2E+07	9.3E+06	1.6E+06	5.6E+02	2.3E+03	2.4E+08	1.2E+07	2.1E+06	NGR	2.6E+06	NGR	NGR

Notes:

NGR No guideline required, as calculated guideline value results in a vapour concentration greater than the maximum possible vapour concentration for that chemical, assuming no NAPL is present. Maximum vapour concentration calculated according to Health Canada (2010) guidance.

(1) Based on default attenuation coefficient of 0.01 (AEP 2016b).

Table 8-3 Soil Vapour Quality Guidelines Protective of Indoor Air Quality for a Commercial Building on Fine-textured Soil [µg/m³]

Depth (cm)	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	Naphtha-lene	F1			F2			
							Aliphatic C6-C8	Aliphatic >C8-C10	Aromatic >C8-C10	Aliphatic >C10-C12	Aromatic >C10-C12	Aliphatic >C12-C16	Aromatic >C12-C16
<100[(1)]	1.1E+03	6.8E+05	1.8E+05	3.2E+04	1.5E+02	3.7E+02	3.3E+06	1.7E+05	3.0E+04	1.8E+05	3.6E+04	1.8E+05	3.6E+04
100	1.5E+06	NGR	NGR	4.6E+07	1.8E+04	5.5E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
150	1.6E+06	NGR	NGR	4.8E+07	1.9E+04	5.8E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
200	1.6E+06	NGR	NGR	5.0E+07	2.0E+04	6.1E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
250	1.7E+06	NGR	NGR	NGR	2.0E+04	6.4E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
300	1.8E+06	NGR	NGR	NGR	2.1E+04	6.7E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
350	1.8E+06	NGR	NGR	NGR	2.1E+04	6.9E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
400	1.9E+06	NGR	NGR	NGR	2.2E+04	7.2E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
450	1.9E+06	NGR	NGR	NGR	2.3E+04	7.5E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
500	2.0E+06	NGR	NGR	NGR	2.3E+04	7.8E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
550	2.0E+06	NGR	NGR	NGR	2.4E+04	8.1E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR
600	2.1E+06	NGR	NGR	NGR	2.4E+04	8.3E+04	NGR	NGR	NGR	NGR	NGR	NGR	NGR

Notes:

NGR No guideline required, as calculated guideline value results in a vapour concentration greater than the maximum possible vapour concentration for that chemical, assuming no NAPL is present. Maximum vapour concentration calculated according to Health Canada (2010) guidance.

(1) Based on default attenuation coefficient of 0.01 (AEP 2016b).

Table 8-4 Soil Vapour Quality Guidelines Protective of Indoor Air Quality for a Commercial Building on Coarse-textured Soil [µg/m³]

Depth (cm)	Benzene	Toluene	Ethyl-benzene	Xylenes	1,2-DCA	Naphtha-lene	F1			F2			
							Aliphatic C6-C8	Aliphatic >C8-C10	Aromatic >C8-C10	Aliphatic >C10-C12	Aromatic >C10-C12	Aliphatic >C12-C16	Aromatic >C12-C16
<100(1)	1.1E+03	6.8E+05	1.8E+05	3.2E+04	1.5E+02	3.7E+02	3.3E+06	1.7E+05	3.0E+04	1.8E+05	3.6E+04	1.8E+05	3.6E+04
100	2.1E+05	1.3E+08	3.6E+07	6.4E+06	2.5E+03	8.1E+03	NGR	NGR	6.8E+06	NGR	NGR	NGR	NGR
150	2.4E+05	NGR	4.2E+07	7.4E+06	2.8E+03	9.6E+03	NGR	NGR	8.3E+06	NGR	NGR	NGR	NGR
200	2.7E+05	NGR	4.8E+07	8.4E+06	3.1E+03	1.1E+04	NGR	NGR	9.7E+06	NGR	NGR	NGR	NGR
250	3.0E+05	NGR	5.3E+07	9.4E+06	3.4E+03	1.3E+04	NGR	NGR	1.1E+07	NGR	NGR	NGR	NGR
300	3.3E+05	NGR	NGR	1.0E+07	3.8E+03	1.4E+04	NGR	NGR	1.3E+07	NGR	NGR	NGR	NGR
350	3.6E+05	NGR	NGR	1.1E+07	4.1E+03	1.6E+04	NGR	NGR	1.4E+07	NGR	NGR	NGR	NGR
400	3.9E+05	NGR	NGR	1.2E+07	4.4E+03	1.7E+04	NGR	NGR	1.5E+07	NGR	NGR	NGR	NGR
450	4.2E+05	NGR	NGR	1.3E+07	4.7E+03	1.9E+04	NGR	NGR	1.7E+07	NGR	NGR	NGR	NGR
500	4.5E+05	NGR	NGR	1.4E+07	5.0E+03	2.0E+04	NGR	NGR	1.8E+07	NGR	NGR	NGR	NGR
550	4.8E+05	NGR	NGR	1.5E+07	5.4E+03	2.2E+04	NGR	NGR	2.0E+07	NGR	NGR	NGR	NGR
600	5.1E+05	NGR	NGR	1.6E+07	5.7E+03	2.3E+04	NGR	NGR	2.1E+07	NGR	NGR	NGR	NGR

Notes:
NGR No guideline required, as calculated guideline value results in a vapour concentration greater than the maximum possible vapour concentration for that chemical, assuming no NAPL is present. Maximum vapour concentration calculated according to Health Canada (2010) guidance.
(1) Based on default attenuation coefficient of 0.01 (AEP 2016b).

Table 8-5 Soil Vapour Quality Guidelines Protective of Outdoor Air Quality for Fine-textured Soil [µg/m³]

							F1			F2			
Depth (cm)	*Benzene*	*Toluene*	*Ethyl-benzene*	*Xylene*	*1,2-DCA*	*Naphtha-lene*	*Aliphatic C6-C8*	*Aliphatic C8-C10*	*Aromatic C8-C10*	*Aliphatic C10-C12*	*Aromatic C10-C12*	*Aliphatic C12-C16*	*Aromatic C12-C16*
100	8.1E+06	NGR	NGR	NGR	8.6E+04	4.1E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
150	1.2E+07	NGR	NGR	NGR	1.3E+05	6.2E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
200	1.6E+07	NGR	NGR	NGR	1.7E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
250	2.0E+07	NGR	NGR	NGR	2.1E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
300	2.4E+07	NGR	NGR	NGR	2.6E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
350	2.8E+07	NGR	NGR	NGR	3.0E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
400	3.3E+07	NGR	NGR	NGR	3.4E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
450	3.7E+07	NGR	NGR	NGR	3.9E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
500	4.1E+07	NGR	NGR	NGR	4.3E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
550	4.5E+07	NGR	NGR	NGR	4.7E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
600	4.9E+07	NGR	NGR	NGR	5.1E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR

Notes:
NGR – Indicates no guideline required as calculated SVQG exceeds maximum theoretical vapour concentration.

Table 8-6 Soil Vapour Quality Guidelines Protective of Outdoor Air Quality for Coarse-textured Soil [µg/m³]

							F1			F2			
Depth (cm)	*Benzene*	*Toluene*	*Ethyl-benzene*	*Xylene*	*1,2-DCA*	*Naphtha-lene*	*Aliphatic C6-C8*	*Aliphatic C8-C10*	*Aromatic C8-C10*	*Aliphatic C10-C12*	*Aromatic C10-C12*	*Aliphatic C12-C16*	*Aromatic C12-C16*
100	4.4E+06	NGR	NGR	NGR	4.7E+04	2.2E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
150	6.6E+06	NGR	NGR	NGR	7.0E+04	3.4E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
200	8.9E+06	NGR	NGR	NGR	9.3E+04	4.5E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
250	1.1E+07	NGR	NGR	NGR	1.2E+05	5.6E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR
300	1.3E+07	NGR	NGR	NGR	1.4E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
350	1.5E+07	NGR	NGR	NGR	1.6E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
400	1.8E+07	NGR	NGR	NGR	1.9E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
450	2.0E+07	NGR	NGR	NGR	2.1E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
500	2.2E+07	NGR	NGR	NGR	2.3E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
550	2.4E+07	NGR	NGR	NGR	2.6E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR
600	2.7E+07	NGR	NGR	NGR	2.8E+05	NGR	NGR	NGR	NGR	NGR	NGR	NGR	NGR

Notes:
NGR – Indicates no guideline required as calculated SVQG exceeds maximum theoretical vapour concentration.

9.0 REFERENCES

AEP (Alberta Environment and Parks). 2016a. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

AEP (Alberta Environment and Parks). 2016b. Alberta Tier 2 Soil and Groundwater Remediation Guidelines.

CAL (Clifton Associates Ltd.). 2016. Sears Canada Inc. Soil Vapour Monitoring Program Hounsfield Heights and North Hill Mall Calgary, Alberta. File CG2430.1 E04. 23 January 2016.

CCME (Canadian Council of Ministers of the Environment). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. PN 1531. ISBN 978-1-77202-013-7 PDF.

Golder Associates and Science Advisory Board for Contaminated Sites in British Columbia. 2011. Derivation of High Density Residential Soil and Vapour Quality Standards for Use under Contaminated Sites Regulation. Submitted to: British Columbia Ministry of Environment.

Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada. Part VII: Guidance for Vapour Intrusion Assessment at Contaminated Sites. Contaminated Sites Division. Safe Environments Program. September 2010.

Intrinsik Environmental Sciences Inc. 2015. Draft report human health and ecological risk assessment for the Hounsfield Heights and North Hill Mall areas, Calgary, Alberta. Submitted to Sears Canada. December 2015.

Johnson, P.C. and R.A. Ettinger. 1991. Heuristic model for predicting the intrusion rate of contaminant vapors into buildings. Environmental Science & Technology 25, 1445-1452.

MSD (Manitoba Sustainable Development). 2016. Raymond Reichelt, personal communication, August 22, 2016.

OMOE (Ontario Ministry of the Environment), 2010. Draft Technical Guidance: Soil Vapour Intrusion Assessment November 2010.

US EPA (United States Environmental Protection Agency). 2001. User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapour Intrusion into Buildings (Revised). United States Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. December, 2000.

US EPA (United States Environmental Protection Agency). 2015. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. Office of Solid Waste and Emergency Response. June 2015. OSWER Publication 9200.2-154.

US EPA (United States Environmental Protection Agency). 2016. Integrated Risk Information System (IRIS). https://www.epa.gov/iris.

DISCLAIMER

Intrinsik Corp. (Intrinsik) provided this report for Sears Canada Inc. (Sears Canada) (hereafter referred to as Sears Canada) solely for the purpose stated in the report. The information contained in this report was prepared and interpreted exclusively for Sears Canada and may not be used in any manner by any other party. Intrinsik does not accept any responsibility for the use of this report for any purpose other than as specifically intended by Sears Canada. Intrinsik does not have, and does not accept, any responsibility or duty of care whether based in negligence or otherwise, in relation to the use of this report in whole or in part by any third party. Any alternate use, including that by a third party, or any reliance on or decision made based on this report, are the sole responsibility of the alternative user or third party. Intrinsik does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Intrinsik makes no representation, warranty or condition with respect to this report or the information contained herein other than that it has exercised reasonable skill, care and diligence in accordance with accepted practice and usual standards of thoroughness and competence for the profession of toxicology and environmental assessment to assess and evaluate information acquired during the preparation of this report. Any information or facts provided by others, and referred to or utilized in the preparation of this report, is believed to be accurate without any independent verification or confirmation by Intrinsik. This report is based upon and limited by circumstances and conditions stated herein, and upon information available at the time of the preparation of the report.

Appendix A
Model for the Derivation of Residential Soil Vapour Quality Guidelines

Table A-1 Default Soil Vapour Quality Guidelines Protective of Indoor Air Quality for Residential buildings (Depths 0 to <100m)

Chemical	Tolerable Concentration µg/m3	Background Air µg/m3	Allocation Factor Unitless	Attenuation Factor (alpha)[(1)] Unitless	Exposure Term Unitless	Bioattenuation Factor Unitless	Soil Vapour Quality Guideline [µg/m3]	
							Non-carcinogen	Carcinogen
Benzene	3	0	1	0.01	1	1		300
Toluene	3800	44.2	0.5	0.01	1	1	187790	
Ethylbenzene	1000	7.5	0.5	0.01	1	1	49625	
Xylenes	180	1.82	0.5	0.01	1	1	8909	
1,2-DCA	0.4	0	1	0.01	1	1		40
Naphthalene	3	0.95	0.5	0.01	1	1	103	
Aliphatic C6-C8	18400	91.1	0.5	0.01	1	1	915445	
Aliphatic >C8-C10	1000	38.8	0.5	0.01	1	1	48060	
Aromatic >C8-C10	200	37.5	0.5	0.01	1	1	8125	
Aliphatic >C10-C12	1000	0	0.5	0.01	1	1	50000	
Aromatic >C10-C12	200	0	0.5	0.01	1	1	10000	
Aliphatic >C12-C16	1000	0	0.5	0.01	1	1	50000	
Aromatic >C12-C16	200	0	0.5	0.01	1	1	10000	

(1) Default attenuation factor for sub-slab soil-gas sample (AEP 2016b)

For non-carcinogens (CCME 2014):

$$SVRG = \frac{(TC - C_a) \times AF \times BAF}{a \times ET}$$

For carcinogens (CCME 2014):

$$SVRG = \frac{RSC \times BAF}{a \times ET}$$

Table A-2 Input Variables for Indoor Vapour Inhalation

Required Input Variables	Land Use	Soil Type
	Residential	Fine

Below Ground Surface Area of Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	1225	CCME 2014
Building width	W_b	cm	1225	CCME 2014
Building Area	A_b	cm^2	2.7E+06	CCME 2014

Flow Rate of Fresh air Into Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	1225	
Building width	W_b	cm	1225	
Building height	H_b	cm	360	CCME 2014
Indoor air exchange rate per hour	ACH	exch/hr	0.5	CCME 2014
Building ventilation rate	Q_b	cm^3/s	7.50E+04	CCME 2014

Pressure-driven Soil Gas Flow Rate From Subsurface Into Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	1.23E+03	
Building width	W_b	cm	1.23E+03	
Crack area	A_{crack}	cm^2	994.5	CCME 2014
Building Area	A_b	cm^2	2.70E+06	
Soil gas flow rate	Q_{soil}	cm^3/s	16.7	CCME 2014

Soil Parameters for Site				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A moisture content	O_w^A	m^3-water / m^3-soil	0.167	CCME 2014
Stratum B moisture content	O_{wB}	m^3-water / m^3-soil		
Stratum C moisture content	O_w^C	m^3-water / m^3-soil		
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	CCME 2014
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil		
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil		
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	CCME 2014
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil		
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil		
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	CCME 2014
Stratum B soil dry bulk density	Pb^B	g/cm^3		
Stratum C soil dry bulk density	Pb^C	g/cm^3		
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm		
Stratum C thickness	S_c	cm		
Total thickness of vadose zone	L_t	cm	100	

Miscelaneous Attenuation Coefficient Variables				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building floor thickness	L_{crack}	cm	11.25	CCME 2014
Building Area	A_b	cm^2	2.70E+06	

Exposure Variables				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Exposure term	ET	Unitless	1.00	CCME 2014

Volatilization Factor Parameters for Soil Vapour to Ambient Air				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Depth to subsurface soil vapour sample	L_s	cm	100	CCME 2014
Ambient air velocity in mixing zone	U_{air}	cm/s	400	CCME 2014
Width of source-zone area parallel to the wind direction	W	cm	3000	CCME 2014
Mixing zone height	M_{air}	cm	150	CCME 2014

Table A-3 Calculation of Temperature-Corrected Dimensionless Henry's Law Constant

Parameters	1,2-DCA	Naphthalene	Benzene	Toluene	Ethylbenzene	Xylenes
Average soil temperature (degrees Celsius)	15	15	15	15	15	15
Average soil temperature (K)	288.15	288.15	288.15	288.15	288.15	288.15
Henry's Law constant (atm-m3/mol)	1.20E-03	4.24E-04	5.50E-03	6.71E-03	8.75E-03	7.30E-03
Enthalpy of vapourization at normal boiling point (cal/mol)	8.03E+03	1.04E+04	7.72E+03	8.51E+03	9.25E+03	9.47E+03
Critical temperature (K)	5.61E+02	7.48E+02	5.62E+02	5.92E+02	6.17E+02	6.21E+02
Normal boiling point (K)	3.58E+02	4.91E+02	3.53E+02	3.84E+02	4.09E+02	4.12E+02
Reference temperature (K)	2.98E+02	2.98E+02	2.98E+02	2.98E+02	2.98E+02	2.98E+02
n	3.57E-01	3.70E-01	3.49E-01	3.64E-01	3.75E-01	3.74E-01
Enthalpy of vapourization at average soil temp (cal/mol)	8.93E+03	1.29E+04	8.48E+03	9.76E+03	1.10E+04	1.13E+04
Dimensionless Henry's Law constant	4.89E-02	1.73E-02	2.25E-01	2.74E-01	3.58E-01	3.00E-01
Temperature-corrected dimensionless Henry's Law constant	3.00E-02	8.44E-03	1.41E-01	1.60E-01	1.94E-01	1.60E-01

Sources:
Health Canada 2010; Part VII: Guidance for Soil Vapour Intrusion Assessment at Contaminated Sites
Health Canada 2009; Part V: DQRA Spreadsheet

Table A-4 Soil Vapour Guideline for Indoor Vapour Inhalation - Benzene

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	147,079	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	46.04	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	8,141,900	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	2,549	
	--	--	No	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.23	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	8.80E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0030	ESRD 2014a
Allocation Factor	AF	Unitless	1	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	12640	ESRD 2014a
Molecular Weight	MW	g/mole	78.11	ESRD 2014a
Solubility	S	mg/L	1780	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	398,270	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	398,270,077	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	124,667	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	400,500	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	400,500,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	125,365	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.44E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.44E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	7.44E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.22E-02	
Alpha	Alpha	Unitless	2.06E-04	
Dilution Factor	DF	Unitless	4,854	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.72E-06	

Tble A-5 Soil Vapour Guideline for Indoor Vapour Inhalation - Toluene
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	91,241,810	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	24,212	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	5,103,681,728	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	1,354,313	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.27	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	8.70E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.0442	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	3.8	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	3800	Health Canada 2009
Molecular Weight	MW	g/mole	92.14	Health Canada 2009
Solubility	S	mg/L	515	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	141,238	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	141,237,837	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	37,479	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	141,110	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	141,110,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	37,445	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.36E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.36E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	7.36E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.18E-02	
Alpha	Alpha	Unitless	2.06E-04	
Dilution Factor	DF	Unitless	4,859	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.68E-06	

Table A-6 Soil Vapour Guideline for Indoor Vapour Inhalation - Ethylbenzene
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	24,447,145	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	5,639	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	1,564,492,908	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	360,867	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.36	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	7.50E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.0075	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	1270	ESRD 2014a
Molecular Weight	MW	g/mole	106.00	ESRD 2014a
Solubility	S	mg/L	152	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	54,304	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	54,304,217	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	12,526	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	54,416	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	54,416,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	12,552	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.34E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.34E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	6.34E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.74E-02	
Alpha	Alpha	Unitless	2.03E-04	
Dilution Factor	DF	Unitless	4,926	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.17E-06	

Table A-7 Soil Vapour Guideline for Indoor Vapour Inhalation - Xylenes
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	4,372,661	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	1,009	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	270,061,338	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	62,292	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.25	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	7.80E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.00182	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.18	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	1070	ESRD 2014a
Molecular Weight	MW	g/mole	106.00	ESRD 2014a
Solubility	S	mg/L	198	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	45,752	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	45,752,371	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	10,553	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	49,896	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	49,896,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	11,509	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.60E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.60E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	6.60E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.85E-02	
Alpha	Alpha	Unitless	2.04E-04	
Dilution Factor	DF	Unitless	4,908	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.30E-06	

Table A-8 Soil Vapour Guideline for Indoor Vapour Inhalation - 1,2-DCA
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	1,803	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	0	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	85,769	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	21	
	--	--	No	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.040	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	1.04E-01	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0004	ESRD 2014a
Allocation Factor	AF	Unitless	1	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	1	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	10531.13385	EPI Suite
Molecular Weight	MW	g/mole	98.96	ESRD 2014a
Solubility	S	mg/L	8520	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	420,396	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	420,396,204	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	103,867	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	341,652	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	341,652,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	84,412	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	8.80E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	8.80E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	8.80E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.80E-02	
Alpha	Alpha	Unitless	2.09E-04	
Dilution Factor	DF	Unitless	4,778	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	4.40E-06	

Table A-9 Soil Vapour Guideline for Indoor Vapour Inhalation - Naphthalene
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	5,175	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	1	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	410,443	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	78	
	--	--	No	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.020	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	5.90E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	9.50E-04	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0030	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	1	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	10.4	Health Canada 2009
Molecular Weight	MW	g/mole	128.00	Health Canada 2009
Solubility	S	mg/L	32	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	537	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	536,991	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	103	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	648	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	647,980	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	124	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.99E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.99E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.99E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.16E-02	
Alpha	Alpha	Unitless	1.98E-04	
Dilution Factor	DF	Unitless	5,049	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.50E-06	

Table A-10 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C6-C8 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	471,439,219	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	115,267	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	43,292,531,190	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	10,585,024	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	50	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.09111	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	18.4	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	6383	ESRD 2014a
Molecular Weight	MW	g/mole	100.00	ESRD 2014a
Solubility	S	mg/L	5.4	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	257,502	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	257,502,309	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	62,959	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	270,000	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	270,000,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	66,015	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-11 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C8-C10 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	24,749,872	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	4,655	Not applicable to fractions of hydrocarbons
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	2,272,795,163	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	427,460	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	80	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.03881	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	638	ESRD 2014a
Molecular Weight	MW	g/mole	130.00	ESRD 2014a
Solubility	S	mg/L	0.43	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	33,475	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	33,475,300	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	6,296	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	34,400	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	34,400,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	6,470	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-12 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C8-C10 Aromatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	4,185,502	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	853	Not applicable to fractions of hydrocarbons
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	384,338,009	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	78,309	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.48	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.03745	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	638	ESRD 2014a
Molecular Weight	MW	g/mole	120.00	ESRD 2014a
Solubility	S	mg/L	65	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	30,900	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	30,900,277	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	6,296	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	31,200	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	31,200,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	6,357	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-13 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C10-C12 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	25,749,198	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	2,364,564,157	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	120	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	0.034	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	4,080	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	4,080,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-14 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C10-C12 Aromatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	5,149,711	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	472,820,219	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.14	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	25	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	3,500	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	3,500,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-15 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C12-C16 Aliphatic)

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	25,749,199	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	2,364,564,574	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	520	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	0.00076	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	395	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	395,200	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,150	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table A-16 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C12-C16 Aromatic)

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	5,149,500	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	472,668,096	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.053	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	5.8	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	307	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	307,400	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	1.94E-04	
Dilution Factor	DF	Unitless	5,149	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.12E-06	

Appendix B
Model for the Derivation of Commercial Soil Vapour Quality Guidelines

Table B-1 Default Soil Vapour Quality Guidelines Protective of Indoor Air Quality for Commercial buildings (Depths 0 to <100cm)

Chemical	Tolerable Concentration µg/m3	Background Air µg/m3	Allocation Factor Unitless	Attenuation Factor (alpha)[(1)] Unitless	Exposure Term Unitless	Bioattenuation Factor Unitless	Soil Vapour Quality Guideline [µg/m3]	
							Non-carcinogen	Carcinogen
Benzene	3	0	1	0.01	0.27	1		1092
Toluene	3800	44.2	0.5	0.01	0.27	1	683556	
Ethylbenzene	1000	7.5	0.5	0.01	0.27	1	180635	
Xylenes	180	1.82	0.5	0.01	0.27	1	32429	
1,2-DCA	0.4	0	1	0.01	0.27	1		146
Naphthalene	3	0.95	0.5	0.01	0.27	1	373	
Aliphatic C6-C8	18400	91.1	0.5	0.01	0.27	1	3332220	
Aliphatic >C8-C10	1000	38.8	0.5	0.01	0.27	1	174938	
Aromatic >C8-C10	200	37.5	0.5	0.01	0.27	1	29575	
Aliphatic >C10-C12	1000	0	0.5	0.01	0.27	1	182000	
Aromatic >C10-C12	200	0	0.5	0.01	0.27	1	36400	
Aliphatic >C12-C16	1000	0	0.5	0.01	0.27	1	182000	
Aromatic >C12-C16	200	0	0.5	0.01	0.27	1	36400	

(1) Default attenuation factor for sub-slab soil-gas sample (AEP 2016b)

For non-carcinogens (CCME 2014): $$SVRG = \frac{(TC - C_a) \times AF \times BAF}{a \times ET}$$

For carcinogens (CCME 2014): $$SVRG = \frac{RSC \times BAF}{a \times ET}$$

Table B-2 Input Variables for Indoor Vapour Inhalation

Required Input Variables	**Land Use**	**Soil Type**
	Commercial	Fine

Below Ground Surface Area of Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	2000	CCME 2014
Building width	W_b	cm	1500	CCME 2014
Building Area	A_b	cm^2	3.0E+06	CCME 2014

Flow Rate of Fresh air Into Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	2000	
Building width	W_b	cm	1500	
Building height	H_b	cm	300	CCME 2014
Indoor air exchange rate per hour	ACH	exch/hr	0.9	CCME 2014
Building ventilation rate	Q_b	cm^3/s	2.25E+05	CCME 2014

Pressure-driven Soil Gas Flow Rate From Subsurface Into Building				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building length	L_b	cm	2.00E+03	
Building width	W_b	cm	1.50E+03	
Crack area	A_{crack}	cm^2	1846	CCME 2014
Building Area	A_b	cm^2	3.00E+06	
Soil gas flow rate	Q_{soil}	cm^3/s	16.7	CCME 2014

Soil Parameters for Site				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A moisture content	O_w^A	m^3-water / m^3-soil	0.167	CCME 2014
Stratum B moisture content	O_{wB}	m^3-water / m^3-soil		
Stratum C moisture content	O_w^C	m^3-water / m^3-soil		
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	CCME 2014
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil		
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil		
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	CCME 2014
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil		
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil		
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	CCME 2014
Stratum B soil dry bulk density	Pb^B	g/cm^3		
Stratum C soil dry bulk density	Pb^C	g/cm^3		
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm		
Stratum C thickness	S_c	cm		
Total thickness of vadose zone	L_t	cm	100	

Miscelaneous Attenuation Coefficient Variables				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Building floor thickness	L_{crack}	cm	11.25	CCME 2014
Building Area	A_b	cm^2	3.00E+06	

Exposure Variables				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Exposure term	ET	Unitless	0.27	CCME 2014

Volatilization Factor Parameters for Soil Vapour to Ambient Air				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Depth to subsurface soil vapour sample	L_s	cm	100	CCME 2014
Ambient air velocity in mixing zone	U_{air}	cm/s	400	CCME 2014
Width of source-zone area parallel to the wind direction	W	cm	3000	CCME 2014
Mixing zone height	M_{air}	cm	150	CCME 2014

Table B-3 Soil Vapour Guideline for Indoor Vapour Inhalation - Benzene
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	1,534,517	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	480.33	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	29,636,517	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	9,277	
	--	--	No	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.23	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	8.80E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0030	ESRD 2014a
Allocation Factor	AF	Unitless	1	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	12640	ESRD 2014a
Molecular Weight	MW	g/mole	78.11	ESRD 2014a
Solubility	S	mg/L	1780	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	398,270	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	398,270,077	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	124,667	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	400,500	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	400,500,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	125,365	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.44E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.088	
Diffusion coefficient in water	D_w	cm^2/s	9.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.225	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.44E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	7.44E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.22E-02	
Alpha	Alpha	Unitless	7.19E-05	
Dilution Factor	DF	Unitless	13,912	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.72E-06	

Table B-4 Soil Vapour Guideline for Indoor Vapour Inhalation - Toluene

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	953,132,900	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	252,923	
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	18,577,401,490	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	4,929,698	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.27	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	8.70E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.0442	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	3.8	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	3800	Health Canada 2009
Molecular Weight	MW	g/mole	92.14	Health Canada 2009
Solubility	S	mg/L	515	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	141,238	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	141,237,837	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	37,479	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	141,110	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	141,110,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	37,445	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.36E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.087	
Diffusion coefficient in water	D_w	cm^2/s	8.60E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.274	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	7.36E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	7.36E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.18E-02	
Alpha	Alpha	Unitless	7.17E-05	
Dilution Factor	DF	Unitless	13,944	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.68E-06	

Table B-5 Soil Vapour Guideline for Indoor Vapour Inhalation - Ethylbenzene

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	258,789,686	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	59,693	
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	5,694,754,186	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	1,313,554	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.36	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	7.50E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.0075	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	1270	ESRD 2014a
Molecular Weight	MW	g/mole	106.00	ESRD 2014a
Solubility	S	mg/L	152	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	54,304	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	54,304,217	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	12,526	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	54,416	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	54,416,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	12,552	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.34E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.075	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.358	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.34E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	6.34E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.74E-02	
Alpha	Alpha	Unitless	6.98E-05	
Dilution Factor	DF	Unitless	14,327	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.17E-06	

Table B-6 Soil Vapour Guideline for Indoor Vapour Inhalation - Xylenes
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	46,148,471	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	10,645	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	983,023,272	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	226,745	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.25	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	7.80E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.00182	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.18	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	1070	ESRD 2014a
Molecular Weight	MW	g/mole	106.00	ESRD 2014a
Solubility	S	mg/L	198	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	45,752	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	45,752,371	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	10,553	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	49,896	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	49,896,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	11,509	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.60E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.078	
Diffusion coefficient in water	D_w	cm^2/s	7.80E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.252	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	6.60E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	6.60E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.85E-02	
Alpha	Alpha	Unitless	7.03E-05	
Dilution Factor	DF	Unitless	14,231	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	3.30E-06	

Table B-7 Soil Vapour Guideline for Indoor Vapour Inhalation - 1,2-DCA
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	18,406	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	5	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	312,200	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	77	
	--	--	No	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.040	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	1.04E-01	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0004	ESRD 2014a
Allocation Factor	AF	Unitless	1	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	1	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	10531.13385	EPI Suite
Molecular Weight	MW	g/mole	98.96	ESRD 2014a
Solubility	S	mg/L	8520	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	420,396	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	420,396,204	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	103,867	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	341,652	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	341,652,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	84,412	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	8.80E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.104	
Diffusion coefficient in water	D_w	cm^2/s	9.90E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.0401	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	8.80E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	8.80E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	3.80E-02	
Alpha	Alpha	Unitless	7.46E-05	
Dilution Factor	DF	Unitless	13,400	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	4.40E-06	

Table B-8 Soil Vapour Guideline for Indoor Vapour Inhalation - Naphthalene
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	55,423	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	11	
	--	--	No	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	1,494,012	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	285	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.020	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	5.90E-02	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	9.50E-04	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RsC	mg/m^3	0.0030	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	1	ESRD 2014a
Vapour pressure at STP	V_{stp}	Pa	10.4	Health Canada 2009
Molecular Weight	MW	g/mole	128.00	Health Canada 2009
Solubility	S	mg/L	32	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	537	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	536,991	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	103	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	648	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	647,980	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	124	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.99E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.059	
Diffusion coefficient in water	D_w	cm^2/s	7.50E-06	
Dimensionless Henry's Law Constant	H	Unitless	0.020441	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.99E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.99E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	2.16E-02	
Alpha	Alpha	Unitless	6.73E-05	
Dilution Factor	DF	Unitless	14,855	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.50E-06	

Table B-9 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C6-C8 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	5,063,354,384	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	1,237,990	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	157,584,813,532	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	38,529,487	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	50	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.09111	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	18.4	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	6383	ESRD 2014a
Molecular Weight	MW	g/mole	100.00	ESRD 2014a
Solubility	S	mg/L	5.4	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	257,502	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	257,502,309	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	62,959	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	270,000	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	270,000,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	66,015	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	50	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B-10 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C8-C10 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	265,818,721	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	49,994	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	8,272,974,392	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	1,555,956	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	80	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.03881	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	638	ESRD 2014a
Molecular Weight	MW	g/mole	130.00	ESRD 2014a
Solubility	S	mg/L	0.43	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	33,475	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	33,475,300	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	6,296	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	34,400	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	34,400,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	6,470	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	80	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B-11 Soil Vapour Guideline for Indoor Vapour Inhalation - F1 (C8-C10 Aromatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	44,953,179	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	9,159	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	1,398,990,353	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	285,044	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.48	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0.03745	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa	638	ESRD 2014a
Molecular Weight	MW	g/mole	120.00	ESRD 2014a
Solubility	S	mg/L	65	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	30,900	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	30,900,277	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	6,296	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	31,200	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	31,200,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	6,357	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.48	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B-12 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C10-C12 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	276,551,696	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	8,607,013,533	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	120	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	0.034	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	4,080	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	4,080,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	120	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B-13 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C10-C12 Aromatic)

Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	55,309,075	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	1,721,065,597	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.14	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	25	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	3,500	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	3,500,000	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.14	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B-14 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C12-C16 Aliphatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	276,551,701	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	8,607,015,048	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	520	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	1	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	0.00076	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	395	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	395,200	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	520	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,195	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.11E-06	

Table B15 Soil Vapour Guideline for Indoor Vapour Inhalation - F2 (C12-C16 Aromatic)
Required Input Variables

Calculated Guidelines				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ug/m^3	55,306,998	CCME 2014
Tier 1 Soil Vapour Guideline at Source	C_{sv}	ppm	#DIV/0!	Not applicable to fractions of hydrocarbons
	--	--	Yes	guideline exceedance of maximum vapour concentration
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ug/m^3	1,720,511,869	
Tier 1 Outdoor Air Quality Guideline	C_{oa}	ppm	#DIV/0!	
	--	--	Yes	guideline exceedance of maximum vapour concentration

Chemical Properties				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Dimensionless Henry's Law Constant	H	Unitless	0.053	ESRD 2014a
Diffusion coefficient in air	D_a	cm^2/s	0.05	ESRD 2014a
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	Health Canada 2009
Background indoor air concentration	C_a	mg/m^3	0	ESRD 2014a or use default value of zero for carcinogens
Reference Concentration	RfC	mg/m^3	0.2	ESRD 2014a
Allocation Factor	AF	Unitless	0.5	ESRD 2014a or use default value of 1 for carcinogens
Bioattenuation Factor	BAF	Unitless	10	
Vapour pressure at STP	V_{stp}	Pa		ESRD 2014a
Molecular Weight	MW	g/mole		ESRD 2014a
Solubility	S	mg/L	5.8	ESRD 2014a
Maximum vapour concentration (NAPL Present)	C_{max}	mg/m^3	-	Health Canada 2010; Part VII
Maximum vapour concentration (NAPL Present)	C_{max}	µg/m^3	-	
Maximum vapour concentration (NAPL Present)	C_{max}	ppm	#DIV/0!	
Maximum vapour concentration (No NAPL Present)	C_{max}	mg/m^3	307	Health Canada 2010; Part VII
Maximum vapour concentration (No NAPL Present)	C_{max}	µg/m^3	307,400	
Maximum vapour concentration (No NAPL Present)	C_{max}	ppm	#DIV/0!	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer A				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	1.00E-05	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum A volumetric moisture content	O_w^A	m^3-water / m^3-soil	0.167	
Stratum A volumetric vapour content	O_a^A	m^3-vapour / m^3-soil	0.303	
Stratum A soil dry bulk density	Pb^A	g/cm^3	1.4	
Stratum A soil total porosity	O_t^A	m^3-voids / m^3-soil	0.47	
Stratum A thickness	S_a	cm	100	
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer B				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum B volumetric moisture content	O_w^B	m^3-water / m^3-soil	0	
Stratum B volumetric vapour content	O_a^B	m^3-vapour / m^3-soil	0	
Stratum B soil dry bulk density	Pb^B	g/cm^3	0	
Stratum B soil total porosity	O_t^B	m^3-voids / m^3-soil	0	
Stratum B thickness	S_b	cm	0	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	

Effective Vapour-phase Diffusion Coefficient Through Soil Layer C				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Diffusion coefficient in air	D_a	cm^2/s	0.05	
Diffusion coefficient in water	D_w	cm^2/s	0.00001	
Dimensionless Henry's Law Constant	H	Unitless	0.053	
Stratum C volumetric moisture content	O_w^C	m^3-water / m^3-soil	0	
Stratum C volumetric vapour content	O_a^C	m^3-vapour / m^3-soil	0	
Stratum C soil dry bulk density	Pb^C	g/cm^3	0	
Stratum C soil total porosity	O_t^C	m^3-voids / m^3-soil	0	
Stratum C thickness	S_c	cm	0	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	

Effective Overall Vapour-phase Diffusion Coefficient Through The Vadose Zone				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Stratum A effective diffusion coefficient	$D^{eff}A$	cm^2/s	4.23E-03	
Stratum B effective diffusion coefficient	$D^{eff}B$	cm^2/s	0.00E+00	
Stratum C effective diffusion coefficient	$D^{eff}C$	cm^2/s	0.00E+00	
Stratum A thickness	S_a	cm	100	
Stratum B thickness	S_b	cm	0	
Stratum C thickness	S_c	cm	0	
Total thickness of vadose zone	L_t	cm	100	
Overal effective diffusion coefficient	D^{eff}	cm^2/s	4.23E-03	

Attenuation Coefficient				
Description	**Abbreviation**	**Units**	**Value**	**Reference/Comment**
Indoor Air Attenuation Coefficients				
Diffusivity in cracks	D_{crack}	cm^2/s	1.83E-02	
Alpha	Alpha	Unitless	6.58E-05	
Dilution Factor	DF	Unitless	15,194	
Outdoor Air Attenuation Coefficients				
Volatilization factor for soil vapour to ambient air	$VF_{sv,amb}$	Unitless	2.12E-06	

Appendix C
Worked Example

The worked example outlined below is presented for the soil vapour quality guideline (SVQG) for benzene at a depth of 100cm that is protective of indoor air quality in a residential building on fine-textured soil. Appendix A presents the input values that were assumed for each model input variable and COPC required to calculate the SVQG.

Calculation of D_T^{eff} ***(Equation 1)***

$$D_T^{eff} = D^{air} \times \left(\frac{\theta_a^{\frac{10}{3}}}{n^2}\right) + \left(\frac{D^{water}}{H'}\right) \times \left(\frac{\theta_w^{\frac{10}{3}}}{n^2}\right)$$

Where:

D_T^{eff}	=	overall effective porous media diffusion coefficient [cm²/s]
D^{air}	=	pure component molecular diffusivity in air [cm²/s]
θ_a	=	air filled porosity [Unitless]
n	=	total porosity [Unitless]
D^{water}	=	pure component molecular diffusivity in water [cm²/s]
H'	=	Dimensionless Henry's Law constant [Unitless] at soil temperature (e.g., 15°C)
θ_w	=	moisture/water filled porosity [Unitless]

Example 1: Overall effective porous media diffusion coefficient for benzene

$$D_T^{eff} = 8.8E-02 \times \left(\frac{0.303^{\frac{10}{3}}}{0.47^2}\right) + \left(\frac{9.8E-06}{2.3E-01}\right) \times \left(\frac{0.167^{\frac{10}{3}}}{0.47^2}\right)$$

$$D_T^{eff} = 7.4E-03 cm^2/s$$

Calculation of D_{crack} ***(Equation 2)***

$$D_{crack} \approx D_{air} \times \left(\frac{n^{10/3}}{n^2}\right)$$

Where:

D_{crack}	=	effective vapour diffusion coefficient through the crack [cm²/s]
D_{air}	=	diffusion coefficient in air [cm²/s]
n	=	total porosity [Unitless]

Example 2: Effective vapour diffusion coefficient through the crack for benzene

$$D_{crack} \approx 8.8E-02 \times \left(\frac{0.47^{10/3}}{0.47^2}\right)$$

$$D_{crack} \approx 3.2E-02 cm^2/s$$

Dilution factor from soil gas to indoor air ***(Equation 3)***

$$DF = \frac{1}{\alpha}$$

$$\alpha = \frac{\left(\frac{D_T^{eff} A_B}{Q_B L_T}\right) \exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right)}{exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{cract}}\right) + \left(\frac{D_T^{eff} A_B}{Q_B L_T}\right) + \left(\frac{D_T^{eff} A_B}{Q_{soil} L_T}\right)\left[exp\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right) - 1\right]}$$

Where:

DF	=	Dilution factor [Unitless]
α	=	attenuation coefficient [Unitless]
D_T^{eff}	=	effective porous media diffusion coefficient [cm²/s]
A_B	=	building area [cm²]
Q_B	=	building ventilation rate [cm³/s]
L_T	=	distance from contaminant source to foundation [cm]
Q_{soil}	=	volumetric flow rate of soil gas into the building [cm³/s]
L_{crack}	=	thickness of the foundation [cm]
D_{crack}	=	effective vapour diffusion coefficient through the crack [cm²/s]
A_{crack}	=	area of cracks through which the contaminant vapours enter [cm²]

Example 3: Attenuation coefficient of benzene for the dilution factor from soil gas to indoor air

$$\alpha = \frac{\left(\frac{7.4E-03 \times 2.7E+06}{7.5E+04 \times 100}\right) \exp\left(\frac{16.7 \times 11.25}{3.2E-02 \times 994.5}\right)}{exp\left(\frac{16.7 \times 11.25}{3.2E-02 \times 994.5}\right) + \left(\frac{7.4E-03 \times 2.7E+06}{7.5E+04 \times 100}\right) + \left(\frac{7.4E-03 \times 2.7E+06}{16.7 \times 100}\right)\left[exp\left(\frac{16.7 \times 11.25}{3.2E-02 \times 994.5}\right) - 1\right]}$$

$$\alpha = 2.1E-04$$

Volatilization Factor ***(Equation 4)***

$$VF_{sv,amb} = \left(1 + \frac{L_s \times U_{air} \times M_{air}}{D_{eff} \times W}\right)^{-1}$$

Where:

$VF_{sv,amb}$	=	volatilization factor, subsurface soil vapour to ambient air (dimensionless)
D_T^{eff}	=	overall effective porous media diffusion coefficient [cm²/s]
L_s	=	depth to subsurface soil vapour sample (cm)
U_{air}	=	ambient air velocity in mixing zone (cm/s)
W	=	width of source-zone area parallel to the wind direction (cm)
M_{air}	=	mixing zone height (cm)

Example 4: Volatilization factor for benzene

$$VF_{sv,amb} = \left(1 + \frac{100 \times 400 \times 150}{7.4E-03 \times 3000}\right)^{-1}$$

$$VF_{sv,amb} = 3.7E-06$$

The following equations were used to calculate $SVQG_{IAQ}$ for the indoor air inhalation pathway (CCME 2014):

Threshold chemical $$SVQG_{IAQ} = \frac{(TC-C_a)\times AF\times BAF}{\propto\times ET}$$ (Equation 5)

Non-threshold chemical $$SVQG_{IAQ} = \frac{(RsC)\times BAF}{\propto\times ET}$$ (Equation 6)

Similarly, the following equations were used to predict $SVQG_{OAQ}$ for the outdoor air inhalation pathway (CCME 2014):

Threshold chemical $$SVQG_{OAQ} = \frac{(TC-C_a)\times AF\times BAF}{VF_{sv,amb}\times ET}$$ (Equation 7)

Non-threshold chemical $$SVQG_{OAQ} = \frac{(RsC)\times BAF}{VF_{sv,amb}\times ET}$$ (Equation 8)

Where:

$SVQG_{IAQ}$ = soil vapour quality guideline for the protection of indoor air quality [mg/m^3]
$SVQG_{OAQ}$ = soil vapour quality guideline for the protection of outdoor air quality [mg/m^3]
TC = tolerable concentration or reference concentration [mg/m^3]
C_a = background indoor air concentration [mg/m^3]
AF = allocation factor [Unitless]
BAF = bioattenuation factor [Unitless]
α = attenuation factor calculated from Johnson and Ettinger (1991)
ET = exposure term [Unitless]
RsC = risk-specific concentration [mg/m^3]
$VF_{sv,amb}$ = volatilization factor for subsurface soil to ambient air [Unitless]

Example 5: Soil vapour quality guideline for the protection of indoor air quality for benzene

$$SVQG_{IAQ} = \frac{(RsC)\times BAF}{\propto\times ET}$$

$$SVQG_{IAQ} = \frac{3.0E-03\times 10}{2.1E-04\times 1}$$

$$SVQG_{IAQ} = 1.5E+02\ mg/m^3$$

Example 6: Soil vapour quality guideline for the protection of outdoor air quality for benzene

$$SVQG_{OAQ} = \frac{(RsC)\times BAF}{VF_{sv,amb}\times ET}$$

$$SVQG_{OAQ} = \frac{3.0E-03\times 10}{3.7E-06\times 1}$$

$$SVQG_{OAQ} = 8.1E+03 mg/m^3$$

Clifton Associates

Regina Office
340 Maxwell Crescent
Regina, SK S4N 5Y5
T (306) 721-7611
F (306) 721-8128

Saskatoon Office
#4, 1925 – 1st Avenue N
Saskatoon, SK S7K 6W1
T (306) 975-0401
F (306) 975-1076

North Battleford Office
#2, 9802 – 27th Avenue
North Battleford, SK S9A 1K5
T (306) 445-1621
F (306) 937-3731

Calgary Office
2222 – 30th Avenue NE
Calgary, AB T2E 7K9
T (403) 263-2556
F (403) 234-9033

Edmonton Office
#200, 9636 – 51st Avenue NW
Edmonton, AB T6E 6A5
T (780) 432-6441
F (780) 432-6271

Lloydminster Office
#10, 6309 – 43rd Street W
Lloydminster, AB T9V 2W9
T (780) 872-5980
F (780) 872-5983

www.clifton.ca