2025 Soil Vapour Monitoring Report
Riverside Light Industrial Park
NW 21-038-27 W4M
Red Deer, Alberta

PRESENTED TO
City of Red Deer

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EXECUTIVE SUMMARY

The City of Red Deer (the City) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct the 2025 soil vapour monitoring and sampling program related to potential buried waste materials at the Riverside Light Industrial Park (RSLIP or the Site). The Site is located within the northwest quarter of 21-038-27 W4M in Red Deer, Alberta.

The objectives of the monitoring program are to evaluate environmental conditions at the Site, assess potential impacts on the environment and adjacent receptors arising from potential buried waste materials, and develop recommendations for risk management activities. These objectives include assessing whether existing soil vapour conditions, in the form of methane from landfill gas (LFG), meet site-specific soil vapour screening levels.

The scope of work for 2025 included the installation, monitoring, and sampling of two soil vapour monitoring wells (25VW-09 and 25VW-10) in November (25VW-09) and December (25VW-10), in addition to soil vapour monitoring of the existing vapour wells 22VW-01, VW-02, 22VW-03, 22VW-04, 22VW-05, 24VW-06, 24VW-07, and 24VW-08. The new soil vapour wells were installed to further assess the spatial distribution of subsurface methane and carbon dioxide at the Site. The wells were positioned beyond the existing lateral extent of the monitoring well network, to the northwest of 24VW-06 (25VW-09; approximately 200 m away from the potential buried waste) and northeast of 24VW-06 (25VW-10; approximately 330 m away from the potential buried waste), with the intent of delineating the extent of soil vapour exceedances for methane previously detected via field monitoring and laboratory measurement of samples.

Based upon the results of the vapour monitoring and sampling in 2025 and previous years, Tetra Tech has developed the following conclusions:

- Soil vapour monitoring completed in 2025 showed elevated methane gas concentrations measured (above 5%) at 22VW-01, VW-02, 22VW-03, and 24VW-06. Methane concentrations at 22VW-04, 22VW-05, 24VW-07, 24VW-08, 25VW-09, and 25VW-10 were all below 0.2%.
- Methane extends beyond the identified waste footprint of the Site, similar to previous results, as outlined below:
  - The two new soil vapour wells installed to the northwest and northeast of 24VW-06, exhibited negligible methane concentrations in November 2025 (25VW-09 only) and December 2025. The measured concentrations at 25VW-09 and 25VW-10 were less than values referenced in soil vapour screening criteria protective of vapour intrusion into indoor air or in the area immediately outside the foundation of a building or structure. The measured concentrations in 25VW-09 and 25VW-10 indicate that methane vapours in the soil may be delineated to the north of the interpreted waste footprint between 24VW-06 and 25VW-09 to the northwest and between 24VW-06 and 25VW-10 to the northeast.
  - Concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds, petroleum hydrocarbon (PHC) fractions, and volatile organic compounds (VOCs) in the soil vapour samples collected from 25VW-09 and 25VW-10 were less than the soil vapour screening criteria. The estimated cumulative risks and hazards associated with the soil vapour samples collected in 2025 did not exceed the corresponding target risk and hazard levels or individual hazard levels.

The results of the vapour monitoring program in 2025, in combination with results from previous years, indicate there are impacts to groundwater and soil vapours from the buried waste in place at the Site. Ongoing risk management is required, including ongoing monitoring and administrative actions.

The following recommendations are made according to these risk management elements.

Ongoing Monitoring:

- The groundwater flow direction and groundwater quality have been reasonably well defined, with a known presence of persistently elevated ammonia at MW-03, based on previous years of monitoring. Therefore, periodic groundwater monitoring and sampling events are recommended, albeit not necessarily on an annual basis. A proposed schedule for the upcoming years is presented below.
- Continue quarterly monitoring of soil vapour concentrations and pressures at all new and existing vapour monitoring wells. Based on the analytical results to date, ongoing collection of soil vapour samples for analytical testing is not considered warranted unless monitoring results yield significant methane concentrations. Sampling of the two new soil vapour wells installed in 2025 is recommended to be completed in 2026 to confirm initial concentrations.
- Based on the above, the following monitoring program is proposed. If results remain consistent, reducing the monitoring and sampling frequency over time may be warranted.

Table E-1: Proposed Site Condition, Surface Water, Groundwater and Vapour Monitoring Program

Activity	2026	2027	2028	2029
Groundwater monitoring (summer) at five wells (MW-01, MW-03, and 22MW-04 within the industrial park and MW-01 and MW-03 on Lot 4, Block 8, to the east of the industrial park.)	X			X
Groundwater sampling (summer) at two wells (MW-03 and 22MW-04).	X			X
Quarterly (four times per year) vapour monitoring of ten locations (22VW-01, VW-02, 22VW-03, 22VW-04, 22VW-05, 24VW-06, 24VW-07, 24VW-08, 25VW-09, and 25VW-10). Sample as needed if monitoring yields significant methane concentrations.	X	X	X	X
Annual spring vapour sampling at 25VW-09 and 25VW-10 to confirm concentrations.	X			

Administrative Actions:

- Ensure that the Site is clearly identified within the City's Zoning Bylaw and appropriate administrative requirements are met for Site development in accordance with City policies and provincial regulations.
- Ensure that the Site is clearly identified within the City's Utility mapping system. Elevated subsurface methane concentrations are present in areas of the Site and future activities in the vicinity (e.g., utility work, repairs, paving) should consider the potential presence of subsurface gas and site-specific safety plans should be developed for work undertaken to limit the potential for exposure to Site workers.
- Further to the above recommendations, as noted, the Site has potential buried waste materials and elevated subsurface methane concentrations. As the Site is fully developed with roadways and commercial buildings, the City should review the Site's status on an ongoing basis with respect to the elevated methane concentrations and the possibility of the accumulation of methane gas in underground utility corridors, trenches/excavations, and potentially within or beneath the footprint of buildings.

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of The City of Red Deer and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than The City of Red Deer, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in Appendix A or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

The City of Red Deer (the City) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct the 2025 soil vapour monitoring and sampling program related to potential buried waste materials at the Riverside Light Industrial Park (RSLIP or the Site). The Site is located within the northwest quarter of 21-038-27 W4M in Red Deer, Alberta, as shown on Figure 1.

The objectives of the monitoring program are to evaluate environmental conditions at the Site, assess potential impacts on the environment and adjacent receptors arising from potential buried waste materials, and develop recommendations for risk management activities.

Tetra Tech's scope of work for the 2025 monitoring and sampling program at the Site was based on the results presented in the 2024 Groundwater and Soil Vapour Monitoring Report – Riverside Light Industrial Park (Tetra Tech 2025). The 2025 scope of work also included the installation, monitoring, and sampling of two soil vapour monitoring wells in October and December 2025, in addition to soil vapour monitoring of the existing vapour wells 22VW-01, VW-02, 22VW-03, 22VW-04, 22VW-05, 24VW-06, 24VW-07, and 24VW-08. The field components of the monitoring program were completed using Tetra Tech's detailed work plans encompassing the scope of work outlined in Section 1.1.

This report was completed under Tetra Tech's Limitations on the Use of this Document for conducting environmental work. A copy of these conditions is provided in Appendix A.

1.1 Scope of Work

Based on the 2024 findings and recommendations, the work conducted in 2025 included the following:

- Installation of two new soil vapour wells (25VW-09 and 25VW-10) to the north and northeast, respectively, of existing soil vapour well 24VW-06; beyond the existing lateral extent of the monitoring well network and the identified potential buried waste area (Figure 2).
- Soil vapour well monitoring at the eight existing (22VW-01, VW-02, 22VW-03, 22VW-04, 22VW-05, 24VW-06, 24VW-07, and 24VW-08) soil vapour wells in October 2025, November 2025, and December 2025 and two new (25VW-09 to 25VW-10) soil vapour well locations in November 2025 (25VW-09 only) and December 2025.
- Sampling of the two new soil vapour wells in November 2025 (25VW-09 only) and December 2025.
- Submission of the soil vapour samples to ALS Canada Ltd. (ALS) in Calgary, Alberta, for analyses.
- Monitoring well repairs, as required.
- Preparation of an annual report summarizing the field activities, interpreting the soil vapour monitoring and analytical results, and providing recommendations for future monitoring activities at the Site.

2.0 BACKGROUND INFORMATION

2.1 General Information

The Site is located within NW 21-038-27 W4M. The Site is zoned I1—Industrial District—and is in a business area used for commercial and light industrial business activities. The Site is located on the west side of the Red Deer River, south of Alberta Highway 11, and east of Gaetz Avenue. Figure 1 shows the general site location plan.

Based on the Phase I and Phase II Environmental Site Assessments (ESAs) conducted in 2013 and 2014 by Tiamat Environmental Consultants Ltd. (Tiamat 2013 and 2014a), there is a historical waste disposal area within the industrial area. The waste is located southeast of 62 Street, northwest of 61 Street, and southwest of 46A Avenue in Red Deer, and appeared to be primarily construction waste materials. Commercial and light industrial buildings which appear to have been primarily constructed as slab on grade structures have been constructed over and surrounding the Site.

The industrial area is surrounded by an environmental preservation land use to the north and west, and parkland to the south and east. The Red Deer River is approximately 200 m from the southern Site boundary and flows in a northeasterly direction.

Municipal waste was not expected, but in the Phase I ESA Tiamat mentioned that it may be present in lesser quantities. During the subsequent Phase II ESA (Tiamat 2014a), the area where wastes were suspected was further assessed, and its footprint was estimated to be approximately 5,500 m^2. The outline of the waste disposal area as defined in Tiamat's Phase II ESA was roughly in between vapour probes VW-01 and VW-02 and is shown on Figure 2.

An aerial photograph from 1962 that was included in the Phase I ESA showed a gravel pit larger than the interpreted waste disposal area, extending further east towards the CN Rail right-of-way (ROW). Tetra Tech obtained an aerial photograph from 1969 (Figure A below), which shows the gravel pit location in orange and an outline of the estimated area of historical waste disposal in pink. The approximate extent of the gravel pit is also presented on Figure 2.

Figure A: Screenshot from the 1969 aerial photograph showing gravel mining operations

Discussions with the City in 2021 and 2022 confirmed that the gravel mining operations took place and that, anecdotally, the pit was filled in and leveled with topsoil, overburden stockpiles, excavation soil from other sites as well as concrete, metal, and wood. The surface was reclaimed with imported topsoil and manure. While this information cannot be verified, it is known that backfilling excavations with materials containing organics often lead to methane generation in the subsurface as the organic wastes break down. Neither the ultimate extent of the gravel mining operations nor the nature of the material used for backfill are fully characterized. Additional information on the Site history, historical groundwater monitoring investigations, geology, and hydrogeology can be found in Appendix B.

Monitoring wells and vapour wells were installed across several city blocks during previous assessments and are located within the industrial area (MW-01 to MW-03, and VW-01 and VW-02) and near the adjacent Lions Campground to the southwest and Red Deer Native Friendship Society Building, Asooahum Crossing (MW-01 to MW-03 [Lot 4]) to the south, along Riverside Drive.

Landfill gas (LFG) is a byproduct of the breakdown of organic wastes and commonly contains elevated concentrations of methane. The lower explosive level (LEL) for methane is 5% by volume (50,000 parts per million [ppm]) and the upper explosive level (UEL) is 15% by volume (150,000 ppm). Outside of this range methane is not considered explosive, but at concentrations above 50% can present a risk of asphyxiation. The presence of buildings representing enclosed spaces in this area present the potential for the accumulation of LFG, thus the necessity for assessing its extent in the subsurface.

In December 2022, Tetra Tech installed a groundwater monitoring well (22MW-04) north of 46A Avenue and east of a rail line ROW. Two soil vapour wells were installed at the northeast corner of 62 Street and 46A Avenue (22VW-03) and adjacent to MW-03 (22VW-05) and replaced two soil vapour wells; 22VW-01 (replacement for VW-01) and 22VW-04 (replacement for VP-01 [Lot 4]).

In September 2024, Tetra Tech installed three new soil vapour wells: one to the north of 22VW-03 near the intersection of 62 Street and 46 Avenue (24VW-06); one to the south of VW-02 along 61 Street (24VW-08); and one to the west along 62 Street (24VW-07). The wells were installed to further assess the lateral distribution of elevated methane concentrations reported in 2021.

In October 2025 and December 2025, Tetra Tech installed two new soil vapour wells (25VW-09 and 25VW-10, respectively), one to the northwest of 24VW-06, near the intersection of 63 Street and 46 Avenue (25VW-09) and one northeast of 24VW-06, in the open field between 46 Avenue and 67 Street (25VW-10). These wells were installed to further assess the lateral distribution of the elevated methane concentrations reported in 2024 and 2025 at 24VW-06.

Soil vapour and groundwater monitoring well locations are shown on Figure 2. Cross-sections that were prepared based on borehole information from the wells previously installed at the Site in 2013 are included in Appendix C (Tiamat 2014a).

2.2 Conceptual Site Model Summary

The selection of comparative guidelines is based on the conceptual site model (CSM), first described in the 2021 Groundwater and Soil Vapour Monitoring Report (Tetra Tech 2022a) and updated in the 2023 Groundwater and Soil Vapour Monitoring Report (Tetra Tech 2024a). The CSM outlines the rationale for the selection of applicable exposure pathways and receptors at the Site. This evaluation is based on guidance presented in the Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Tier 1 Guidelines; Alberta Environment and Parks [AEP] 2022 as amended in 2024 by Alberta Environment and Protected Areas [AEPA]).

The CSM included the following items:

- Description of any identified environmental issues including a description of processes or activities undertaken at or near the Site and a listing of chemicals of potential concern (COPCs) identified in earlier investigations.
- Description of known and reported historical releases, including locations and status of any subsequent ESAs and remediation.
- Identification of applicable exposure pathways and receptors.

The following table presents a summary of the relevant receptors and exposure pathways identified in the CSM.

Table 2-1: Summary of Exposure Pathways and Receptors for Soil and Groundwater

Release Mechanism	COPC	Migration Pathway	Potential Receptor
Impacted groundwater migration	Chloride, sodium, ammonia, nitrate, and the dissolved metals arsenic, cadmium, and zinc.	Direct soil and waste contact.	Human users of the area; ecological plants and soil invertebrates.
		Migration to groundwater users via water wells; migration to Red Deer River via groundwater or surface seeps.	Domestic use aquifer (DUA) drinking water; freshwater aquatic life (FAL) in the Red Deer River.
		Nutrient and energy cycling.	Microbial functioning of the soil.
Hazardous ground gas emissions	Volatile organic compounds (VOCs), methane, benzene, toluene, ethylbenzene, and total xylenes (BTEX), and petroleum hydrocarbon (PHC) fractions.	Vapour inhalation (ambient and indoors); preferential pathway migration via utility corridors and coarse-grained stratigraphies (sand/gravel layers).	Building occupants and users in onsite/adjacent commercial/industrial buildings and residential buildings to the southeast (Lot 4); workers in excavations/trenches.

2.2.1 Data Evaluation

To establish the appropriate guidelines for the Site, residential land use criteria were used due to the most sensitive receptors being residences in the adjacent lots to the southeast. The receptors were determined by a combination of the degree of potential exposure, the exposure pathway, and the contaminants of concern. Human receptor exposures applicable to the Site include the DUA, direct soil contact, and inhalation pathways. The ecological receptor exposures applicable to the Site include direct soil contact, FAL, and nutrient and energy cycling. Previous investigations at the Site have determined that the dominant soil stratigraphy governing transport at the Site is coarse-grained.

As recommended by AEP, the soil vapour results obtained during investigation were compared to the Canadian Council of Ministers of the Environment's (CCME's) document A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours (CCME 2014). To determine the appropriate guidelines to compare the vapour sampling results to, indoor air risk calculations were undertaken, and methane explosive risks were evaluated.

Based on the CSM, the most applicable guidelines for groundwater and vapour results for the Site were as follows:

- Groundwater concentrations at the Site were compared to the Tier 1 Guidelines (AEPA 2024a) under residential land use for coarse-grained soils (AEP 2022a).
- Soil vapour analytical results were compared to soil vapour screening criteria for buildings with both slab-on-grade and basement construction for coarse-grained soils (CCME 2014). Soil vapour screening criteria have been updated using current toxicity reference values (TRVs) from Health Canada and the United States Environmental Protection Agency (USEPA).
- Cumulative target risk and hazard levels for the hazard quotient (HQ) evaluation were determined in accordance with *Alberta Tier 2 Soil and Groundwater Remediation Guidelines* (Tier 2 Guidelines; AEPA 2024b). For carcinogens, the target risk level is 1×10^{-5}, as this value is considered by Health Canada to represent a negligible risk. This risk level applies to both individual compounds and a summation (i.e., cumulative) of individual compounds risks. For non-carcinogens, a cumulative target hazard level of 1.0 is used as potential exposures that result in cumulative hazard indices equal to or less than 1.0 signify negligible potential for adverse health effects. For individual compounds, a hazard index of 0.2 was used. Each sampling location was screened individually for every chemical detected, and the results evaluated relative to both individual and cumulative risks and hazard levels. For some compounds, both carcinogenic and non-carcinogenic effects required calculation.

Hazard quotients greater than the target risk value pose a potential concern and require further evaluation or risk management. However, it is important to note that HQs greater than the target risk value do not necessarily indicate that adverse health effects will occur. This is because of the conservative assumptions used in estimating concentrations and in setting the target values. Hazard quotients that are less than the target risk value indicate that exposure is within acceptable levels and no further risk management is necessary. Hazard quotients greater than the target risk value suggest that further investigation or risk management (e.g., remediation) may be warranted. For non-carcinogens, the cumulative target risk value used was 1.00. This target risk value accounts for additional exposure to the chemicals of concern from sources other than the Site. There are not currently AEPA standards to evaluate methane for a historical site with buried wastes such as this. The Standards for Landfills in Alberta (Standards; AENV[1] 2010) provide concentrations to evaluate methane concentrations at a landfill and at the landfill perimeter. While not directly applicable to this Site, they have been used as a qualifier of potential impact to aid in results interpretation.

2.3 Monitoring Well Network

The original groundwater monitoring network at the Site consisted of six monitoring wells (MW-01 to MW-03 within the industrial park, and MW-01 to MW-03 on Lot 4, Block 8, to the east of the industrial park).

Monitoring wells MW-01, MW-01 (Lot 4), MW-02 (Lot 4), and MW-03 (Lot 4) were screened across native sand and gravel and into mudstone or shale bedrock. MW-02 was screened in native sand and gravel layer and into a clay layer, and MW-03 was screened in the native sand and gravel. Monitoring wells MW-02 and MW-02 (Lot 4) have not been located since 2013 and are suspected to be destroyed. An additional hydraulically down-gradient groundwater monitoring well (22MW-04) was installed in December 2022. It is screened across in the native sand and clay. In summary, as of December 2025, the groundwater monitoring well network consisted of six wells – MW-01, MW-03, 22MW-04, MW-01 (Lot 4), MW-02 (Lot 4), and MW-03 (Lot 4). Groundwater monitoring well completion details, historical groundwater analytical results, historical groundwater monitoring elevation trends, and elevation contours from 2024 are included in Appendix G.

The original soil vapour well monitoring network consisted of three wells (VW-01, VW-02, and VP-01 [Lot 4]). In 2021, VW-01 and VP-01 (Lot 4) were found to be compromised; these vapour wells were replaced in December 2022, as 22VW-01 and 22VW-04 along with an additional two soil vapour monitoring wells (22VW-03 and 22VW-05).

Three new soil vapour wells were installed in September 2024 (24VW-06, 24VW-07, and 24VW-08) to further assess the spatial distribution of subsurface methane and carbon dioxide at the Site. The wells were positioned beyond the existing lateral extent of the network of monitoring wells, to the northeast (24VW-06; approximately 180 m away), northwest (24VW-07; approximately 230 m away), and southwest (24VW-08; approximately 220 m away) of the potential buried waste.

Two new soil vapour wells were installed in October 2025 (25VW-09) and December 2025 (25VW-10) to further assess the spatial distribution of subsurface methane and carbon dioxide at the Site. The wells were positioned beyond the existing lateral extent of the network of monitoring wells, to the northwest and northeast of 24VW-06 which had historically elevated methane concentrations. In summary, at the time of monitoring and sampling in December 2025, the soil vapour monitoring network consisted of ten probes: 22VW-01, VW-02, VW-03, 22VW-04, 22V-05, 24VW-06, 24VW-07, 24VW-08, 25VW-09, and 25VW-10.

[1] Alberta Environment.

Groundwater and vapour monitoring well locations are shown on Figure 2. Borehole logs for both groundwater and soil vapour monitoring wells are presented in Appendix F.

3.0 FIELD MONITORING AND SAMPLING METHODOLOGY

A discussion of the methods used for the soil vapour well installation, fieldwork and laboratory testing is presented in the following sections.

3.1 Soil Vapour Well Installation

On October 17, 2025, and December 3, 2025, Tetra Tech contracted Ernco Environmental Drilling & Coring Inc. and Velocity Hydrovac to install two soil vapour wells using a hydrovac vehicle. The soil vapour wells were positioned beyond the existing lateral extent of the monitoring well network, to the northwest of 24VW-06 (25VW-09; approximately 200 m away from the potential buried waste) and northeast of 24VW-06 (25VW-10; approximately 330 m away from the potential buried waste), with the intent of delineating the extent of soil vapour exceedances for methane previously detected via field monitoring and laboratory measurement of samples.

Tetra Tech commented on soil staining, odours, and/or debris (if present). The soil vapour wells were installed with a casing of 25 mm diameter solid polyvinyl chloride (PVC) pipe and screened with 25 mm slotted PVC pipe. The installation details were as follows:

- 25VW-09: Installed to a total depth of 3.0 metres below grade (mbg) with a 1.0 m screen from 2.0 mbg to 3.0 mbg. No waste encountered.
- 25VW-10: Installed to a total depth of 3.0 mbg with a 1.5 m screen from 1.5 mbg to 3.0 mbg. No waste encountered.

Silica sand was placed from the base of the borehole to approximately 0.15 m above the slotted interval of the standpipe within the borehole annulus, followed by bentonite clay to ground level. Flush mount gatic covers were installed over the wells for protection and pea gravel was placed at the top 0.25 m to seal the monument in place.

The soil vapour well locations are shown on Figure 2, and the installation details are provided on the borehole logs in Appendix F.

3.2 Vapour Field Program

Tetra Tech conducted soil vapour headspace monitoring at eight soil vapour monitoring wells between October 15, 2025, and October 16, 2025, at nine wells on November 12, 2025, and at ten wells between December 3, 2025, and December 4, 2025. Tetra Tech conducted soil vapour sampling at one well (25VW-09) on November 12, 2025, and two wells (25VW-09 and 25VW-10) between December 3, 2025, and December 4, 2025.

Measurements were taken of the methane headspace concentrations in each soil vapour monitoring well using a LandGEM 5000 LFG analyzer calibrated to methane.

Each soil vapour probe was inspected for visible signs of damage and the position of the sampling labcock was noted. Soil gas pressure was recorded using a digital manometer. Once the soil gas pressure measurement was recorded, the soil gas probe was purged of three well volumes of air, or until readings stabilized.

Gas composition measurements for methane, carbon dioxide, oxygen, balance gas, and hydrogen sulphide were recorded on a percent volumetric basis using a GEM analyzer. Then, the soil vapour well depths and depth to groundwater (if present) were measured and recorded to confirm that any water within the well was beneath the screen (i.e., the well was not blinded).

Leak detection tests were not completed at the newly installed wells (25VW-09 and 25VW-10) in 2025. Leak detection testing is recommended for 2026 at 25VW-09 and 25VW-10 to confirm well integrity.

Sampling of the soil vapour monitoring wells was based on the methodology of the CCME sampling guidelines (CCME 2016a; 2016b), and is summarized as follows:

- Prior to collecting the soil vapour well samples, the well was purged of three well volumes, or until headspace readings stabilized.
- A 1.4 L Summa vacuum canister was used for sample collection.
- Sample data was recorded on the provided sample tag for each canister.
- Sample tubing that was used to connect the canister to the soil vapour probe was low in VOCs and only used once to prevent sample cross-contamination.
- When beginning sample collection, the end cap was removed, and a 60-minute flow controller was attached to the canister. The start time and starting pressure were recorded on the sample tag.
- When sampling was complete, the valve was closed, and the flow controller was removed. The end time and final pressure were recorded on the sample tag.
- The protective end cap was replaced back on the canister.
- Canisters, flow controllers, and pressure gauges were placed in the original shipping container and returned to the laboratory under chain of custody (COC).
- The soil vapour well sampling port was returned to the closed position, and the well was securely locked.

The vapour samples were submitted to ALS laboratory in Calgary, Alberta, for chemical analyses of VOCs, BTEX, PHCs, and matrix gases including oxygen, carbon dioxide, methane, and nitrogen. ALS is accredited by the Canadian Association for Laboratory Accreditation (CALA).

3.2.1 Vapour Well Analytical Program

The analytical program for the vapour monitoring probe is summarized below:

- VOCs.
- Matrix gases including oxygen, carbon dioxide, methane, and nitrogen.
- BTEX and PHCs.
- Naphthalene.

4.0 RESULTS AND DISCUSSION

This section presents the results of the fieldwork conducted in 2025 at the Site and discussions of these results.

4.1 Soil Vapour Monitoring Results

The soil vapour monitoring results are presented in Table 1.

Pressures at all vapour wells were negligible during the October, November, and December 2025 monitoring events.

Elevated methane gas concentrations were measured in 2025 at 22VW-01 (16.8% in October, 16.4% in November, and 13.9% in December), VW-02 (18.7% in October, 4.5% in November, and 12.5% in December), at 22VW-03 (1.5% in October and 0.6% in November), and 24VW-06 (15.5% in October, 12.4% in November, and 5.6% in December). Methane concentrations at 22VW-03 (December only), 22VW-04, 22VW-05, 24VW-07, 24VW-08, 25VW-09, and 25VW-10 were all below 0.2%. Figure 3 includes a spatial diagram of methane gas concentrations in the soil vapour wells.

Carbon dioxide was also elevated at most soil vapour wells, indicating a widespread distribution of elevated carbon dioxide. The carbon dioxide concentrations ranged from 3.2% at 22VW-04 to 22.9% at 22VW-01. Carbon monoxide was detected at 25VW-10 (10% in December 2025). Carbon dioxide is a normal component of soil gas and is also a byproduct of the decomposition of waste, causing it to be elevated in LFG.

A carbon monoxide concentration of 10 ppm, or 0.001% v/v was recorded at soil vapour well 25VW-10 in December 2025. Carbon monoxide is a normal trace component of soil gas, which is why it is measured in ppm rather than as a percentage. It is a natural product of the decay of soil organic matter. As there is no accompanying methane, which is what has been used to indicate delineation of the LFG present, the most likely explanation for the slightly elevated concentration of carbon monoxide is the natural variability of bacterial activity and organic matter in the soil, unrelated to the production of LFG.

4.2 Soil Vapour Analytical Results

Table 2 summarizes the 2025 soil vapour analytical results for 25VW-09 and 25VW-10, together with results from across the vapour well network, dating back to 2019.

The results have been compared against soil vapour screening criteria protective of vapour intrusion into indoor air. The laboratory analytical report is included in Appendix D.

The parameters BTEX and PHC fractions F1 and F2 (parameters with a TRV for inhalation) were compared against the screening criteria for residential land use for coarse-grained soil. The aliphatic and aromatic PHC fractions that comprise F1 and F2 were detected in 25VW-09 and 25VW-10. However, soil vapour concentrations were between one and three orders of magnitude less than the soil vapour screening criteria.

The VOC (parameters with a TRV for inhalation) results were compared against the screening criteria for residential land use, coarse-grained soil. Several VOC analytes were detected in each sample; however, the VOC concentrations were up to six orders of magnitude less than the soil vapour screening criteria.

The methane concentrations in the soil vapour samples 25VW-09 and 25VW-10 were below the methane LEL of 5%. Historically, the measured methane concentrations at 22VW-01 (field-measured), VW-02, and 24VW-06 were greater than the value of 20% LEL (10,000 ppm) referenced in the Standards for on-site buildings or enclosed

structures or in the area immediately outside the foundation of a building or structure. While the Standards are not directly applicable to the Site, they are used as a relative indicator of impact.

Based on the results from the existing and newly installed soil vapour wells, the newly installed wells 25VW-09 and 25VW-10 provide sufficient delineation of the lateral distribution of elevated methane gas concentrations to the north of the former gravel pit and/or interpreted waste footprint and northwest/northeast of 24VW-06.

4.3 Quality Assurance/Quality Control

4.3.1 Methods

Tetra Tech's quality assurance/quality control (QA/QC) procedures include reviewing the data collected for precision and accuracy and following the appropriate field protocols.

The field procedures for QA/QC involved:

- Changing nitrile gloves between sample collections;
- Using sample containers provided by the laboratory;
- Cleaning monitoring and sampling tools between sample locations; and
- Documenting field procedures and sampling activities.

4.3.2 Results

Soil vapour QA/QC, including duplicate sample results collected in December 2024, were addressed in the previous summary report (Tetra Tech 2025) and have been included as Table 8. No soil vapour duplicates were collected during the December 2025 sampling event.

5.0 UPDATED HAZARD QUOTIENT RESULTS

Using the soil vapour screening levels and calculations described in the 2024 Groundwater and Soil Vapour Monitoring Report (Tetra Tech 2025), the soil vapour sampling results, estimated cancer risks (for carcinogens), and estimated HQs (for non-carcinogens) were calculated for the Site.

Cumulative target risk and hazard levels were determined in accordance with 2024 AEPA Tier 2 Guidelines. For carcinogens, the target risk level is 1×10^{-5}, as this value is considered by Health Canada to represent a negligible risk. This risk level applies to both individual compounds and a summation (i.e., cumulative) of individual compound risks. For non-carcinogens, a cumulative target hazard level of 1.0 is used as potential exposures that result in cumulative hazard indices equal to or less than 1.0 signify negligible potential for adverse health effects. For individual compounds, a hazard index of 0.2 was used. Each sampling location was screened individually for every chemical detected, and the results evaluated relative to both individual and cumulative risks and hazard levels.

As discussed in Section 2.2.1, the assumptions used to estimate concentrations and set the target values for HQs are conservative. Thus, HQs greater than the target risk value do not necessarily indicate that adverse health effects will occur but suggest that further investigation or risk management (e.g., remediation) may be warranted. Hazard quotients that are less than the target risk value indicate that exposure is within acceptable levels and no further risk management is necessary. For non-carcinogens, the target risk value accounts for additional exposure to the chemicals of concern from sources other than the Site.

As shown in Table 7, the estimated cumulative risks and hazards associated with the soil vapour samples collected in November 2025 and December 2025 did not exceed the corresponding target risk and hazard levels. The cumulative risk level for carcinogens in samples 25VW-09 and 25VW-10 were less than 1 x 10^{-5} by one to two orders of magnitude. The cumulative hazard level identified in the three soil vapour samples for the non-carcinogens were less than the target hazard level of 1.00.

Table 3 summarizes the properties of the compounds being assessed. Table 4 summarizes the soil properties used for the calculations. Table 5 summarizes the building properties used for the calculations, and Table 6 presents the generic soil vapour criteria calculated.

6.0 EVALUATION OF SITE CONDITIONS

6.1 Summary of Site Conditions

The Site has buried waste and fill material within an industrial area, approximately 200 m west of a surface water receptor, namely the Red Deer River.

Based on findings from the 2025 soil vapour monitoring and sampling events and historical data for the Site, there are concerns related to soil vapours generated from the potential buried wastes.

Historical groundwater analytical results confirmed that the groundwater is deeply anoxic, based on elevated concentrations of redox sensitive parameters (e.g., dissolved iron and manganese) at MW-03, while sulphate is reduced. These conditions are consistent with the presence of methane at vapour wells and are likely related to the decomposition of buried organic materials. Along with historical data from other monitoring wells between MW-03 and the Red Deer River, the environmental risk related to Tier 1 Guideline exceedances measured at the various monitoring wells is interpreted to be low.

Soil vapour sample results from wells 25VW-09 and 25VW-10 did not exceed the cumulative target risks and hazard levels for the parameters tested and only historical analysis of dichlorodifluoromethane in VW-02 in 2021 and 2024 exceeded the individual hazard level. However, historical methane and carbon dioxide levels were measured at elevated concentrations across the monitoring network, indicating a widespread issue. Historical methane concentrations in soil vapour samples at VW-02 and 24VW-06 have been measured above the methane LEL of 5%. Carbon dioxide has been field-measured at most wells at concentrations above 5% in 2025 with the exception of 22VW-04, with a maximum carbon dioxide concentration measured of 22.9% at 22VW-01 in 2025. Unless carbon dioxide is present at concentrations exceeding 50%, at which point it presents a risk for asphyxiation, the elevated concentration is not considered a risk to potential receptors. However, the elevated methane concentrations may present a risk to potential receptors.

6.2 Summary of Hazard Quotient Results

A summary of the 2014 HQs from the 2014 risk management plan (RMP) for the Site that was completed by Tiamat is attached in Appendix B.

For consistency with XCG Consulting Limited's (XCG's) approach from 2017, Tetra Tech compared individual HQs with the individual target hazard level (0.2). Based on the 2019, 2021, and 2023 to 2025 programs, the greatest individual HQ calculated for the Site was 0.6 (vs a target individual hazard level of 0.2) for dichlorodifluoromethane at VW-02 in 2021 and the greatest individual estimated cancer risk was 3.5 x 10^{-6} (vs a target risk of 1.0 x 10^{-5}) for benzene at 25VW-10 in December 2025. The greatest cumulative HQ calculated for the Site was 0.6 (vs target

cumulative hazard level of 1.0) at VW-02 in 2021, and the greatest cumulative estimated cancer risk was 5.0 x 10^{-6} at 25VW-10 (2025) and 4.5 x 10^{-6} at VW-02 (2024).

While further development at the Site is not currently proposed, for illustrative purposes and based on the HQs and cancer risk levels calculated from the 2019, 2021, and 2023 to 2025 vapour data, the Site was upgraded from no passive or active measures required for development within the setback area to Passive Level A measures (compacted clay liner with a minimum thickness of 1 m and confirmed maximum hydraulic conductivity of 10^{-6} cm/sec) using the prior RMP approach.

These measures relate to compounds with HQs and cancer risks and were not specifically developed for methane. Risk management for methane should consider concentrations as well as other factors such as volume of methane-generating material, generation rates, and soil gas movement. Common concentrations and soil gas pressures are used to assess response requirements. Based on the measured methane concentrations at the Site, Passive Level A measures may not be sufficient in certain areas of the setback.

Future applications for development within the setback are subject to review by the City. The developer's team would be responsible for reviewing and verifying the available data relative to their proposed development. The mitigative measures presented above are generic and can be used as a general guide for expectations by the City, but it is recommended that future applications for development within the setback review this report and the historical methane concentration data to determine if the generic measures would be sufficient with respect to methane for their specific development and location. Ultimately, the developer's design engineer would be responsible for developing measures specific to the intended development based on the above or an appropriate equivalent. Protection of workers (e.g., construction and utility) should form part of any development plan.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of the vapour monitoring and sampling in 2025 and previous years, Tetra Tech has developed the following conclusions:

- Soil vapour monitoring completed in 2025 showed elevated methane gas concentrations measured (above 5%) at 22VW-01, VW-02, 22VW-03, and 24VW-06. Methane concentrations at 22VW-04, 22VW-05, 24VW-07, 24VW-08, 25VW-09, and 25VW-10 were all below 0.2%. Carbon dioxide, a common component of normal soil gas as well as LFG, was also elevated at most soil vapour wells, indicating a widespread distribution of elevated carbon dioxide. The carbon dioxide concentrations ranged from 3.2% at 22VW-04 to 22.9% at 22VW-01. Carbon monoxide was detected at 25VW-10 (10% in December 2025).
- Methane extends beyond the identified waste footprint of the Site, similar to previous results, as outlined below:
  - The two new soil vapour wells installed to the northwest and northeast of 24VW-06, exhibited negligible methane concentrations in November 2025 (25VW-09 only) and December 2025. The measured concentrations at 25VW-09 and 25VW-10 were less than values referenced in soil vapour screening criteria protective of vapour intrusion into indoor air or in the area immediately outside the foundation of a building or structure. The measured concentrations in 25VW-09 and 25VW-10 indicate that methane vapours in the soil may be delineated to the north of the interpreted waste footprint between 24VW-06 and 25VW-09 to the northwest and between 24VW-06 and 25VW-10 to the northeast.
  - Concentrations of the BTEX compounds, PHCs, and VOCs in the soil vapour samples collected from 25VW-09 and 25VW-10 were less than the soil vapour screening criteria. The estimated cumulative risks and hazards associated with the soil vapour samples collected in 2025 did not exceed the corresponding target risk and hazard levels or individual hazard levels.

The results of the vapour monitoring program in 2025, in combination with results from previous years, indicate there are impacts to groundwater and soil vapours from the buried waste in place at the Site. Ongoing risk management is required, including ongoing monitoring and administrative actions.

The following recommendations are made according to these risk management elements.

Ongoing Monitoring:

- The groundwater flow direction and groundwater quality have been reasonably well defined as of 2024, with a known presence of persistently elevated ammonia at MW-03, based on previous years of monitoring. Therefore, periodic groundwater monitoring and sampling events are recommended, albeit not necessarily on an annual basis. A proposed schedule for the upcoming years is presented below.
- Continue quarterly monitoring of soil vapour concentrations and pressures at all new and existing vapour monitoring wells. Based on the analytical results to date, ongoing collection of soil vapour samples for analytical testing is not considered warranted unless monitoring results yield significant methane concentrations. Sampling of the two new soil vapour wells installed in 2025 is recommended to be completed in 2026 to confirm initial concentrations.
- Based on the above, the following monitoring program is proposed. If results remain consistent, reducing the monitoring and sampling frequency over time may be warranted.

Table 7-1: Proposed Site Condition, Surface Water, Groundwater, and Vapour Monitoring Program

Activity	2026	2027	2028	2029
Groundwater monitoring (summer) at five wells (MW-01, MW-03, and 22MW-04 within the industrial park and MW-01 and MW-03 on Lot 4, Block 8, to the east of the industrial park).	X			X
Groundwater sampling (summer) at two wells (MW-03 and 22MW-04).	X			X
Quarterly (four times per year) vapour monitoring of ten locations (22VW-01, VW-02, 22VW-03, 22VW-04, 22VW-05, 24VW-06, 24VW-07, 24VW-08, 25VW-09, and 25VW-10). Sample as needed if monitoring yields significant methane concentrations.	X	X	X	X
Annual spring vapour sampling at 25VW-09 and 25VW-10 to confirm concentrations.	X			

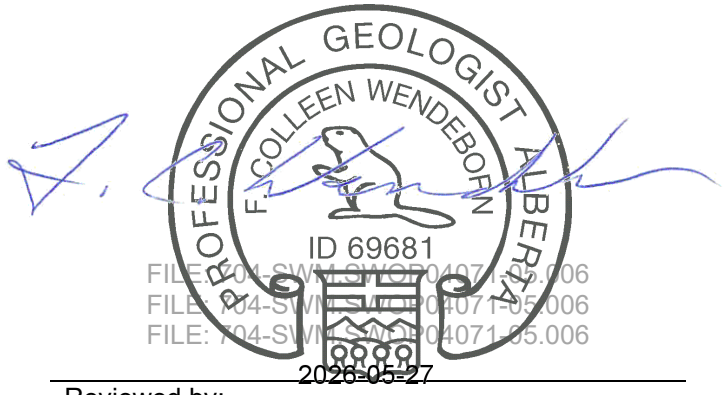
Administrative Actions:

- Ensure that the Site is clearly identified within the City's Zoning Bylaw and appropriate administrative requirements are met for Site development in accordance with City policies and provincial regulations.
- Ensure that the Site is clearly identified within the City's Utility mapping system. Elevated subsurface methane concentrations are present in areas of the Site and future activities in the vicinity (e.g., utility work, repairs, paving) should consider the potential presence of subsurface gas and site-specific safety plans should be developed for work undertaken to limit the potential for exposure to site workers.
- Further to the above recommendations, as noted, the Site has buried waste materials and elevated subsurface methane concentrations. As the Site is fully developed with roadways and commercial buildings, the City should review the Site's status on an ongoing basis with respect to the elevated methane concentrations and the possibility of the accumulation of methane gas in underground utility corridors, trenches/excavations, and potentially within or beneath the footprint of buildings.

8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



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/as

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TABLES

Table 1: Soil Vapour Monitoring Results

Parameter	Vapour Well																													
	VW-01							22VW-01								VW-02														
	Aug-13	Jun-19	Dec-19	Apr-21	May-21	Jul-21	Nov-21	Jan-23	Apr-23	May-23	Nov-23	Dec-24	Oct-25	Nov-25	Dec-25	Aug-13	Jun-19	Dec-19	Apr-21	May-21	Jul-21	Nov-21	Jan-23	May-23	Nov-23	Dec-24	Oct-25	Nov-25	Dec-25
Total Drilled Depth (m)	4.6							4.5								5.0														
Top of Screen Interval (mbg)	4.3							3.5								4.7														
Bottom of Screened Interval (mbg)	4.6							4.5								5.0										4.9				
Stick up (m)	-0.12							-0.01				-0.12	-0.11	-0.11	-0.11	-0.02										-0.08	-0.09	-0.13	-0.13	
Pressure (kPa)[1]		0.01	0.0	0.0	*	0.0	0.0	0.0	-0.1	0.0	0.0	-0.002	0.0	0.0	0.0		0.02	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NM	0.0	
CH_4 (%)	27.4	11.3	0.0	0.0	0.0	0.0	0.9	1.9	7.2	12.2	20.0	21.7	16.8	16.4	13.9	17.6	17.1	1.4	12.1	14.6	15.9	18.2	17.5	17.1	16.9	18.3	18.7	4.5	12.5	
CO (ppm)[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	
CO_2 (%)	19.8	9.9	0.2	0.5	0.2	0.1	1.4	9.3	15.9	17.3	24.3	20.8	22.9	21.4	21.1	10.4	10.4	1.7	8.8	10.2	10.2	14.5	13.1	9.7	15.3	14.9	14.8	8.8	15.9	
O_2 (%)	2.0	9.4	20.3	19.9	20.9	20.1	20.4	12.0	0.2	0.3	0.2	0.0	0.2	0.0	0.2	5.0	0.4	17.9	2.3	0.4	0.1	0.0	0.0	0.4	0.2	0.0	0.2	1.0	2.3	
Balance (% v/v)	50.9	69.5	79.5	79.4	78.9	79.9	77.2	76.9	76.8	70.1	55.5	57.6	60.1	62.3	64.8	67.0	72.0	78.8	76.8	74.7	73.8	67.3	69.4	72.9	67.6	66.8	66.3	85.7	69.2	
Static Water Level (mbtoc)[3]		Dry	Dry	Dry	NM	Dry	Dry	Dry	Dry	Dry	Dry	Dry	4.37	Dry	Dry		Dry	Dry	Dry	NM	Dry	Dry	Dry	Dry	Dry	Dry	5.40	Dry	Dry	

Notes:

[1] Kpa - Kilopascal.

[2] ppm - Parts per million.

[3] mbtoc - Metres below top of casing.

* Vapour well headspace pressures were not measured.

N/A - Not applicable - well can not be accessed to obtain measurement or has a submerged screen (blinded).

NM - Not measured.

VW-01 and VW-01 (Lot 4) were decommissioned in December 2022.

Bold - exceeds the applicable criterion.

CNO - Could not open probe enough to obtain water level and well depth.

Table 1: Soil Vapour Monitoring Results

Parameter	Vapour Well																							
	22VW-03							VP-01 (Lot 4)			22VW-04							22VW-05						
	Jan-23	May-23	Nov-23	Dec-24	Oct-25	Nov-25	Dec-25	May-21	Jul-21	Nov-21	Jan-23	May-23	Nov-23	Dec-24	Oct-25	Nov-25	Dec-25	Jan-23	May-23	Nov-23	Dec-24	Oct-25	Nov-25	Dec-25
Total Drilled Depth (m)	3.0							3.2			3.0							3.0						
Top of Screen Interval (mbg)	2.0							2.9			2.0							2.0						
Bottom of Screened Interval (mbg)	3.0			2.6				3.2			3.0			3.8				3.0			2.732			
Stick up (m)	0.04			-0.14	-0.11	-0.11	-0.11	0.91			0.88			0.79		0.85		-0.03			-0.18	-0.16	-0.16	-0.16
Pressure (kPa)[1]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CH_4 (%)	0.0	5.7	0.0	0.2	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0
CO (ppm)[2]	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0	0.0	0.0	0
CO_2 (%)	4.2	10.8	7.8	7.9	14.4	11.9	10.0	2.5	2.9	4.2	1.8	2.3	3.9	2.7	4.0	3.2	3.4	3.8	7.7	7.5	9.0	9.7	9.1	7.5
O_2 (%)	19.9	9.3	16.0	15.7	9.4	10.2	12.6	18.9	17.6	17.7	19.5	17.1	19.3	19.6	19.3	18.5	19.8	19.6	13.0	14.8	12.6	13.3	12.3	15.9
Balance (% v/v)	76.0	74.4	76.2	76.7	74.7	77.3	77.3	78.6	79.5	78.1	78.7	80.6	76.8	77.6	76.6	78.2	76.8	76.6	79.3	77.7	78.3	77.0	78.6	76.5
Static Water Level (mbtoc)[3]	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Blocked	Blocked	Blocked	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Notes:

[1] Kpa - Kilopascal.

[2] ppm - Parts per million.

[3] mbtoc - Metres below top of casing.

* Vapour well headspace pressures were not measured.

N/A - Not applicable - well can not be accessed to obtain measurement or has a submerged screen (blinded).

NM - Not measured.

VW-01 and VW-01 (Lot 4) were decommissioned in December 2022.

Bold - exceeds the applicable criterion.

CNO - Could not open probe enough to obtain water level and well depth.

Table 1: Soil Vapour Monitoring Results

Parameter	Vapour Well														
	24VW-06				24VW-07				24VW-08				25VW-09		25VW-10
	Dec-24	Oct-25	Nov-25	Dec-25	Dec-24	Oct-25	Nov-25	Dec-25	Dec-24	Oct-25	Nov-25	Dec-25	Nov-25	Dec-25	Dec-25
Total Drilled Depth (m)	4.5				4.2				4.5				3.0		3.0
Top of Screen Interval (mbg)	3.5				3.42				3.5				2.0		1.5
Bottom of Screened Interval (mbg)	4.3				4.1				4.1				3.0		3
Stick up (m)	-0.38	-0.35	-0.35	-0.34	-0.30	-0.35	-0.35	-0.34	-0.32	-0.35	-0.35	-0.32	-0.12	-0.12	-0.16
Pressure (kPa)[1]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
CH_4 (%)	10.8	15.5	12.4	5.6	0	0.1	0	0	0.1	0.1	0	0	0	0	0
CO (ppm)[2]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
CO_2 (%)	13.9	12.9	9.3	8.4	4.5	6.3	5.6	5.5	17.8	18.7	17.2	16.6	9.6	9.7	5.3
O_2 (%)	0.6	2.5	6.8	9.4	17.7	15.2	15.6	17.0	0.5	0.7	1.3	2.9	11.3	12.5	16.1
Balance (% v/v)	74.7	69.2	71.5	76.5	77.7	78.5	78.8	77.4	81.5	80.5	81.5	80.6	79.1	77.8	78.7
Static Water Level (mbtoc)[3]	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Notes:

[1] Kpa - Kilopascal.

[2] ppm - Parts per million.

[3] mbtoc - Metres below top of casing.

* Vapour well headspace pressures were not measured.

N/A - Not applicable - well can not be accessed to obtain measurement or has a submerged screen (blinded).

NM - Not measured.

VW-01 and VW-01 (Lot 4) were decommissioned in December 2022.

Bold - exceeds the applicable criterion.

CNO - Could not open probe enough to obtain water level and well depth.

Table 2: Soil Vapour Analytical Results

Location	Generic Soil Vapour Criteria - Residential Coarse-Grained ($\mu g/m^3$)[1]	VW-01			22VW-01	VW-02						24VW-06	24VW-07	24VW-08	25VW-09		25VW-10
Field ID		VW-01	VW-01	19DUP01	22VW-01	VW-02	VW-02	VW-02/1229	VW-02/9880	VW-02	DUPLICATE	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
Sample Date		5-Dec-2019	5-Dec-2019	5-Dec-2019	5-Apr-2023	5-Dec-2019	5-Dec-2019	4-May-2021	12-Jul-2021	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	12 Nov 2025	03 Dec 2025	03 Dec 2025
Laboratory Report Number		L2393570	L2393570	L2393570	CG2304075	L2393570	L2393570	C1C2833	C1J4824	CG2418081	CG2418081	CG2418081	CG2418081	CG2418081	CG2516682	CG2517660	CG2517660
Laboratory Sample ID		L2393570-1	L2393570-4	L2393570-3	CG2304075-001	L2393570-2	L2393570-5	PMX241	QBY851	CG2418081-001	CG2418081-005	CG2418081-002	CG2418081-003	CG2418081-004	CG2516682-001	CG2517660-001	CG2517660-002
Parameter	**Unit**	**$\mu g/m^3$**															
Field Parameters																	
Pressure on receipt	Inches Hg	NG	0	-	-10.2	-8.99	-6.7	-	-4.3	-4.6	-10.8	-11.0	-7.56	-7.15	-6.54	-8.38	-9.8	-11.8
C1-C5 Hydrocarbon Gases (%)																		
Methane	%	NG	0.00029	-	0.00116	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethane	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethene	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Propane	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Propene	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Butane	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentane	%	NG	<0.00020	-	<0.00020	-	-	-	-	-	-	-	-	-	-	-	-	-
Gas (ppm)																		
n-Butane	ppm	NG	-	-	-	-	-	-	<0.27	0.36	-	-	-	-	-	-	-	-
n-Pentane	ppm	NG	-	-	-	-	-	-	<0.27	<0.24	-	-	-	-	-	-	-	-
Ethane	ppm	NG	-	-	-	-	-	-	<0.27	1.1	-	-	-	-	-	-	-	-
Ethene	ppm	NG	-	-	-	-	-	-	<0.27	<0.24	-	-	-	-	-	-	-	-
Acetylene	ppm	NG	-	-	-	-	-	-	<0.27	<0.24	-	-	-	-	-	-	-	-
Methane	ppm	NG	-	-	-	-	-	-	1,600	-	-	-	-	-	-	-	-	-
Propane	ppm	NG	-	-	-	-	-	-	<0.27	0.40	-	-	-	-	-	-	-	-
Propene	ppm	NG	-	-	-	-	-	-	<0.27	<0.24	-	-	-	-	-	-	-	-
Propyne	ppm	NG	-	-	-	-	-	-	<0.27	<0.24	-	-	-	-	-	-	-	-
Fixed Gases																		
Oxygen	% v/v	NG	21.8	-	21.6	1.27	21.7	-	22.6	1.6	1.76	1.73	4.94	16.60	2.55	14.1	13.5	18.7
Nitrogen	% v/v	NG	80.3	-	80.2	68.9	80.7	-	76.8	67.2	62.3	61.8	68.2	74.6	75.0	71.5	73.9	78.4
Carbon Monoxide	% v/v	NG	<0.05	-	<0.05	<0.050	<0.05	-	<0.3	<0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methane	% v/v	NG	<0.05	-	<0.05	7.36	0.234	-	<0.3	18.5	15.30	15.30	7.58	0.07	<0.050	<0.050	<0.050	<0.050
Carbon Dioxide	% v/v	NG	0.15	-	0.205	14.0	0.246	-	0.4	12.7	11.90	11.80	10.60	3.99	14.70	7.98	7.49	3.95
Aliphatics																		
Aliphatic (>C5-C6)	$\mu g/m^3$	NG	-	-	-	-	-	-	16.1	2,950	-	-	-	-	-	-	-	-
Aliphatics (C6-C8)	$\mu g/m^3$	740,737	56	-	31	2,580	59	-	13.3	1,470	1,560	1,570	743	42	134	120	41	631
Aliphatics (>C8-C10)	$\mu g/m^3$	40,257	83	-	152	1,590	50	-	6.4	87	172	195	802	29	83	350	90	617
Aliphatics (>C10-C12)	$\mu g/m^3$	40,257	70	-	145	212	32	-	16.6	23	<15	<15	686	<15	23	260	54	331
Aliphatics (>C12-C16)	$\mu g/m^3$	40,257	<30	-	<30	31	<30	-	5.3	<10	<30	<30	48	<30	<30	50	<30	<30
Aromatics																		
Aromatics (C6-C8)	$\mu g/m^3$	NG	-	-	-	<15	-	-	<5.0	<10	33	34	<15	<15	<15	65	<15	116
Aromatics (>C8-C10)	$\mu g/m^3$	805	<15	-	<15	39	<15	-	<5.0	<10	19	21	23	<15	<15	30	<15	88
Aromatics (>C10-C12)	$\mu g/m^3$	8,051	<15	-	<15	677	<15	-	<5.0	<10	<15	<15	22	<15	<15	<15	<15	<15
Aromatics (>C12-C16)	$\mu g/m^3$	8,051	<30	-	<30	1,210	<30	-	<5.0	<10	<30	<30	<30	<30	<30	<30	<30	<30

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NG - No applicable criteria.

BOLD - Greater than criteria.

"-" Not analyzed.

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Table 2: Soil Vapour Analytical Results

Location		Generic Soil Vapour Criteria - Residential Coarse-Grained ($\mu g/m^3$)[1]	VW-01			22VW-01	VW-02						24VW-06	24VW-07	24VW-08	25VW-09		25VW-10
Field ID			VW-01	VW-01	19DUP01	22VW-01	VW-02	VW-02	VW-02/1229	VW-02/9880	VW-02	DUPLICATE	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
Sample Date			5-Dec-2019	5-Dec-2019	5-Dec-2019	5-Apr-2023	5-Dec-2019	5-Dec-2019	4-May-2021	12-Jul-2021	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	12 Nov 2025	03 Dec 2025	03 Dec 2025
Laboratory Report Number			L2393570	L2393570	L2393570	CG2304075	L2393570	L2393570	C1C2833	C1J4824	CG2418081	CG2418081	CG2418081	CG2418081	CG2418081	CG2516682	CG2517660	CG2517660
Laboratory Sample ID			L2393570-1	L2393570-4	L2393570-3	CG2304075-001	L2393570-2	L2393570-5	PMX241	QBY851	CG2418081-001	CG2418081-005	CG2418081-002	CG2418081-003	CG2418081-004	CG2516682-001	CG2517660-001	CG2517660-002
Parameter	**Unit**	**$\mu g/m^3$**																
CWS TVOC																		
CWS TVOC (C6-C8)	$\mu g/m^3$	NG	-	-	-	-	-	-	-	-	1,590	1,600	743	42	134	185	41	747
CWS TVOC (>C8-C10)	$\mu g/m^3$	NG	-	-	-	-	-	-	-	-	191	216	825	29	83	380	90	705
CWS TVOC (>C10-C12)	$\mu g/m^3$	NG	-	-	-	-	-	-	-	-	<15	<15	708	<15	23	260	54	331
CWS TVOC (>C12-C16)	$\mu g/m^3$	NG	-	-	-	-	-	-	-	-	<30	<30	48	<30	<30	50	<30	<30
BTEXS F1-F2																		
Benzene	$\mu g/m^3$	41	1.54	-	2.55	0.83	2.11	-	2.82	<0.64	18.4	16.9	4.38	2.14	0.67	0.7	0.61	14.4
Toluene	$\mu g/m^3$	75,190	17.7	-	4.24	1.47	4.75	-	1.09	<0.75	21.0	21.6	6.29	3.39	8.59	71.2	17.2	111
Ethylbenzene	$\mu g/m^3$	68,650	<0.87	-	<0.87	1.26	<0.87	-	<0.43	<0.87	3.08	3.26	1.39	0.61	0.82	3.26	1.39	12.6
Xylene (o)	$\mu g/m^3$	NG	<0.87	-	1.31	2.6	0.92	-	<0.43	<0.87	3.00	3.13	2.26	0.74	1.17	5.17	2.3	11.3
Xylenes (m & p)	$\mu g/m^3$	NG	2.0	-	3.2	2.43	2.4	-	1.35	<1.7	9.25	9.90	5.12	2.30	3.00	11.2	5.95	39.8
Xylenes Total	$\mu g/m^3$	3,520	2.0	-	4.5	5.00	3.3	-	1.30	<2.6	12.2	13.0	7.40	3.00	4.20	16.4	8.2	51.1
Styrene	$\mu g/m^3$	3,220	<0.85	-	<0.85	<0.85	<0.85	-	<0.43	<0.85	<0.89	<0.94	<0.85	<0.85	<0.85	<0.85	<0.85	<0.98
Total BTEX	mg/m^3	NG	-	-	-	8.6	-	-	-	-	54.7	54.8	19.4	9.2	14.2	91.6	27.4	189
F1 (C_6-C_{10})	$\mu g/m^3$	867,383	146	-	199	2,660	76	-	-	-	1,600	1,630	1,490	66	201	550	169	1,400
F1 (C_6-C_{10}) - BTEX	$\mu g/m^3$	867,383	-	-	-	2,650	-	-	54.3	1,880	1,540	1,580	1,470	57	187	0.458	0.142	1.21
F2 (C_{10}-C_{16})	$\mu g/m^3$	52,495	88	-	201	3,830	50	-	68.8	118	18	20	939	<15	46	361	105	444
F2-NAPHTHALENE	$\mu g/m^3$	NG	-	-	-	2,790	-	-	-	-	18	20	939	<15	46	361	105	444
Alcohols																		
Ethanol	$\mu g/m^3$	NG	-	-	-	-	-	-	17.8	6.5	-	-	-	-	-	-	-	-
2-propanol	$\mu g/m^3$	6,219	2.8	-	<2.5	-	<2.5	-	<2.5	<4.9	-	-	-	-	-	-	-	-
Linear & Cyclic Methyl Siloxanes																		
D3(CVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
D4(CVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
D5(CVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
D6(CVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
MM(LVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
MDM(LVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
MD2M(LVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
MD3M(LVMS)	$\mu g/m^3$	NG	-	<170	-	-	-	<170	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																		
1,1,1,2-Tetrachloroethane	$\mu g/m^3$	NG	-	-	-	-	-	-	<0.69	<1.4	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	$\mu g/m^3$	1,693,510	<1.1	-	<1.1	<1.1	<1.1	-	<0.55	<1.1	<1.1	<1.2	<1.1	<1.1	188	<1.1	<1.1	<1.3
1,1,2,2-Tetrachloroethane	$\mu g/m^3$	11	<1.4	-	<1.4	<1.4	<1.4	-	<0.69	<1.4	<1.4	<1.5	<1.4	<1.4	<1.4	<1.4	<1.4	<1.6
1,1,2-Trichloroethane	$\mu g/m^3$	7	<1.1	-	<1.1	<1.1	<1.1	-	<0.55	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.1	<1.3
1,1-Dichloroethane	$\mu g/m^3$	430	<0.81	-	<0.81	<0.81	<0.81	-	<0.4	<0.81	<0.85	<0.89	<0.81	<0.81	6.11	<0.81	<0.81	<0.93
1,1-Dichloroethene	$\mu g/m^3$	6,470	<0.79	-	<0.79	<0.79	<0.79	-	<0.4	<0.79	<0.83	<0.87	<0.79	<0.79	<0.79	<0.79	<0.79	<0.91

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Location		Generic Soil Vapour Criteria - Residential Coarse-Grained ($\mu g/m^3$)[1]	VW-01			22VW-01	VW-02						24VW-06	24VW-07	24VW-08	25VW-09		25VW-10
Field ID			VW-01	VW-01	19DUP01	22VW-01	VW-02	VW-02	VW-02/1229	VW-02/9880	VW-02	DUPLICATE	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
Sample Date			5-Dec-2019	5-Dec-2019	5-Dec-2019	5-Apr-2023	5-Dec-2019	5-Dec-2019	4-May-2021	12-Jul-2021	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	12 Nov 2025	03 Dec 2025	03 Dec 2025
Laboratory Report Number			L2393570	L2393570	L2393570	CG2304075	L2393570	L2393570	C1C2833	C1J4824	CG2418081	CG2418081	CG2418081	CG2418081	CG2418081	CG2516682	CG2517660	CG2517660
Laboratory Sample ID			L2393570-1	L2393570-4	L2393570-3	CG2304075-001	L2393570-2	L2393570-5	PMX241	QBY851	CG2418081-001	CG2418081-005	CG2418081-002	CG2418081-003	CG2418081-004	CG2516682-001	CG2517660-001	CG2517660-002
Parameter	**Unit**	**$\mu g/m^3$**																
Volatile Organic Compounds (VOCs)																		
1,2,4-Trichlorobenzene	$\mu g/m^3$	365	<1.5	-	<1.5	<1.5	<1.5	-	<3.7	<7.4	<1.6	<1.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.7
1,2,4-Trimethylbenzene	$\mu g/m^3$	2,235	<0.98	-	<0.98	4.9	<0.98	-	<2.5	<4.9	3.0	3.0	2.0	<1.0	1.70	4	2.1	6.6
1,2-Dibromoethane	$\mu g/m^3$	2.2	<1.5	-	<1.5	<1.5	<1.5	-	<0.77	<1.5	<1.6	<1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.8
1,2-Dichlorobenzene	$\mu g/m^3$	7,072	<1.2	-	<1.2	<1.2	<1.2	-	<0.6	<1.2	<1.3	<1.3	<1.2	<1.2	<1.2	<1.2	<1.2	<1.4
1,2-Dichloroethane	$\mu g/m^3$	24	<0.81	-	<0.81	<0.81	<0.81	-	<0.4	<0.81	<0.85	<0.89	<0.81	<0.81	<0.81	<0.81	<0.81	<0.93
1,2-Dichloroethene [cis]	$\mu g/m^3$	242	<0.79	-	<0.79	<0.79	<0.79	-	<0.4	<0.79	<0.83	<0.87	<0.79	<0.79	<0.79	<0.79	<0.79	<0.91
1,2-Dichloroethene [trans]	$\mu g/m^3$	1,400	<0.79	-	<0.79	<0.79	<0.79	-	<0.4	<0.79	<0.83	<0.87	<0.79	<0.79	<0.79	<0.79	<0.79	<0.91
1,2-Dichloropropane	$\mu g/m^3$	135	<0.92	-	<0.92	<0.9	<0.92	-	<0.46	<0.92	<1.0	<1.0	<0.9	<0.9	<0.9	<0.9	<0.9	<1.1
1,2-Dichlorotetrafluoroethane	$\mu g/m^3$	566,335	<1.4	-	<1.4	<1.4	<1.4	-	<1.2	<2.4	2.9	8.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.6
1,3,5-Trimethylbenzene	$\mu g/m^3$	2,235	<0.98	-	<0.98	6.8	<0.98	-	<2.5	<4.9	<1.0	<1.1	1.0	<1.0	<1.0	<1.0	<1.0	2.3
1,3-Butadiene	$\mu g/m^3$	17	<0.44	-	<0.44	<2.88	<0.44	-	<1.1	<2.2	<0.46	<0.49	<1.11	<0.44	<0.44	<0.44	<0.44	<0.77
1,3-Dichlorobenzene	$\mu g/m^3$	64	<1.2	-	<1.2	<1.2	<1.2	-	<2.4	<4.8	<1.3	<1.3	<1.2	<1.2	<1.2	1.5	<1.2	<1.4
1,3-Dichloropropene, [cis+trans]	µg/m3	NG	-	-	-	<1.8	-	-	-	-	<1.9	<2.0	<1.8	<1.8	<1.8	<1.8	<1.8	<2.1
1,3-Dichloropropene [cis]	$\mu g/m^3$	163	<0.91	-	<0.91	<0.9	<0.91	-	<0.45	<0.91	<1.0	<1.0	<0.9	<0.9	<0.9	<0.9	<0.9	<1.0
1,3-Dichloropropene [trans]	$\mu g/m^3$	149	<0.91	-	<0.91	<0.9	<0.91	-	<0.45	<0.91	<1.0	<1.0	<0.9	<0.9	<0.9	<0.9	<0.9	<1.0
1,4-Dichlorobenzene	$\mu g/m^3$	64	<1.2	-	<1.2	<1.2	<1.2	-	<0.6	<1.2	<1.3	<1.3	<1.2	<1.2	<1.2	<1.2	<1.2	<1.4
1,4-Dioxane	$\mu g/m^3$	105	<0.72	-	<0.72	<0.72	<0.72	-	<3.6	<7.2	<0.76	<0.79	<0.72	<0.72	<0.72	<0.72	<0.72	<0.83
1-Methyl-4 ethyl benzene	$\mu g/m^3$	14,461	<0.98	-	<0.98	1.9	<0.98	-	<2.5	<4.9	<1.0	<1.1	<1.0	<1.0	<1.0	1.1	<1.0	3.3
2,2,4-Trimethylpentane	$\mu g/m^3$	NG	-	-	-	-	-	-	<0.93	40.9	28.40	28.40	17.90	<0.9	<0.9	-	-	-
2-Butanone (MEK)	$\mu g/m^3$	167,364	1.12	-	1.23	1.68	1.15	-	1.38	<1.2	4.98	5.37	<0.59	<0.59	1.62	<2.06	0.77	23.4
2-Hexanone (MBK)	$\mu g/m^3$	1,053	<4.1	-	<4.1	<12.3	<4.1	-	<4.1	<8.2	<4.51	<4.51	5.33	<4.10	<4.10	<4.10	<4.10	<20.5
4-Methyl-2-pentanone (MIBK)	$\mu g/m^3$	102,977	<0.82	-	<0.82	<9.75	<0.82	-	<0.82	<1.6	<0.86	<0.90	<0.82	<0.82	<0.82	<0.82	<0.82	17
Acetone	$\mu g/m^3$	918,788	16.3	-	12.6	15.7	13.1	-	8.7	<2.9	3.3	4.0	3.1	3.3	37.0	18.5	7.4	264
Allyl chloride	$\mu g/m^3$	32	<0.63	-	<0.63	<0.63	<0.63	-	-	-	<0.66	<0.69	<0.63	<0.63	<0.63	<0.63	<0.63	<0.72
Benzyl chloride	$\mu g/m^3$	34	<1	-	<1	<1.2	<1	-	<2.6	<5.2	<1.1	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2
Bromodichloromethane	$\mu g/m^3$	28	<1.3	-	<1.3	<1.3	<1.3	-	<1.3	<2.7	<1.4	<1.5	<1.3	<1.3	<1.3	<1.3	<1.3	<1.5
Bromoform	$\mu g/m^3$	1,494	<2.1	-	<2.1	<2.1	<2.1	-	<2.1	<4.1	<2.2	<2.3	<2.1	<2.1	<2.1	<2.1	<2.1	<2.4
Bromomethane	$\mu g/m^3$	173	<0.78	-	<0.78	<0.78	<0.78	-	<0.39	<0.78	<0.82	<0.85	<0.78	<0.78	<0.78	<0.78	<0.78	<0.89
Carbon disulfide	$\mu g/m^3$	21,713	<0.62	-	<0.62	<1.6	11.7	-	<1.6	<3.1	<1.6	<1.7	<1.6	1.6	48.9	40.8	22.7	63.5
Carbon tetrachloride	$\mu g/m^3$	113	<1.3	-	<1.3	<1.26	<1.3	-	<0.63	<1.3	<1.32	<1.38	<1.26	<1.26	<1.26	<1.26	<1.26	<1.45

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Location		Generic Soil Vapour Criteria - Residential Coarse-Grained ($\mu g/m^3$)[1]	VW-01			22VW-01	VW-02						24VW-06	24VW-07	24VW-08	25VW-09		25VW-10
Field ID			VW-01	VW-01	19DUP01	22VW-01	VW-02	VW-02	VW-02/1229	VW-02/9880	VW-02	DUPLICATE	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
Sample Date			5-Dec-2019	5-Dec-2019	5-Dec-2019	5-Apr-2023	5-Dec-2019	5-Dec-2019	4-May-2021	12-Jul-2021	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	4-Dec-2024	12 Nov 2025	03 Dec 2025	03 Dec 2025
Laboratory Report Number			L2393570	L2393570	L2393570	CG2304075	L2393570	L2393570	C1C2833	C1J4824	CG2418081	CG2418081	CG2418081	CG2418081	CG2418081	CG2516682	CG2517660	CG2517660
Laboratory Sample ID			L2393570-1	L2393570-4	L2393570-3	CG2304075-001	L2393570-2	L2393570-5	PMX241	QBY851	CG2418081-001	CG2418081-005	CG2418081-002	CG2418081-003	CG2418081-004	CG2516682-001	CG2517660-001	CG2517660-002
Parameter	**Unit**	**$\mu g/m^3$**																
Volatile Organic Compounds (VOCs)																		
Chlorobenzene	$\mu g/m^3$	347	<0.92	-	<0.92	<0.92	<0.92	-	<0.46	<0.92	<0.97	<1.01	<0.92	<0.92	<0.92	<0.92	<0.92	<1.06
Chloroethane	$\mu g/m^3$	124,080	<0.53	-	<0.53	<0.53	<0.53	-	<0.79	<1.6	<0.55	0.61	<0.53	<0.53	<0.53	<0.53	<0.53	<0.61
Chloroform	$\mu g/m^3$	27	<0.98	-	<0.98	<0.98	<0.98	-	<0.49	<0.98	<1.02	<1.07	<0.98	<0.98	<0.98	4.83	2.93	70.3
Chloromethane	$\mu g/m^3$	2,657	1.05	-	1.04	0.6	1.7	-	1.11	<1.2	9.64	10.1	0.54	<0.41	<0.41	0.41	<0.41	<0.50
Cyclohexane	$\mu g/m^3$	201,510	<0.69	-	<0.69	67.1	1.2	-	0.78	<12	14.5	13.7	43.7	2.48	2.17	2.72	1	2.75
Dibromochloromethane	$\mu g/m^3$	6,070	<1.7	-	<1.7	<1.7	<1.7	-	<1.7	<3.4	<1.8	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<2.0
Dichlorodifluoromethane	$\mu g/m^3$	3,584	2.76	-	2.75	11.2	23.8	-	13.9	2,110	1670	1740	3.40	37.5	1.80	3.9	3	1.4
Ethyl acetate	$\mu g/m^3$	2,509	11.9	-	0.76	1.76	<0.72	-	<3.6	<7.2	<0.76	<0.79	<0.72	<0.72	<0.72	<0.72	<0.72	<0.83
Freon 113	$\mu g/m^3$	230,627	<1.5	-	<1.5	<1.5	<1.5	-	<1.2	<2.3	<1.6	<1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.8
Heptane	$\mu g/m^3$	14,461	<0.82	-	0.99	13	1.35	-	3	3.1	7.42	6.84	6.93	3.12	<0.82	<0.82	<0.82	24.6
Hexachlorobutadiene	$\mu g/m^3$	51	<2.1	-	<2.1	<2.1	<2.1	-	<5.3	<11	<2.2	<2.3	<2.1	<2.1	<2.1	<2.1	<2.1	<2.5
Hexane	$\mu g/m^3$	18,839	20.1	-	2.25	21.4	2.42	-	<0.7	6	11.0	9.38	22.2	4.44	0.81	2.96	<0.70	18.1
Isooctane	$\mu g/m^3$	14,917	<0.93	-	1.05	<14.0	1.92	-	-	-	28.4	28.4	17.9	<0.9	<0.9	<0.9	<0.9	20.5
iso-Propylbenzene (cumene)	$\mu g/m^3$	14,461	<0.98	-	<0.98	<1.0	<0.98	-	-	-	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1
Methyl t-Butyl Ether (MTBE)	$\mu g/m^3$	1,153	18.9	-	<0.72	7.36	<0.72	-	<0.72	<1.4	<0.76	<0.79	<0.72	<0.72	<0.72	<0.72	<0.72	<0.83
Methylene Chloride	$\mu g/m^3$	18,764	4	-	<0.69	<0.72	<0.69	-	<2.1	<4.2	<0.73	<0.76	<0.69	<0.69	<0.69	<0.69	<0.69	2.36
Naphthalene	$\mu g/m^3$	380	<2.6	-	<2.6	<0.69	<2.6	-	1.2	<2.1	<0.58	<0.58	<0.52	<0.52	<0.52	<0.52	<0.52	<0.58
Propene	$\mu g/m^3$	91,723	<0.34	-	<0.34	<112	<0.34	-	-	<260	<177	<184	484	<0.69	<8.09	8.54	<2.82	<56.1
Tetrachloroethene	$\mu g/m^3$	1,390	<1.4	-	<1.4	<1.4	<1.4	-	<0.68	<1.4	<1.4	<1.5	<1.4	<1.4	<1.4	33.5	18.9	129
Tetrahydrofuran	$\mu g/m^3$	62,828	0.8	-	0.6	2.39	<0.59	-	<1.2	<2.4	<0.62	<0.65	<0.59	<0.59	<0.59	<0.59	<0.59	<3.80
Trichloroethene	$\mu g/m^3$	70	<1.1	-	1.4	<1.1	<1.1	-	<0.54	<1.1	10.7	10.5	3.8	1.9	2.7	20.3	16.6	389
Trichlorofluoromethane	$\mu g/m^3$	34,325	1.3	-	1.3	<1.1	1.6	-	<1.1	<2.2	<1.2	<1.2	<1.1	1.7	<1.1	<1.1	<1.1	<1.3
Vinyl acetate	$\mu g/m^3$	6,586	<1.8	-	<1.8	<12.7	<1.8	-	<0.7	<1.4	<1,150	<1,160	<19.7	<1.8	<2.3	<1.8	<1.8	<2.0
Vinyl bromide (bromoethene)	$\mu g/m^3$	40	<0.87	-	<0.87	<0.9	<0.87	-	<0.87	<1.8	<0.9	<1.0	<0.9	<0.9	<0.9	<0.9	<0.9	<1.0
Vinyl chloride	$\mu g/m^3$	70	<0.51	-	<0.51	<0.51	<0.51	-	<0.26	<0.51	<0.54	<0.56	<0.51	<0.51	<0.51	<0.51	<0.51	<0.59

Notes:

[1] Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

NG - No applicable criteria.

BOLD - Greater than criteria.

"-" Not analyzed.

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Table 3: Chemical, Physical, and Toxicological Properties

Parameter		TC	RsC	H'	D_{air}	D_{water}	BAF	MF		
		Tolerable Concentration	Risk-Specific Concentration	Unitless Henry's Law Constant	Pure Component Molecular Diffusivity in Air	Pure Component Molecular Diffusivity in Water	Bioattenuation Factor	Mass Fraction in Soil (Coarse and Fine)	Mass Fraction in Soil Vapour - Coarse Soil	Mass Fraction in Soil Vapour - Fine Soil
Units		mg/m^3	mg/m^3	unitless	cm^2/s	cm^2/s	unitless	unitless	unitless	unitless
Benzene		--	0.003	0.225	0.088	1.00E-05	10	--	--	--
Toluene		3.8	--	0.274	0.087	9.20E-06	10	--	--	--
Ethylbenzene		1	--	0.358	0.075	8.50E-06	10	--	--	--
Xylenes		0.18	--	0.252	0.078	9.90E-06	10	--	--	--
Naphthalene		0.003	--	0.017	0.059	7.50E-06	10	--	--	--
F1	Aliphatic C>6-C8	18.4	--	50	0.05	0.00001	10	0.55	0.854	0.842
	Aliphatic C>8-C10	1	--	80	0.05	0.00001	10	0.36	0.141	0.153
	Aromatic C>8-C10	0.2	--	0.48	0.05	0.00001	10	0.09	0.005	0.005
F2	Aliphatic C>10-C12	1	--	120	0.05	0.00001	10	0.36	0.767	0.766
	Aliphatic C>12-C16	1	--	520	0.05	0.00001	10	0.44	0.205	0.206
	Aromatic C>10-C12	0.2	--	0.14	0.05	0.00001	10	0.09	0.023	0.023
	Aromatic C>12-C16	0.2	--	0.053	0.05	0.00001	10	0.11	0.005	0.005
1,1,1-Trichloroethane		5	--	0.688	0.078	0.000009	10	--	--	--
1,1,2,2-Tetrachloroethane		--	0.000172	0.019	0.071	0.000008	10	--	--	--
1,1,2-Trichloroethane		0.0002	0.000625	0.038	0.078	0.000009	10	--	--	--
1,1-Dichloroethane		--	0.006250	0.240	0.074	0.000011	10	--	--	--
1,1-Dichloroethene		0.2	--	0.942	0.090	0.000010	10	--	--	--
1,2,4-Trichlorobenzene		0.007	--	0.112	0.030	0.000008	10	--	--	--
1,2,4-Trimethylbenzene		0.06	--	0.230	0.061	0.000008	10	--	--	--
1,2-Dibromoethane		0.0093	0.016700	0.027	0.022	0.000012	10	--	--	--
1,2-Dichlorobenzene		0.2	--	0.072	0.069	0.000008	10	--	--	--
1,2-Dichloroethane		0.007	0.000385	0.049	0.104	0.000010	10	--	--	--
1,2-Dichloropropane		0.004	0.002703	0.110	0.078	0.000009	10	--	--	--
1,3,5-Trimethylbenzene		0.06	--	0.359	0.060	0.000008	10	--	--	--
1,3-Butadiene		0.002	0.000333	3.009	0.249	0.000011	10	--	--	--
1,3-Dichlorobenzene		0.095	0.000909	0.128	0.069	0.000008	10	--	--	--
1,4-Dichlorobenzene		0.095	0.000909	0.098	0.069	0.000008	10	--	--	--
1,4-Dioxane		0.03	0.002000	0.000	0.229	0.000010	10	--	--	--
2-Hexanone		0.03	--	0.004	0.070	0.000008	10	--	--	--
Acetone		31	--	0.002	0.124	0.000011	10	--	--	--
Allyl chloride		0.001	--	0.450	0.094	0.000011	10	--	--	--
Benzyl chloride		0.001	--	0.017	0.075	0.000008	10	--	--	--
Bromodichloromethane		--	0.000270	0.098	0.030	0.000011	10	--	--	--
Bromoform		--	0.009091	0.024	0.015	0.000010	10	--	--	--
Bromomethane		0.005	--	0.255	0.073	0.000012	10	--	--	--
Carbon Disulfide		0.7	--	0.705	0.104	0.000010	10	--	--	--
Carbon Tetrachloride		0.1	0.001667	1.183	0.078	0.000009	10	--	--	--
Chlorobenzene		0.01	--	0.148	0.073	0.000009	10	--	--	--
Chloroethane		1	--	0.073	0.271	0.000012	10	--	--	--
Chloroform		0.098	0.000435	0.154	0.104	0.000010	10	--	--	--
Chloromethane		0.09	--	0.388	0.126	0.000007	10	--	--	--
cis-1,2-Dichloroethene		0.007	--	0.302	0.074	0.000011	10	--	--	--
cis-1,3-Dichloropropene		0.02	0.002500	0.053	0.087	0.000010	10	--	--	--
Cyclohexane		6	--	7.618	0.080	0.000009	10	--	--	--
Dibromochloromethane		0.07	--	0.040	0.020	0.000011	10	--	--	--
Dichlorodifluoromethane		0.1	--	16.475	0.067	0.000010	10	--	--	--
4-Ethyltoluene		0.40	--	0.205	0.065	0.000007	10	--	--	--
Ethyl acetate		0.07	--	0.006	0.067	0.000010	10	--	--	--
Freon 113		5	--	21.500	0.038	0.000009	10	--	--	--
Freon 114		17	--	115.000	0.082	0.000009	10	--	--	--
Heptane		0.4	--	83.709	0.065	0.000007	10	--	--	--
Hexachlorobutadiene		--	0.000455	0.421	0.027	0.000007	10	--	--	--
Isooctane		0.4	--	30.500	0.060	0.000007	10	--	--	--
Isopropyl alcohol		0.2	--	0.000331	0.103	0.000011	10	--	--	--
Isopropylbenzene		0.4	--	0.591	0.065	0.000007	10	--	--	--
Methyl ethyl ketone		5	--	0.001	0.081	0.000010	10	--	--	--
Methyl isobutyl ketone		0.003	--	0.006	0.075	0.000008	10	--	--	--
Methylene chloride		0.6	1	0.151	0.101	0.000012	10	--	--	--
MTBE		0.037	--	0.028	0.102	0.000011	10	--	--	--
n-Hexane		0.7	--	73.916	0.200	0.000008	10	--	--	--
Propylene		3	--	8.013	0.110	0.000011	10	--	--	--
Styrene		0.092	--	0.130	0.071	0.000008	10	--	--	--
Tetrachloroethylene		0.36	0.038462	1.077	0.072	0.000008	10	--	--	--
Tetrahydrofuran		2	--	0.003	0.099	0.000011	10	--	--	--
trans-1,2-Dichloroethene		--	--	0.277	0.071	0.000012	10	--	--	--
trans-1,3-Dichloropropene		0.02	0.002500	0.053	0.087	0.000010	10	--	--	--
Trichloroethylene		0.04	0.002439	0.477	0.079	0.000009	10	--	--	--
Trichlorofluoromethane		1.05	--	5.200	0.087	0.000010	10	--	--	--
Vinyl acetate		0.2	--	0.024	0.085	0.000009	10	--	--	--
Vinyl bromide		0.003	--	0.260	0.100	0.000012	10	--	--	--
Vinyl chloride		0.1	0.002273	3.236	0.106	0.000012	10	--	--	--
Hydrogen Sulfide		0.002	--	0.350	0.188	0.000022	10	--	--	--

Notes:

cm^2/s	Square centimetres per second.
F1	Fraction 1 (C6-C10).
F2	Fraction 2 (C>10-C16).
mg/m^3	Milligrams per cubic metre.
PHC	Petroleum hydrocarbon.
--	Not applicable.

References:

Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Alberta Environment and Protected Areas (EPA). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.
Health Canada. 2021. Federal contaminated site risk assessment in Canada: Toxicological reference values (TRVs), Version 3.0.
United States Environmental Protection Agency (US EPA). 2024. Regional Screening Levels for Chemical Contaminants at Superfund Sites.

Table 4: Soil Properties for Evaluation of Vapour Transport

Parameter		Units	Coarse-Grained Soil	Fine-Grained Soil
θ_a	Vapour-filled porosity	unitless	0.31	0.303
ρ_b	Dry bulk density	g/cm^3	1.7	1.4
n	Total soil porosity	unitless	0.36	0.47
θ_w	Moisture-filled porosity	unitless	0.05	0.167
Q_{soil}	Soil gas flow rate	cm^3/s	167	16.7

Notes:

Values from CCME (2014).

cm Centimetre.

cm^2 Square centimetre.

g/cm^3 Grams per cubic centimetre.

PHC Petroleum hydrocarbon.

References: Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Alberta Environment and Protected Areas (EPA). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

Table 5: Building Properties for Evaluation of Vapour Transport

Parameter		Units	Residential/Parkland Land Use
L_B	Building length	cm	1,225
W_B	Building width	cm	1,225
A_B	Building area exposed to soil, including basement wall area	cm^2	2.70E+06
H_B	Building height	cm	360
L_{crack}	Thickness of the foundation	cm	11.25
A_{crack}	Area of cracks through which contaminant vapours enter the building	cm^2	994.5
ACH	Air exchanges per hour	h^{-1}	0.5

Notes:

Values taken from CCME (2014).

cm Centimetre.

cm^2 Square centimetre.

h^{-1} Per hour.

References:

Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Alberta Environment and Protected Areas (EPA). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

Table 6: Generic Soil Vapour Criteria

Parameter	Residential/Parkland			
	Units	Coarse-Grained	Units	Coarse-Grained
Benzene	mg/m^3	0.041	µg/m^3	41.0
Toluene		75.2		75,190
Ethylbenzene		68.7		68,650
Xylenes		3.52		3,520
PHC F1		867		867,380
PHC F2		52.5		52,500
Naphthalene		0.38		1,694,000
1,1,1-Trichloroethane		1,694		1,693,510
1,1,2,2-Tetrachloroethane		0.011		11.2
1,1,2-Trichloroethane		0.0070		7.00
1,1-Dichloroethane		0.43		430
1,1-Dichloroethene		6.47		6,470
1,2,4-Trichlorobenzene		0.36		365
1,2,4-Trimethylbenzene		2.23		2,235
1,2-Dibromoethane		0.0022		2.16
1,2-Dichlorobenzene		7.07		7,072
1,2-Dichloroethane		0.020		23.9
1,2-Dichloroethene (cis)		0.24		242
1,2-Dichloroethene (trans)		1.40		1,400
1,2-Dichloropropane		0.14		135
1,3,5-Trimethylbenzene		2.23		2,235
1,3-Butadiene		0.020		17.3
1,3-Dichlorobenzene		0.060		64.3
1,3-Dichloropropene [cis]		0.16		163
1,3-Dichloropropene [trans]		0.15		149
1,4-Dichlorobenzene		0.064		64.0
1,4-Dioxane		0.11		105
1-Methyl-4 ethyl benzene		14.5		14,461
2-Butanone (MEK)		167		167,364
2-Hexanone (MBK)		1.05		1,053
4-Methyl-2-pentanone (MIBK)		103		102,977
Acetone		919		918,788
Allyl chloride		0.030		32.0
Benzyl chloride		0.030		34.3
Bromodichloromethane		0.030		28.3
Bromoform		1.49		1,494
Bromomethane		0.17		173
Carbon disulfide		21.7		21,713
Carbon tetrachloride		0.11		113
Chlorobenzene		0.35		347
Chloroethane		124		124,080
Chloroform		0.030		27.0
Chloromethane		2.66		2,657
Cyclohexane		202		201,510
Dibromochloromethane		6.07		6,070
Dichlorodifluoromethane		3.58		3,584
Ethyl acetate		2.51		2,509
Freon 113		231		230,627
Freon 114		566		566,335
Heptane		14.5		14,461
Hexachlorobutadiene		0.050		50.7
Hexane		18.8		18,839
Isooctane		14.9		14,917
iso-Propylbenzene (cumene)		14.5		14,461
Isopropanol		6.22		6,219
Methyl t-Butyl Ether (MTBE)		1.15		1,153
Methylene Chloride		18.8		18,764
Propylene		91.7		91,723
Styrene		3.22		3,220
Tetrachloroethene		1.39		1,390
Tetrahydrofuran		62.8		62,828
Trichloroethene		0.070		70.0
Trichlorofluoromethane		34.3		34,325
Vinyl acetate		6.59		6,586
Vinyl bromide (bromoethene)		0.040		40.0
Vinyl chloride		0.070		70.0

Notes:

mg/m^3 Milligrams per cubic metre.

µg/m^3 Micrograms per cubic metre.

References:

[1] Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

[2] Alberta Environment and Protected Areas (EPA). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines.

[3] Health Canada. 2021. Federal contaminated site risk assessment in Canada: Toxicological reference values (TRVs), Version 3.0.

[4] United States Environmental Protection Agency (US EPA). 2024. Regional Screening Levels for Chemical Contaminants at Superfund Sites.

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Table 7: Soil Vapour Risk Evaluation

Parameter	Unit	Soil Vapour Screening Criteria [a]	Soil Vapour Results (µg/m³)												Comparisons of Soil Vapour Measurementsto Soil Vapour Criteria											
															Estimated Cancer Risk [b]											
			VW-01	22VW-01	VW-02	VW-02	VW-02	VW-02	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10	VW-01	22VW-01	VW-02	VW-02	VW-02	VW-02	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
			5-Dec-19	5-Apr-23	5-Dec-19	4-May-21	12-Jul-21	4-Dec-24	4-Dec-24	4-Dec-24	4-Dec-24	12-Nov-25	3-Dec-25	3-Dec-25	5-Dec-19	5-Apr-23	5-Dec-19	4-May-21	12-Jul-21	4-Dec-24	4-Dec-24	4-Dec-24	4-Dec-24	12-Nov-25	3-Dec-25	3-Dec-25
Benzene	µg/m³	41	2.55	0.83	2.11	2.82	<0.64	18.4	4.38	2.14	0.67	0.7	0.61	14.4	6.2E-07	2.0E-07	5.1E-07	6.9E-07	ND	4.5E-06	1.1E-06	5.2E-07	1.6E-07	1.7E-07	1.5E-07	3.5E-06
Toluene	µg/m³	75,190	17.7	1.47	4.75	1.09	<0.75	21.6	6.29	3.39	8.59	71.2	17.2	111	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/m³	68,650	<0.87	1.26	<0.87	<0.43	<0.87	3.26	1.39	0.61	0.82	3.26	1.39	12.6	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes Total	µg/m³	3,520	4.5	5	3.3	1.3	<2.6	13	7.4	3	4.2	16.4	8.2	51.1	-	-	-	-	-	-	-	-	-	-	-	-
F1 (C_6-C_{10})	µg/m³	867,383	199	2,660	76	54.3	1880	1630	1490	66	201	550	169	1,400	-	-	-	-	-	-	-	-	-	-	-	-
F2 (C_{10}-C_{16})	µg/m³	52,495	201	3,830	50	68.8	118	20	939	<15	46	361	105	444	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics (C_6-C_8)	µg/m³	740,737	56	2,580	59	13.3	1470	1570	743	42	134	120	41	631	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics (>C_8-C_{10})	µg/m³	40,257	152	1,590	50	6.4	87	195	802	29	83	350	90	617	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics (>C_{10}-C_{12})	µg/m³	40,257	145	212	32	16.6	23	<15	686	<15	23	260	54	331	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics (>C12-C16)	µg/m³	40,257	<30	31	<30	5.3	<10	<30	48	<30	<30	50	<30	<30	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics (>C8-C10)	µg/m³	805	<15	39	<15	<5.0	<10	21	23	<15	<15	30	<15	88	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics (>C10-C12)	µg/m³	8,051	<15	677	<15	<5.0	<10	<15	22	<15	<15	<15	<15	<15	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics (>C12-C16)	µg/m³	8,051	<30	1,210	<30	<5.0	<10	<30	<30	<30	<30	<30	<30	<30	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	µg/m³	1,693,510	<1.1	<1.1	<1.1	<0.55	<1.1	<1.2	<1.1	<1.1	188	<1.1	<1.1	<1.3	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	µg/m³	430	<0.81	<0.81	<0.81	<0.4	<0.81	<0.89	<0.81	<0.81	6.11	<0.81	<0.81	<0.93	ND	ND	ND	ND	ND	ND	ND	ND	1.4E-07	ND	ND	ND
1,2,4-Trimethylbenzene	µg/m³	2,235	<0.98	4.9	<0.98	<2.5	<4.9	3	2	<1.0	1.7	4	2.1	6.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorotetrafluoroethane	µg/m³	566,335	<1.4	<1.4	<1.4	<1.2	<2.4	8.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.6	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/m³	2,235	<0.98	6.8	<0.98	<2.5	<4.9	<1.1	1	<1.0	<1.0	<1.0	<1.0	2.3	-	-	-	-	-	-	-	-	-	-	-	-
1-Methyl-4 ethyl benzene	µg/m³	14,461	<0.98	1.9	<0.98	<2.5	<4.9	<1.1	<1.0	<1.0	<1.0	1.1	<1.0	3.3	-	-	-	-	-	-	-	-	-	-	-	-
Isopropanol (2-Propanol)	µg/m³	6,219	2.8	--	<2.5	<2.5	<4.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	µg/m³	167,364	1.23	1.68	1.15	1.38	<1.2	5.37	<0.59	<0.59	1.62	<2.06	0.77	23.4	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone (MBK)	µg/m³	1,053	<4.1	<12.3	<4.1	<4.1	<8.2	<4.51	5.33	<4.10	<4.10	<4.10	<4.10	<20.5	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	µg/m³	918,788	16.3	15.7	13.1	8.7	<2.9	4	3.1	3.3	37	18.5	7.4	264	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/m³	21,713	<0.62	<1.6	11.7	<1.6	<3.1	<1.7	<1.6	1.6	48.9	40.8	22.7	63.5	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	µg/m³	124,080	<0.53	<0.53	<0.53	<0.79	<1.6	0.61	<0.53	<0.53	<0.53	<0.53	<0.53	<0.61				-								
Chloromethane	µg/m³	2,657	1.05	0.6	1.7	1.11	<1.2	10.1	0.54	<0.41	<0.41	0.41	<0.41	<0.50	-	-	-	-	-	-	-	-	-	-	-	-
Cyclohexane	µg/m³	201,510	<0.69	67.1	1.2	0.78	<12	14.5	43.7	2.48	2.17	2.72	1	2.75	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	µg/m³	3,584	2.76	11.2	23.8	13.9	2110	1740	3.4	37.5	1.8	3.9	3	1.4	-	-	-	-	-	-	-	-	-	-	-	-
Ethyl acetate	µg/m³	2,509	11.9	1.76	<0.72	<3.6	<7.2	<0.79	<0.72	<0.72	<0.72	<0.72	<0.72	<0.83	-	-	-	-	-	-	-	-	-	-	-	-
Heptane	µg/m³	14,461	0.99	13	1.35	3	3.1	7.42	6.93	3.12	<0.82	<0.82	<0.82	24.6	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	µg/m³	18,839	20.1	21.4	2.42	<0.7	6	11	22.2	4.44	0.81	2.96	<0.70	18.1	-	-	-	-	-	-	-	-	-	-	-	-
Isooctane	µg/m³	14,917	1.05	<14.0	1.92	-	--	28.40	17.90	<0.9	<0.9	<0.9	<0.9	20.5	-	-	-	-	-	-	-	-	-	-	-	-
Methyl t-Butyl Ether (MTBE)	µg/m³	1,153	18.9	7.36	<0.72	<0.72	<1.4	<0.79	<0.72	<0.72	<0.72	<0.72	<0.72	<0.83	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	µg/m³	18,764 / 62,546 [e]	4.00	<0.72	<0.69	<2.1	<4.2	<0.76	<0.69	<0.69	<0.69	<0.69	<0.69	2.36	6.4E-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.8E-10
Naphthalene	µg/m³	380	<2.6	<0.69	<2.6	1.2	<2.1	<0.58	<0.52	<0.52	<0.52	<0.52	<0.52	<0.58	-	-	-	-	-	-	-	-	-			
Propene	µg/m³	91,723	<0.34	<112	<0.34	-	<260	<184	484	<0.69	<8.09	8.54	<2.82	<56.1	-	-	-	-	-	-	-	-	-			
Tetrahydrofuran	µg/m³	62,828	0.80	2.39	<0.59	<1.2	<2.4	<0.65	<0.59	<0.59	<0.59	<0.59	<0.59	<3.8	-	-	-	-	-	-	-	-	-			
Trichloroethene	µg/m³	1,392 / 2,679 [e]	1.4	<1.1	<1.1	<0.54	<1.1	10.7	3.8	1.9	2.7	20.3	16.6	389	5.2E-09	ND	ND	ND	ND	4.0E-08	1.4E-08	7.1E-09	1.0E-08	7.6E-08	6.2E-08	1.5E-06
Trichlorofluoromethane	µg/m³	6,586	1.3	<1.1	1.6	<1.1	<2.2	<1.2	<1.1	1.7	<1.1	<1.1	<1.1	<1.3	-	-	-	-	-	-	-	-	-			
Cumulative Risk [d]															6.3E-07	2.0E-07	5.1E-07	6.9E-07	ND	4.5E-06	1.1E-06	5.3E-07	3.2E-07	2.5E-07	2.1E-07	5.0E-06
Target Risk Levels															**1.0 x 10^{-5}**											

Notes:

< – not detected. Listed value is the corresponding detection limit.

- = screening criteria not calculated as appropriate toxicity data not available.

Bold = identifies estimated risks and hazards that exceed the target risk level of 1 x 10^{-5} or target hazard level of 1.

[a] Listed soil vapour screening criteria derived in accordance with CCME, 2014.

[b] Estimated cancer risk = (soil vapour concentration/cancer soil vapour screening level) x 10^{-5}.

[c] Estimated hazard quotient = (soil vapour concentration/non-cancer soil vapour screening level).

[d] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

[e] Soil vapour screening criteria shows both the threshold criteria and non-threshold criteria. Target risk and hazard levels are calculated with the appropriate criteria.

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Table 7: Soil Vapour Risk Evaluation

Parameter	Unit	Soil Vapour Screening Criteria [a]	Comparisons of Soil Vapour Measurementsto Soil Vapour Criteria											
			Estimated Hazard Quotients[c]											
			VW-01	22VW-01	VW-02	VW-02	VW-02	VW-02	24VW-06	24VW-07	24VW-08	25VW-09	25VW-09	25VW-10
			5-Dec-19	5-Apr-23	5-Dec-19	4-May-21	12-Jul-21	4-Dec-24	4-Dec-24	4-Dec-24	4-Dec-24	12-Nov-25	3-Dec-25	3-Dec-25
Benzene	µg/m^3	41	-	-	-	-	-	-	-	-	-			
Toluene	µg/m^3	75,190	2.4E-04	2.0E-05	6.3E-05	1.4E-05	ND	2.9E-04	8.4E-05	4.5E-05	1.1E-04	9.5E-04	2.3E-04	1.5E-03
Ethylbenzene	µg/m^3	68,650	ND	1.8E-05	ND	ND	ND	4.7E-05	2.0E-05	8.9E-06	1.2E-05	4.7E-05	2.0E-05	1.8E-04
Xylenes Total	µg/m^3	3,520	1.3E-03	1.4E-03	9.4E-04	3.7E-04	ND	3.7E-03	2.1E-03	8.5E-04	1.2E-03	4.7E-03	2.3E-03	1.5E-02
F1 (C_6-C_{10})	µg/m^3	867,383	2.3E-04	3.1E-03	8.8E-05	6.3E-05	2.2E-03	1.9E-03	1.7E-03	7.6E-05	2.3E-04	6.3E-04	1.9E-04	1.6E-03
F2 (C_{10}-C_{16})	µg/m^3	52,495	3.8E-03	7.3E-02	9.5E-04	1.3E-03	2.2E-03	3.8E-04	1.8E-02	ND	8.8E-04	6.9E-03	2.0E-03	8.5E-03
Aliphatics (C_6-C_8)	µg/m^3	740,737	7.6E-05	3.5E-03	8.0E-05	1.8E-05	2.0E-03	2.1E-03	1.0E-03	5.7E-05	1.8E-04	1.6E-04	5.5E-05	8.5E-04
Aliphatics (>C_8-C_{10})	µg/m^3	40,257	3.8E-03	3.9E-02	1.2E-03	1.6E-04	2.2E-03	4.8E-03	2.0E-02	7.2E-04	2.1E-03	8.7E-03	2.2E-03	1.5E-02
Aliphatics (>C_{10}-C_{12})	µg/m^3	40,257	3.6E-03	5.3E-03	7.9E-04	4.1E-04	5.7E-04	ND	1.7E-02	ND	5.7E-04	6.5E-03	1.3E-03	8.2E-03
Aliphatics (>C12-C16)	µg/m^3	40,257	ND	7.7E-04	ND	1.3E-04	ND	ND	1.2E-03	ND	ND	1.2E-03	ND	ND
Aromatics (>C8-C10)	µg/m^3	805	ND	4.8E-02	ND	ND	ND	2.6E-02	2.9E-02	ND	ND	3.7E-02	ND	0.11
Aromatics (>C10-C12)	µg/m^3	8,051	ND	8.4E-02	ND	ND	ND	ND	2.7E-03	ND	ND	ND	ND	ND
Aromatics (>C12-C16)	µg/m^3	8,051	ND	0.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	µg/m^3	1,693,510	ND	ND	ND	ND	ND	ND	ND	ND	1.1E-04	ND	ND	ND
1,1-Dichloroethane	µg/m^3	430	ND	ND	ND	ND	ND	ND	ND	ND	1.4E-02	ND	ND	ND
1,2,4-Trimethylbenzene	µg/m^3	2,235	ND	2.2E-03	ND	ND	ND	1.3E-03	8.9E-04	ND	7.6E-04	1.8E-03	9.4E-04	3.0E-03
1,2-Dichlorotetrafluoroethane	µg/m^3	566,335	ND	ND	ND	ND	ND	1.5E-05	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	µg/m^3	2,235	ND	3.0E-03	ND	ND	ND	ND	4.5E-04	ND	ND	ND	ND	1.0E-03
1-Methyl-4 ethyl benzene	µg/m^3	14,461	ND	1.3E-04	ND	ND	ND	ND	ND	ND	ND	7.6E-05	ND	2.3E-04
Isopropanol (2-Propanol)	µg/m^3	6,219	4.5E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	µg/m^3	167,364	7.3E-06	1.0E-05	6.9E-06	8.2E-06	ND	3.2E-05	ND	ND	9.7E-06	ND	4.6E-06	1.4E-04
2-Hexanone (MBK)	µg/m^3	1,053	ND	ND	ND	ND	ND	ND	5.1E-03	ND	ND	ND	ND	ND
Acetone	µg/m^3	918,788	1.8E-05	1.7E-05	1.4E-05	9.5E-06	ND	4.4E-06	3.4E-06	3.6E-06	4.0E-05	2.0E-05	8.1E-06	2.9E-04
Carbon disulfide	µg/m^3	21,713	ND	ND	5.4E-04	ND	ND	ND	ND	7.4E-05	2.3E-03	1.9E-03	1.0E-03	2.9E-03
Chloroethane	µg/m^3	124,080	ND	ND	ND	ND	ND	4.9E-06	ND	ND	ND	ND	ND	ND
Chloromethane	µg/m^3	2,657	4.0E-04	2.3E-04	6.4E-04	4.2E-04	ND	3.8E-03	2.0E-04	ND	ND	1.5E-04	ND	ND
Cyclohexane	µg/m^3	201,510	ND	3.3E-04	6.0E-06	3.9E-06	ND	7.2E-05	2.2E-04	1.2E-05	1.1E-05	1.3E-05	5.0E-06	1.4E-05
Dichlorodifluoromethane	µg/m^3	3,584	7.7E-04	3.1E-03	6.6E-03	3.9E-03	**0.59**	**0.49**	9.5E-04	1.0E-02	5.0E-04	1.1E-03	8.4E-04	3.9E-04
Ethyl acetate	µg/m^3	2,509	4.7E-03	7.0E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptane	µg/m^3	14,461	6.8E-05	9.0E-04	9.3E-05	2.1E-04	2.1E-04	5.1E-04	4.8E-04	2.2E-04	ND	ND	ND	1.7E-03
Hexane	µg/m^3	18,839	1.1E-03	1.1E-03	1.3E-04	ND	3.2E-04	5.8E-04	1.2E-03	2.4E-04	4.3E-05	1.6E-04	ND	9.6E-04
Isooctane	µg/m^3	14,917	7.0E-05	ND	1.3E-04	ND	ND	1.9E-03	1.2E-03	ND	ND	ND	ND	1.4E-03
Methyl t-Butyl Ether (MTBE)	µg/m^3	1,153	1.6E-02	6.4E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	µg/m^3	18,764 / 62,546[e]	2.1E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	µg/m^3	380	ND	ND	ND	3.2E-03	ND	ND	ND	ND	ND	ND	ND	ND
Propene	µg/m^3	91,723	ND	ND	ND	ND	ND	ND	5.3E-03	ND	ND	9.3E-05	ND	ND
Tetrahydrofuran	µg/m^3	62,828	1.3E-05	3.8E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	µg/m^3	1,392 / 2,679 [e]	1.0E-03	ND	ND	ND	ND	7.7E-03	2.7E-03	1.4E-03	ND	ND	ND	ND
Trichlorofluoromethane	µg/m^3	6,586	2.0E-04	ND	2.4E-04	ND	ND	ND	ND	2.6E-04	ND	ND	ND	ND
Cumulative Risk [d]			**3.8E-02**	**0.43**	**1.3E-02**	**1.0E-02**	**0.60**	**0.54**	**0.11**	**1.4E-02**	**2.3E-02**	**7.2E-02**	**1.1E-02**	**0.17**
Target Risk Levels			**1.00**											

Notes:

< – not detected. Listed value is the corresponding detection limit.

- = screening criteria not calculated as appropriate toxicity data not available.

Bold = identifies estimated risks and hazards that exceed the target risk level of 1 x 10^{-5} or target hazard level of 1.

[a] Listed soil vapour screening criteria derived in accordance with CCME, 2014.

[b] Estimated cancer risk = (soil vapour concentration/cancer soil vapour screening level) x 10^{-5}.

[c] Estimated hazard quotient = (soil vapour concentration/non-cancer soil vapour screening level).

[d] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

[e] Soil vapour screening criteria shows both the threshold criteria and non-threshold criteria. Target risk and hazard levels are calculated with the appropriate criteria.

Table 8: Soil Vapour Quality Assurance/Quality Control Analytical Results

	Location	VW-02		**RPD**
	Field ID	VW-02	DUPLICATE	
	Sample Date	04 Dec 2024	04 Dec 2024	
	Laboratory Report Number	CG2418081	CG2418081	
	Laboratory Sample ID	CG2418081-001	CG2418081-005	
Parameter	**Unit**			
Field Parameters				
Pressure on receipt	Inches Hg	-10.8	-11.0	2
Fixed Gases				
Oxygen	% v/v	1.76	1.73	2
Nitrogen	% v/v	62.3	61.8	1
Carbon Monoxide	% v/v	<0.050	<0.050	-
Methane	% v/v	15.3	15.3	-
Carbon Dioxide	% v/v	11.9	11.8	1
Aliphatics				
Aliphatics (C6-C8)	$\mu g/m^3$	1,560	1,570	1
Aliphatics (>C8-C10)	$\mu g/m^3$	172	195	13
Aliphatics (>C10-C12)	$\mu g/m^3$	<15	<15	-
Aliphatics (>C12-C16)	$\mu g/m^3$	<30	<30	-
Aromatics				
Aromatics (C6-C8)	$\mu g/m^3$	33	34	3
Aromatics (>C8-C10)	$\mu g/m^3$	19	21	10
Aromatics (>C10-C12)	$\mu g/m^3$	<15	<15	-
Aromatics (>C12-C16)	$\mu g/m^3$	<30	<30	-
CWS TVOC				
CWS TVOC (C6-C8)	$\mu g/m^3$	1,590	1,600	1
CWS TVOC (>C8-C10)	$\mu g/m^3$	191	216	12
CWS TVOC (>C10-C12)	$\mu g/m^3$	<15	<15	-
CWS TVOC (>C12-C16)	$\mu g/m^3$	<30	<30	-
BTEXS F1-F2				
Benzene	$\mu g/m^3$	18.4	16.9	8
Toluene	$\mu g/m^3$	21	21.6	3
Ethylbenzene	$\mu g/m^3$	3.08	3.26	6
Xylene (o)	$\mu g/m^3$	3	3.13	4
Xylenes (m & p)	$\mu g/m^3$	9.25	9.9	7
Xylenes Total	$\mu g/m^3$	12.2	13	6
Styrene	$\mu g/m^3$	<0.89	<0.94	-
Total BTEX	mg/m^3	54.7	54.8	-
F1 (C_6-C_{10})	$\mu g/m^3$	1,600	1,630	2
F1 (C_6-C_{10}) - BTEX	$\mu g/m^3$	1,540	1,580	3
F2 (C_{10}-C_{16})	$\mu g/m^3$	18	20	11
F2-NAPHTHALENE	$\mu g/m^3$	18	20	11
Volatile Organic Compounds (VOCs)				
1,1,1-Trichloroethane	$\mu g/m^3$	<1.1	<1.2	-
1,1,2,2-Tetrachloroethane	$\mu g/m^3$	<1.4	<1.5	-
1,1,2-Trichloroethane	$\mu g/m^3$	<1.1	<1.2	-
1,1-Dichloroethane	$\mu g/m^3$	<0.85	<0.89	-
1,1-Dichloroethene	$\mu g/m^3$	<0.83	<0.87	-
1,2,4-Trichlorobenzene	$\mu g/m^3$	<1.6	<1.6	-
1,2,4-Trimethylbenzene	$\mu g/m^3$	3	3	-
1,2-Dibromoethane	$\mu g/m^3$	<1.6	<1.7	-
1,2-Dichlorobenzene	$\mu g/m^3$	<1.3	<1.3	-
1,2-Dichloroethane	$\mu g/m^3$	<0.85	<0.89	-
1,2-Dichloroethene [cis]	$\mu g/m^3$	<0.83	<0.87	-
1,2-Dichloroethene [trans]	$\mu g/m^3$	<0.83	<0.87	-
1,2-Dichloropropane	$\mu g/m^3$	<1.0	<1.0	-
1,2-Dichlorotetrafluoroethane	$\mu g/m^3$	2.9	8.4	**97**
1,3,5-Trimethylbenzene	$\mu g/m^3$	<1.0	<1.1	-
1,3-Butadiene	$\mu g/m^3$	<0.46	<0.49	-
1,3-Dichlorobenzene	$\mu g/m^3$	<1.3	<1.3	-
1,3-Dichloropropene, [cis+trans]	$\mu g/m^3$	<1.9	<2.0	-
1,3-Dichloropropene [cis]	$\mu g/m^3$	<1.0	<1.0	-
1,3-Dichloropropene [trans]	$\mu g/m^3$	<1.0	<1.0	-
1,4-Dichlorobenzene	$\mu g/m^3$	<1.3	<1.3	-
1,4-Dioxane	$\mu g/m^3$	<0.76	<0.79	-
1-Methyl-4 ethyl benzene	$\mu g/m^3$	<1.0	<1.1	-
2,2,4-Trimethylpentane	$\mu g/m^3$	28.4	28.4	-
2-Butanone (MEK)	$\mu g/m^3$	4.98	5.37	8
2-Hexanone (MBK)	$\mu g/m^3$	<4.51	<4.51	-
4-Methyl-2-pentanone (MIBK)	$\mu g/m^3$	<0.86	<0.90	-

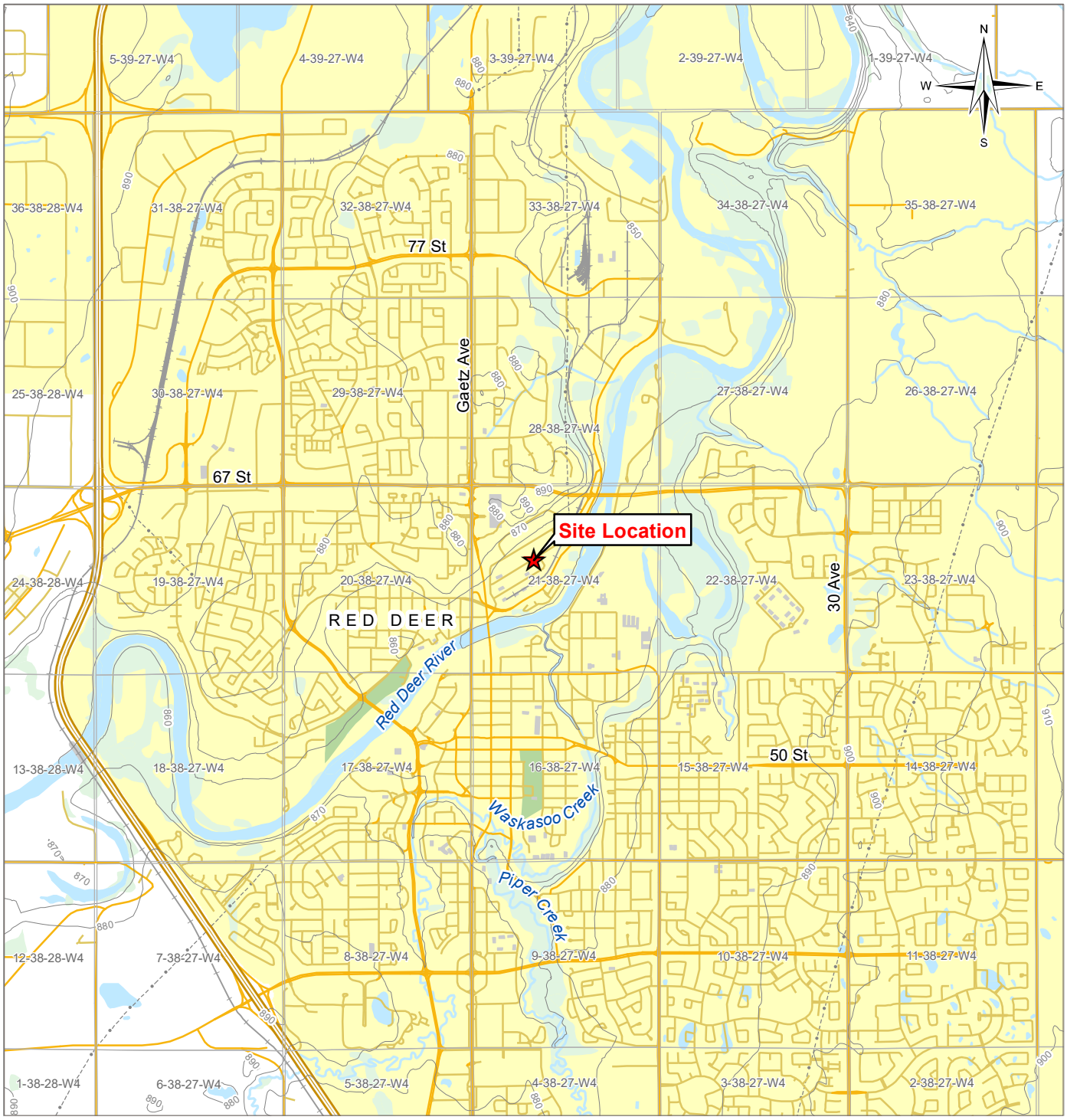
Notes:
RDL - Reportable detection limit.
RPD - RPD is Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.
"-" Indicates RPD not calculated. RPDs have only been considered where both concentrations are greater than 5 times the RDL.
N/A - Not applicable.
BOLD - RPD value greater than 50%.

Table 8: Soil Vapour Quality Assurance/Quality Control Analytical Results

	Location	VW-02		**RPD**
	Field ID	VW-02	DUPLICATE	
	Sample Date	04 Dec 2024	04 Dec 2024	
	Laboratory Report Number	CG2418081	CG2418081	
	Laboratory Sample ID	CG2418081-001	CG2418081-005	
Parameter	**Unit**			
Volatile Organic Compounds (VOCs)				
Acetone	µg/m^3	3.3	4	19
Allyl chloride	µg/m^3	<0.66	<0.69	-
Benzyl chloride	µg/m^3	<1.1	<1.1	-
Bromodichloromethane	µg/m^3	<1.4	<1.5	-
Bromoform	µg/m^3	<2.2	<2.3	-
Bromomethane	µg/m^3	<0.82	<0.85	-
Carbon disulfide	µg/m^3	<1.6	<1.7	-
Carbon tetrachloride	µg/m^3	<1.32	<1.38	-
Chlorobenzene	µg/m^3	<0.97	<1.01	-
Chloroethane	µg/m^3	<0.55	0.61	10
Chloroform	µg/m^3	<1.02	<1.07	-
Chloromethane	µg/m^3	9.64	10.1	5
Cyclohexane	µg/m^3	14.5	13.7	6
Dibromochloromethane	µg/m^3	<1.8	<1.9	-
Dichlorodifluoromethane	µg/m^3	1,670	1,740	4
Ethyl acetate	µg/m^3	<0.76	<0.79	-
Freon 113	µg/m^3	<1.6	<1.7	-
Heptane	µg/m^3	7.42	6.84	8
Hexachlorobutadiene	µg/m^3	<2.2	<2.3	-
Hexane	µg/m^3	11	9.38	16
Isooctane	µg/m^3	28.4	28.4	-
iso-Propylbenzene (cumene)	µg/m^3	<1.0	<1.1	-
Methyl t-Butyl Ether (MTBE)	µg/m^3	<0.76	<0.79	-
Methylene Chloride	µg/m^3	<0.73	<0.76	-
Naphthalene	µg/m^3	<0.58	<0.58	-
Propene	µg/m^3	<177	<184	-
Tetrachloroethene	µg/m^3	<1.4	<1.5	-
Tetrahydrofuran	µg/m^3	<0.62	<0.65	-
Trichloroethene	µg/m^3	10.7	10.5	2
Trichlorofluoromethane	µg/m^3	<1.2	<1.2	-
Vinyl acetate	µg/m^3	<1,150	<1,160	-
Vinyl bromide (bromoethene)	µg/m^3	<0.9	<1.0	-
Vinyl chloride	µg/m^3	<0.54	<0.56	-

Notes:
RDL - Reportable detection limit.
RPD - RPD is Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.
"-" Indicates RPD not calculated. RPDs have only been considered where both concentrations are greater than 5 times the RDL.
N/A - Not applicable.
BOLD - RPD value greater than 50%.

FIGURES



LEGEND

- Site Location
- Highway
- Main Road
- Local Road
- Resource/Recreational Road
- Railway
- Power Line
- Building
- Park
- Residential Area
- Contour (10 m)
- Watercourse
- Waterbody
- Wooded Area
- Urban Area

NOTES
Base data source: CanVec 1:50,000.

2025 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT RIVERSIDE LIGHT INDUSTRIAL PARK

Site Location Plan

PROJECTION	DATUM	CLIENT
3TM 114	NAD83	The City of Red Deer

Scale: 1:50,000
1 0.5 0 1
Kilometres

FILE NO. SWOP04071-05_Figure01_SiteLocation.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-EDM	MRB	SL	CW	0

DATE January 22, 2026
PROJECT NO. SWM.SWOP04071-05.006

TETRA TECH

Figure 1

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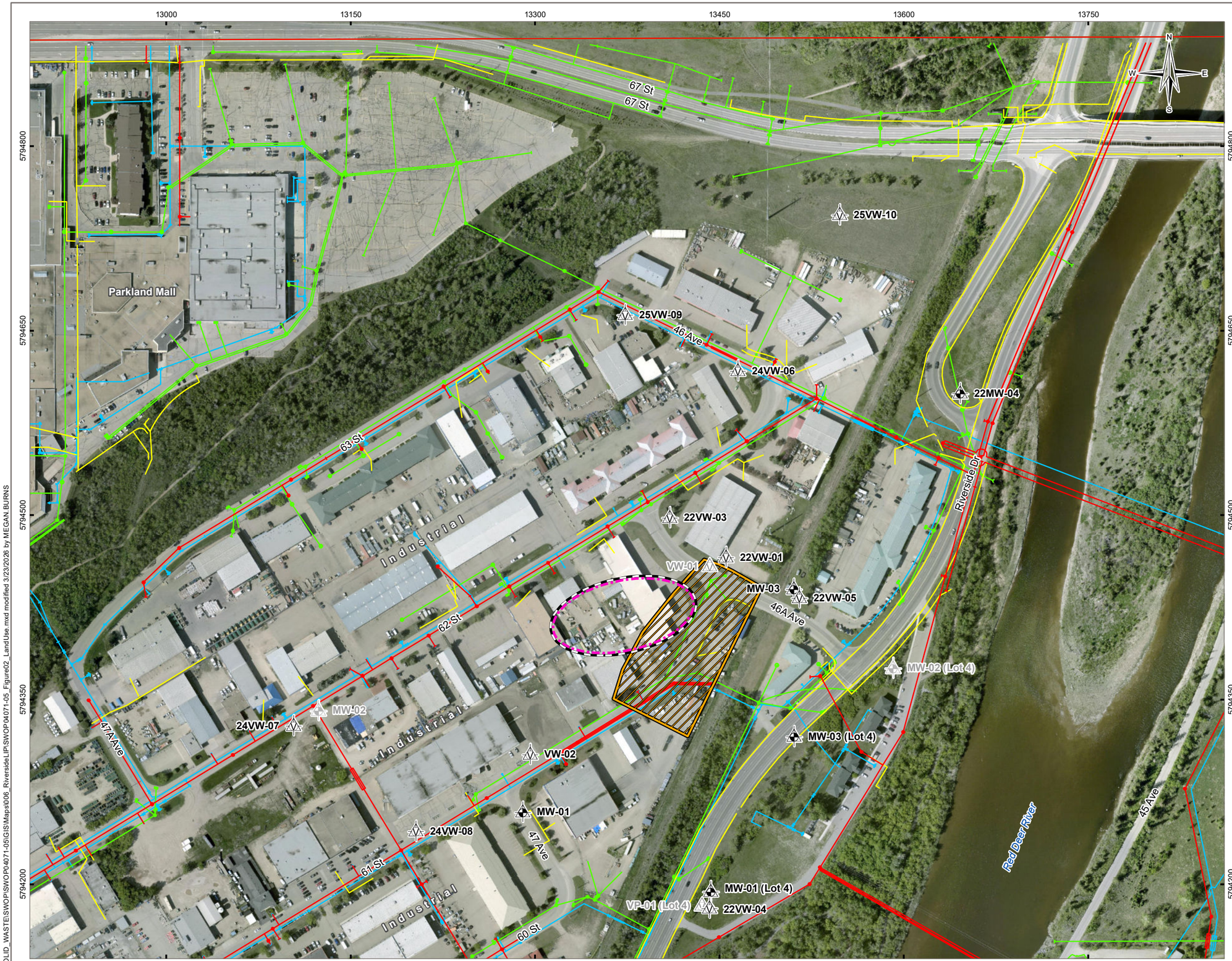

LEGEND

- Monitoring Well
- Destroyed Monitoring Well
- Vapour Well
- Vapour Well Decommissioned
- Site Boundary
- Approximate Area of Former Gravel Pit
- Historic Waste Disposal (Provided by Tiamat, 2014)

Utilities

- Electrical
- Sanitary
- Storm
- Water

NOTES

Base data source: Imagery provided by ESRI; Red Deer County (2025)
Roads from City of Red Deer Open Data, 2018
Utilities provided by City of Red Deer.
Locations have not been field verified, and should not be used for construction or other intrusive field activities.

2025 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT RIVERSIDE LIGHT INDUSTRIAL PARK

Site Plan and Surrounding Land Use

PROJECTION 3TM 114	**DATUM** NAD83		**CLIENT** THE CITY OF Red Deer
Scale: 1:3,000 — 50 25 0 50 — Metres			TETRA TECH
FILE NO. SWOP04071-05_Figure02_LandUse.mxd			
OFFICE Tt-EDM	**DWN** MRB / **CKD** SL / **APVD** CW / **REV** 0		**Figure 2**
DATE March 23, 2026	**PROJECT NO.** SWM.SWOP04071-05.006		

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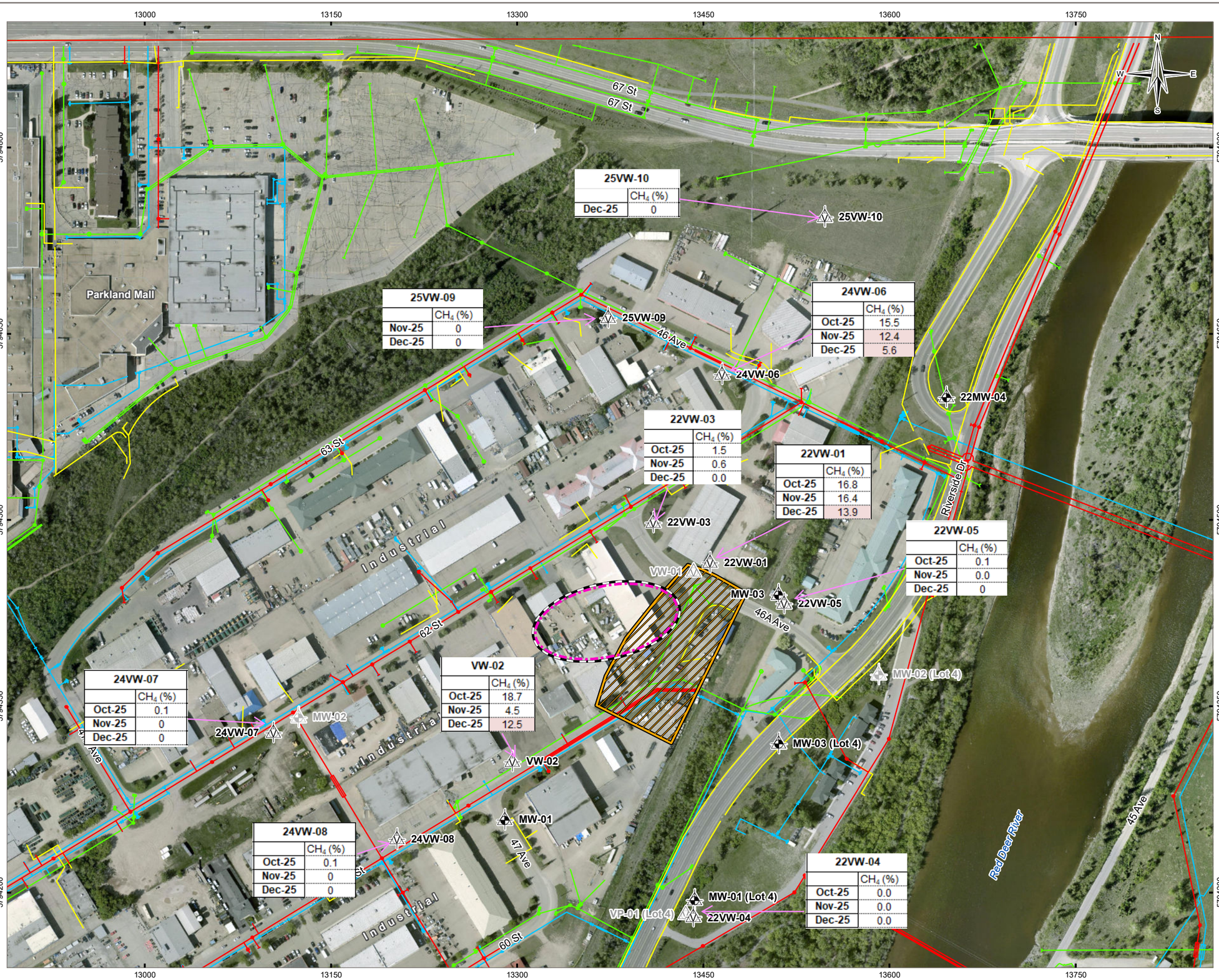

LEGEND

- Monitoring Well
- Destroyed Monitoring Well
- Vapour Well
- Vapour Well Decommissioned
- Site Boundary
- Approximate Area of Former Gravel Pit
- Historic Waste Disposal (Provided by Tiamat, 2014)

Utilities

- Electrical
- Sanitary
- Storm
- Water

Methane concentration between lower level explosive limit (5%) and upper level explosive limit (15%)

NOTES

Base data source: Imagery provided by ESRI; Red Deer County (2025)
Roads from City of Red Deer Open Data, 2018
Utilities provided by City of Red Deer.
Locations have not been field verified, and should not be used for construction or other intrusive field activities.

2025 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT RIVERSIDE LIGHT INDUSTRIAL PARK

Methane Concentrations in Soil Vapour Wells

PROJECTION: 3TM 114	DATUM: NAD83	CLIENT: The City of Red Deer	
Scale: 1:3,000 (50 25 0 50 Metres)		TETRA TECH	
FILE NO.: SWOP04071-05_Figure02_LandUse.mxd			
OFFICE: Tt-EDM	DWN: MRB / CKD: SL / APVD: CW / REV: 0		Figure 3
DATE: March 23, 2026	PROJECT NO.: SWM.SWOP04071-05.006		

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APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

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1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

SITE HISTORY, SITE SETTING, AND 2014 RISK MANAGEMENT PLAN REVIEW

1.0 SITE HISTORY

The following section summarizes the history of the Red Deer Riverside Light Industrial Park (RSLIP) site and was developed for the 2019 groundwater and soil vapour monitoring report[1].

Municipal records do not indicate a timeline for waste disposal at the site. Based on the Phase I environmental site assessment[2] (ESA), aerial photographs were reviewed and ground disturbance was observed from 1962 to 1976. Large pits and trenches were visible in the photographs prior to the commercial development. Historical information indicates the waste consisted of construction waste possibly mixed with municipal solid waste (MSW).

Historical waste disposal areas identified during the 2014 Phase II ESA[3] were beneath commercial buildings, roadways, and other infrastructure in the industrial park. The historical waste disposal area is estimated to be within the central and northeast parts of the industrial park, and the nature of how buildings above the waste footprint were constructed, or if any immediate waste removal was conducted, is not known. The estimated waste area is identified on Figure 2. The Red Deer River is located east of the site within 200 m. The status of the former landfill is listed as closed and inactive.

Results of the Phase II ESA[3] indicated that surface material consisted of sod, loam, and asphalt with varying amounts of clay fill. This material was overlying sand and clay fill. In the southwest to northeast, the fill was overlying native gravel. TH-01 encountered shale bedrock. In the north area, the fill was overlying native silt and in various other areas native sand and gravel were present beneath fill.

2.0 HISTORICAL GROUNDWATER MONITORING AND INVESTIGATION SUMMARY

Monitoring wells were installed in 2013, including three groundwater monitoring wells (MW-01 to MW-03) within and beside the waste material boundary and two soil vapour wells (VW-01 and VW-02). An additional five testholes were advanced to monitor the material and determine the extent of the waste. Monitoring wells MW-01 to MW-03 on Lot 4 to the east were installed in 2013 as part of a site investigation in response to development interest. Development on the Lot 4 site was subsequently approved by the Subdivision and Development Appeal Board.

Previous reports conducted by Tiamat Environmental Consultants Ltd. (Tiamat) include:

- Environmental Site Assessment Landfill Variance Request, 4615 Riverside Drive, Red Deer, Alberta. May 10, 2013[4].
- Phase I Environmental Site Assessment, Historic Waste Disposal Site, Riverside Light Site, The City of Red Deer. October 10, 2013[2].
- Phase II Environmental Site Assessment, Historic Waste Disposal Site, Riverside Light Industrial Park, The City of Red Deer. February 7, 2014[3].

[1] Tetra Tech Canada Inc. 2019 Groundwater and Soil Vapour Monitoring Report – Riverside Light Industrial Park. Prepared for The City of Red Deer. October 2020. Project Number: 704-SWM.SWOP04071-01.008.

[2] Tiamat Environmental Consultants Ltd. 2013. Phase I Environmental Site Assessment, Historic Waste Disposal Site, Riverside Light Industrial Park, The City of Red Deer. October 10, 2013.

[3] Tiamat Environmental Consultants Ltd. 2014. Phase II Environmental Site Assessment, Historic Waste Disposal Site, Riverside Light Industrial Park, The City of Red Deer. February 7, 2014.

[4] Tiamat Environmental Consultants Ltd. 2013. Environmental Site Assessment Landfill Variance Request, 4615 Riverside Drive. The City of Red Deer. May 10, 2013.

- Environmental Risk Management Plan, Historic Waste Disposal Sites, Riverside Light Industrial Park, The City of Red Deer. November 24, 2014[5].

The results of the site assessment at 4615 Riverside Drive (Lot 4) identified the presence of the adjacent historical waste disposal site, and included the following:

- Five boreholes were advanced and did not identify unusual conditions (odours or discolouration).
- Groundwater sampling did not identify obvious concerns; however, soil vapour samples identified detectable volatile organic compounds (VOCs) in subsurface vapour. The levels were considered to be limited and manageable, and specific potential/proposed developments and associated infrastructure were recommended to be reviewed to determine whether mitigative measures may be required to limit exposure to soil vapours.

The results of the Phase II ESA conducted by Tiamat in 2014 indicated the following:

- The historical waste disposal area extends to under a public roadway and private land. Residential properties are located west of Gaetz Avenue at more than 500 m from the previous Riverside Light disposal area and are situated approximately 20 m higher than the industrial park.
- Commercial/industrial guidelines have been established for the area.

The recommendations of the program were as follows:

- Monitor groundwater elevations and soil vapour data semi-annually for at least one hydrogeological cycle.
- Collect an additional set of soil vapour and groundwater analytical data, groundwater elevations, and volatile headspace measurement during the winter months to determine seasonal changes in soil vapour concentrations.
- Create a risk management plan (RMP) that outlines the environmental issues of the site and future land use.
- Review any available data to update the RMP.

The results of the RMP[5] indicated the following:

- Information in the preliminary quantitative risk assessment (PQRA) should be updated as new site information is obtained.
- A review of the RMP should be completed when the PQRA information is updated, if there are changes to the chemicals of potential concern (COPCs).
- The RMP should be reviewed and updated at five-year intervals.

[5] Tiamat Environmental Consultants Ltd. 2014. Environmental Risk Management Plan, Historic Waste Disposal Sites, Riverside Light Industrial Park, The City of Red Deer. November 24, 2014.

3.0 SITE SETTING

The following section presents an overview of the regional and local setting for the site.

3.1 Geology

The following sections summarize the regional and local geology.

3.1.1 Geological Setting and Stratigraphy

The City of Red Deer (the City) and site are located within the Red Deer River drainage basin with principal drainage via the Red Deer River located east of the site. The Red Deer River has incised the uplands with gentle slopes to the east and west of the river in the vicinity of the site.

The geology in the river valley is characterized by fluvial surficial sediments deposited by the Red Deer River, overlying shale and sandstone bedrock of the Paskapoo Formation.

Key elements of the geological setting are presented below from Tiamat's 2013 Phase I Report[2]:

"The fertile black soil in the region (Penhold Loam) is of alluvial lacustrine origin. The Penhold Loam is a well-drained fine sandy loam classified as Chernozemic. It is generally stone free and in natural areas, is typically 1.5 m thick, more or less.

The Quaternary deposits consist of drift deposits of clay, silt, gravel and sand. Published information indicates the banks of the Red Deer River comprise of dirty gravel with thickness ranging from 6 to 12 m, more or less.

Terrace gravels hydraulically connected to the Red Deer River are a known resource of groundwater. Surficial soils comprise largely of poorly to moderately sorted sand, silt and gravel with a varying amount of clay. The fluvial sediments generally have obscure bedding planes. Medium to coarse sized gravel with cross-bedded sand have been documented.

The Tertiary bedrock consists of sequences of alternating shales and sandstones of the Paskapoo Formation. The Paskapoo Formation underlies the gravel sediments. This non-marine bedrock is composed of mudstone, siltstone and sandstone. The formation of the Rocky Mountains subjected the Paskapoo Formation to a regional stress-induced fracture pattern."

3.1.2 Local Geology

Based on the 2014 Phase II ESA, the RSLIP consisted of 10 cm to 20 cm of sod and loam overlying the waste. The MSW included a mix of construction debris, wood, and glass. Where no MSW was observed, under the fill material was a mixture of sand and gravel to depths of 6.1 m. Native gravel and sand were under the fill material and overlying a shale bedrock.

3.2 Hydrogeology

The following sections summarize the regional and local hydrogeology.

3.2.1 Regional Hydrogeology

The regional hydrogeology is most influenced by the presence of the river sediments situated within the valley along the Red Deer River and a bedrock valley trending north-northeast in the vicinity of the site.

Key elements of the hydrogeological setting are presented below from Tiamat's 2013 Phase I report[2]:

"A significant buried valley and aquifer resource trending northeastward through the city has been partially mapped and lies in the SE 28-38-27 W4M (McKenzie Trail and Riverside). This buried valley extends to a depth of 21 m, more or less and may extend to the south into north portions of 21-28-27 W4M." Mapping by the Alberta Geological Survey[6] indicates that the valley is east of the site; however, the width of the valley is not defined.

"The dominant type of near-surface groundwater in the Paskapoo Formation in the area of assessment is sodium bicarbonate. Notable concentrations of sodium sulphate type groundwater have also been reported. The quality of groundwater for potable use is generally suitable to depths of 300 m on the west side of Red Deer and decreases to 90 m, more or less in the east.

Areas of recharge (downward flow) in unsaturated heterogeneous sediments include most areas above the river and creek valleys, whereas; the river valleys will generally exhibit discharge. The distribution of groundwater in the area can also be influenced by the local geology, topographic relief, areas of artesian flow, springs and reasonable yielding water source wells.

Numerous permanent surface water features within The City of Red Deer and vicinity include Red Deer River, Waskasoo Creek, Gaetz Lakes, Hazlett Lake, Bower Ponds (result of formerly mining gravel resources), various sloughs in the fringe areas of the city and an assortment of other smaller creeks and springs.

The regional groundwater flow is expected to follow the bedrock topography and will be influenced by the varying distribution of sediments in the river valley, which will have been deposited in various historical channels since filled in under varying depositional environments. Further, the river is in hydrologic connection with the adjacent sediments, and therefore seasonal changes in river stage will affect the local groundwater flow patterns (magnitude and direction). In seasons of higher river flow, bank storage will occur whereas in seasons of lower flow (such as late summer/fall), the storage will be released."

3.2.2 Local Hydrogeology

The RSLIP area is relatively level with a gentle slope to the southeast. Areas to the west near Gaetz Avenue and north of Highway 11 are considerably higher in elevation. Groundwater flow direction is interpreted to be to the east or southeast towards the Red Deer River. The Red Deer River flows north. No other surface waterbodies were identified within 500 m of the site.

3.3 Groundwater Resource Usage

A search of the Alberta Water Well Database conducted in January 2020 for groundwater users within a 1 km radius of the RSLIP identified 22 groundwater wells; seven of the wells are listed as domestic use, four are listed as domestic and industrial use, four are listed as industrial use, six as investigation use, and one is unknown use[7].

[6] Andriashek, L. comp. 2018. Thalwegs of Bedrock Valleys, Alberta (GIS data, line features); Alberta Energy Regulator, AER/AGS Digital Data 2018-0001.

[7] Alberta Environment and Parks. 2019. Water Well Database. Information obtained included in the 2019 monitoring report. http://www.telusgeomatics.com/tgpub/ag_water/.

The nearest water well to site is located approximately 370 m southeast of the site, near the Red Deer River. The proposed well use was listed as for investigation purposes. The water wells within a 1 km radius of the site range from 4.5 m to 235 m deep. The status and use of the surrounding groundwater wells were not confirmed and they were not field verified.

4.0 HAZARD QUOTIENTS

4.1 Review of the 2014 Hazard Quotients from the Risk Management Plan

The following section is a review of the 2014 RMP for the site that was completed by Tiamat[5]. The review of the 2014 RMP was completed for the 2019 groundwater and soil vapour monitoring report[1].

The 2014 RMP presented a proposed site-specific environmental RMP as a tool to assist with the review of future subdivision applications on lands lying within the regulated setback distance from the site (300 m). The focus was on potential ingress of soil gas for COPCs with a hazard quotient (HQ) greater than 1.0. Residential land use was considered most sensitive, and exposure ratings for other land uses (e.g., school, public institutions, commercial complexes) were considered to not be greater than residential; however, unique exceptions would have to be reviewed and addressed on a site-specific basis[8]. Further, underground utility workers and subsurface utility infrastructure were considered relevant to potential exposure.

The RMP applied a 10x factor of safety to the HQs to address uncertainties. The HQs from the RMP ranged up to 1,406 (including the 10x factor of safety). Based on these, the RMP then provided recommended generic mitigative measures based on the calculated HQs, ranging from passive to active measures, recognizing that the ultimate approach would require a design professional for the proposed development.

Following the 2014 RMP, the Canadian Council of Ministers of the Environment (CCME) released the document "A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours"[9], designed to provide guidance for developing site-appropriate soil vapour quality guidelines. The guidelines developed using the methods outlined in the CCME document were used for this current study and are included with the vapour sampling results in Table 4. HQs were calculated using estimated dose (based on concentrations measured at the site) and divided by tolerable daily intake. Soil vapour concentrations from the Phase II ESA conducted in 2013 were not compared to soil vapour quality guidelines; however, spot checks of five target compounds with the highest HQs in the 2013 work (vinyl chloride, tetrachloroethylene, chloromethane, trichloroethylene, and chloroform) identified that none of the 2013 concentrations would have unacceptable HQs using the updated CCME methodology.

The 2014 RMP was prepared concurrent to RMPs at several other former City landfills, and a common set of mitigative measures was applied based on the HQs. Subsequent to the 2014 RMP and to the release of the CCME Protocol document, the City undertook additional assessment at another former City Landfill (Montfort); as part of that work, their consultant XCG Consulting Limited (XCG) revised the 2014 RMP criteria ranges for each generic mitigative measure category to include a Cancer Risk range to allow comparison of the 2014 RMP ranges with the HQ and Cancer Risks calculated by XCG[8]. From that work, XCG identified the following generic mitigative measures

[8] XCG Consulting Limited. 2018. Vapour Intrusion Assessment and Environmental Monitoring Report, prepared for the City of Red Deer's Montfort Landfill.

[9] Canadian Council of Ministers of the Environment. 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Exposure Protection of Human Exposures via Inhalation of Vapours. Available online: http://ceqg-rcqe.ccme.ca/en/index.html.

for developments within a 300 m setback of these landfills (based on Tiamat 2014), and these have been adopted for this site.

Passive Measures

1. Passive Measures – Level A: for Cancer Risk of > $1E^{-5}$ and < $5E^{-5}$ and/or HQ >0.2 and <1.

   Compacted clay liner with a minimum thickness of 1 m and confirmed maximum hydraulic conductivity of 10^{-6} cm/sec.

2. Passive Measures – Level B: for Cancer Risk of > $5E^{-5}$ and < $5E^{-4}$ and/or HQ >1 and <5.

   Synthetic liner with type of material, thickness and installation details dependent on the design professional.

3. Passive Measures – Level C: for Cancer Risk of > $5E^{-4}$ and < $1E^{-3}$ and/or HQ >5 and <50.

   Passive sub-slab depressurization (SSD) system with a minimum depressurization of 4 Pa to 10 Pa. In some instances (such as a pervious subgrade), the actual depressurization necessary may require an active SSD or alternative active ventilation system.

Active Measures

Field verify the presence of the identified chemicals of concern and other potential chemicals in the soil gas state at the development site. If confirmed, determine the most appropriate manner to prevent soil vapour intrusion.

1. Active Measures – Level D: for Cancer Risk of > $1E^{-3}$ and < $2E^{-3}$ and/or HQ values >50 and <100.

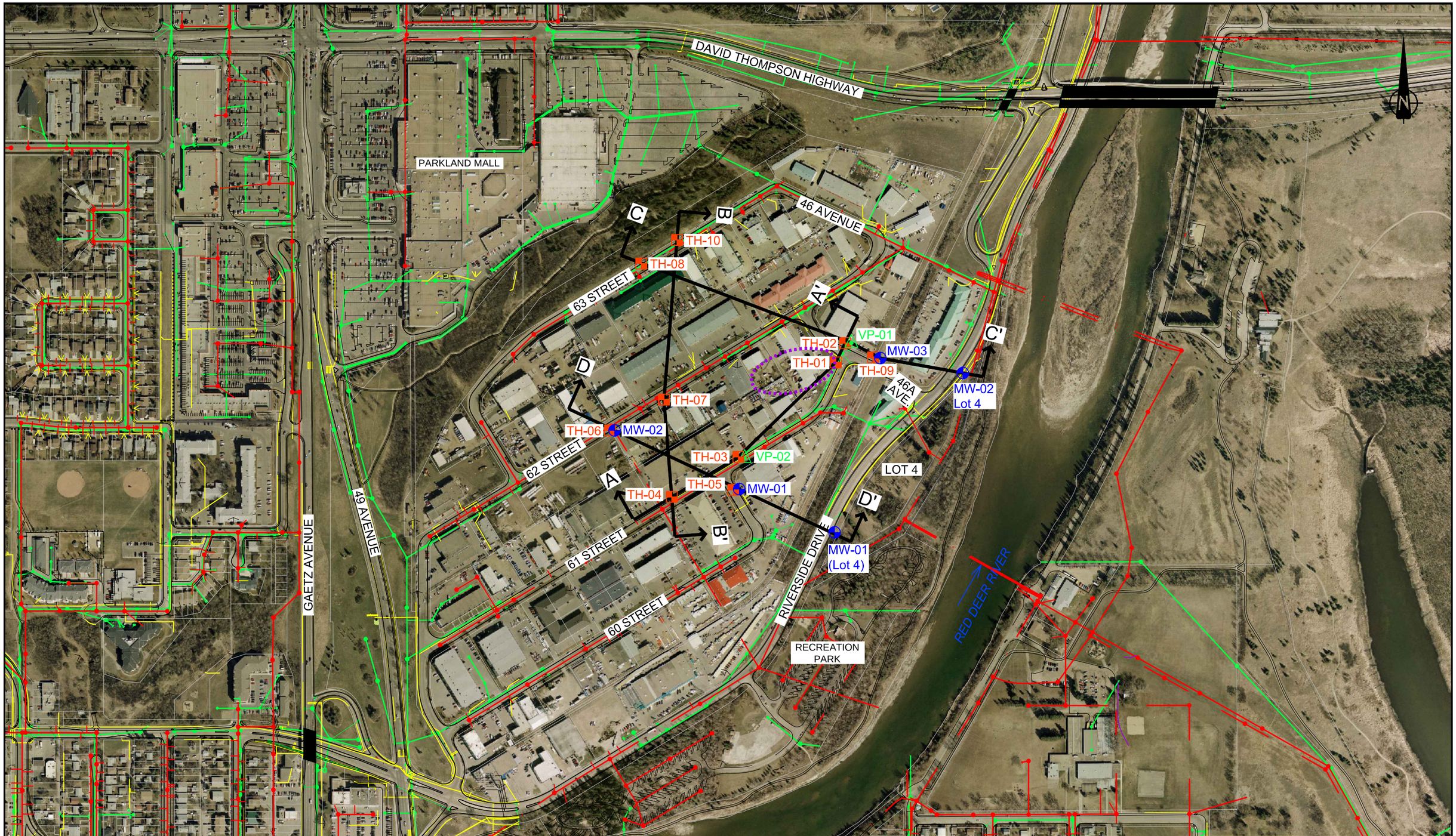
   Active SSD must be configured to compensate for depressurization of the building and have adequate negative pressure gradients across the entire footprint of the foundation.

2. Active Measures – Level E: for Cancer Risk of >$2E^{-3}$ and/or HQ values >100.

   Installation of geomembrane and active soil vapour extraction with system fault notification alarm.

APPENDIX C

CROSS-SECTIONS (TIAMAT 2014)



SOURCE
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0 50 100 200m
Scale 1:5000

PHASE II TEST LOCATIONS
MW-## GROUNDWATER MONITORING WELL (3)
TH-## TESTHOLE (10)
VW-## SOIL VAPOUR MONITORING WELL (2)

LEGEND
HISTORIC WASTE DISPOSAL
LOT BOUNDARY
CROSS SECTION LOCATION
ELECTRICAL
SANITARY
STORM
WATER

NOTE:
LOCATION OF BURIED UTILITIES ARE APPROXIMATE, ACTUAL LOCATIONS OF THE SHALLOW UTILITIES AND ANY OTHER UTILITIES SHOULD BE VERIFIED PRIOR TO ANY GROUND DISTURBANCE ACTIVITY.

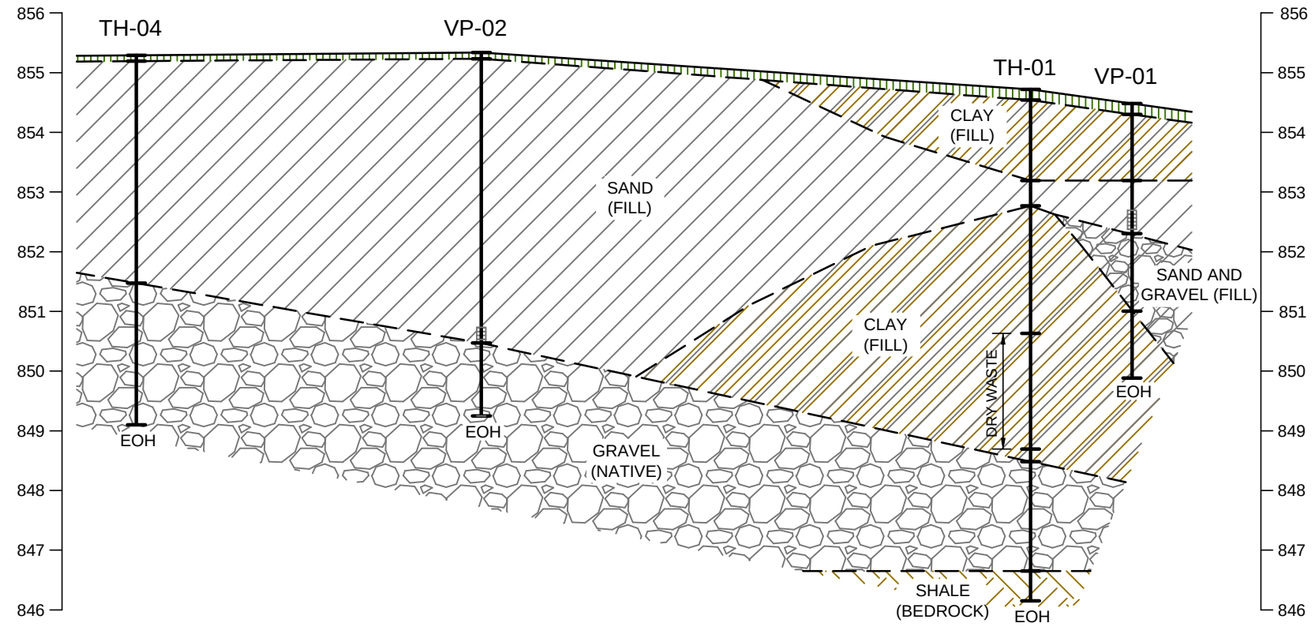
CLIENT: THE CITY OF RED DEER

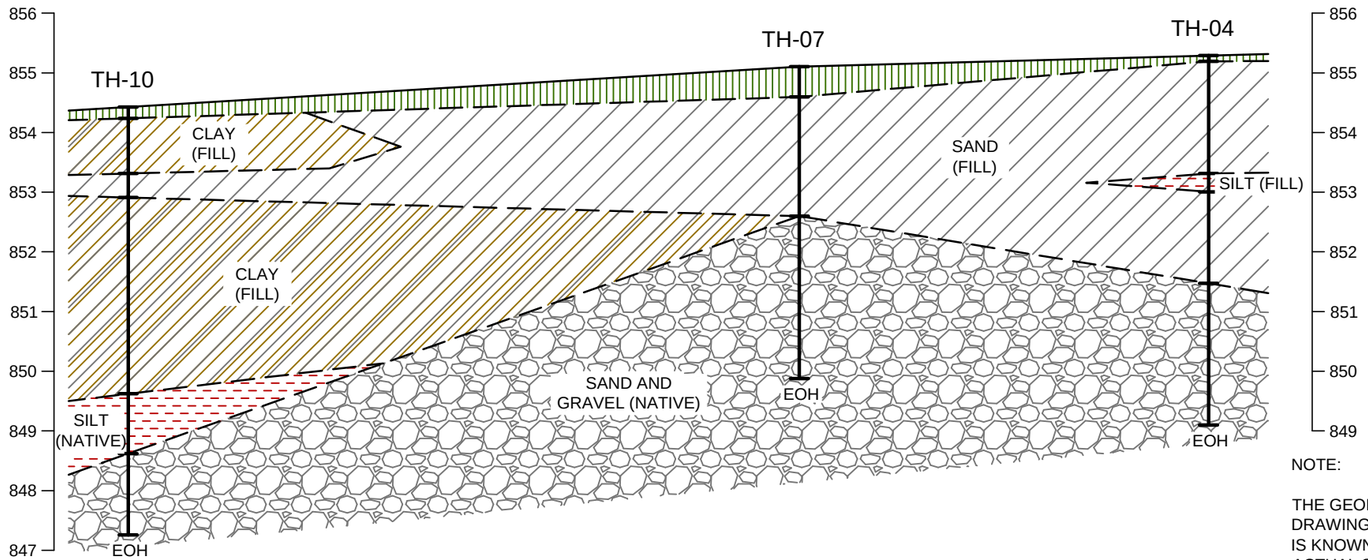
PROJECT: ENVIRONMENTAL RISK MANAGEMENT PLAN
HISTORIC WASTE DISPOSAL SITE
RIVERSIDE LIGHT INDUSTRIAL PARK

TITLE: SITE PLAN SHOWING INTERPRETED EXTENT OF WASTE

Tiamat Environmental Consultants Ltd.

SCALE:	DATE:	PROJECT NO.:	FIGURE NO.:
1 : 5000	June 1/14	12-435	FIGURE 2
DRAWN BY: LCH	CHECKED BY: LTM	CAD FILE NO.: ERMP v1.02.dwg	





NOTE:

THE GEOLOGIC AND STRATIGRAPHIC SECTIONS SHOWN ON THIS DRAWING ARE INTERPRETED FROM BOREHOLE LOGS. STRATIGRAPHY IS KNOWN WITH CERTAINTY ONLY AT THE BOREHOLE LOCATIONS. ACTUAL STRATIGRAPHY AND GEOLOGIC CONDITIONS BETWEEN BOREHOLES MAY VARY FROM THAT INDICATED ON THIS DRAWING.

0 2 5 10m
Vertical Scale 1:200

0 20 50 100m
Horizontal Scale 1:2000

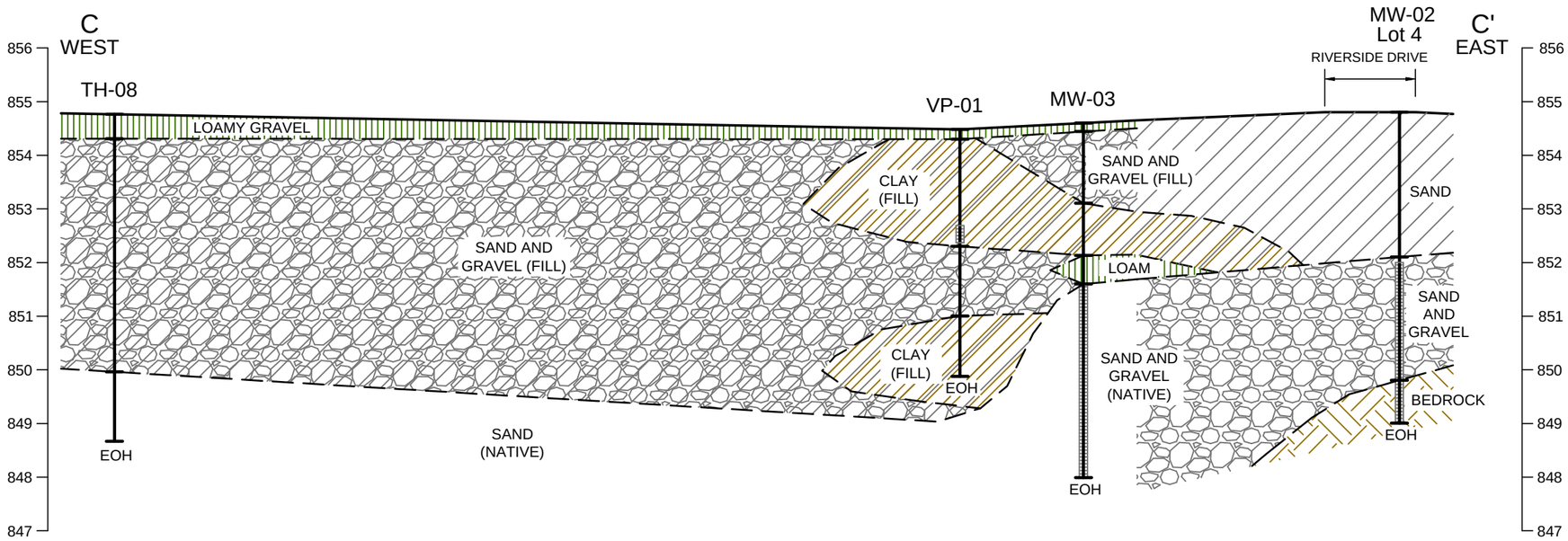
CLIENT: THE CITY OF RED DEER

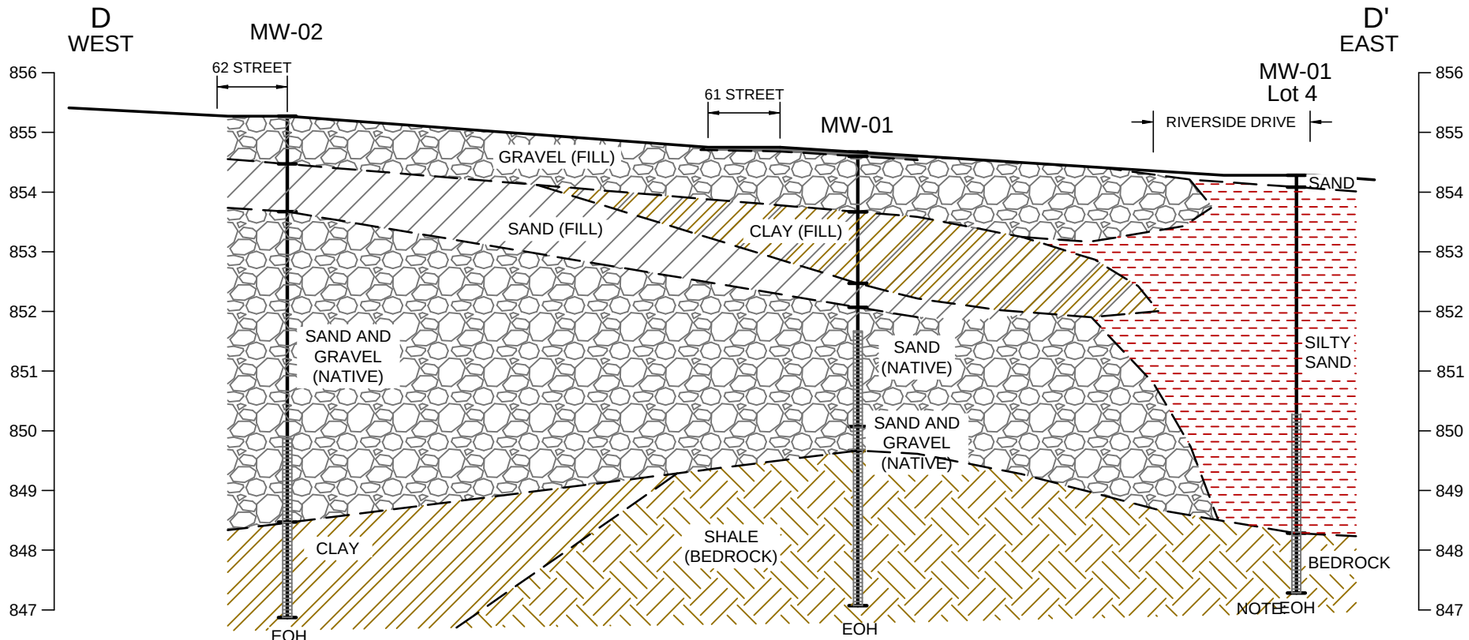
PROJECT: ENVIRONMENTAL RISK MANAGEMENT PLAN
HISTORIC WASTE DISPOSAL SITE
RIVERSIDE LIGHT INDUSTRIAL PARK

TITLE: CROSS SECTION A - A` AND B - B'

Tiamat Environmental Consultants Ltd.

SCALE:	DATE:	PROJECT NO.:	FIGURE NO.:
AS SHOWN	June 1/14	12-435	FIGURE 3A
DRAWN BY: LCH	CHECKED BY: LTM	CAD FILE NO.: ERMP Sections v1.02	





NOTE:

THE GEOLOGIC AND STRATIGRAPHIC SECTIONS SHOWN ON THIS DRAWING ARE INTERPRETED FROM BOREHOLE LOGS. STRATIGRAPHY IS KNOWN WITH CERTAINTY ONLY AT THE BOREHOLE LOCATIONS. ACTUAL STRATIGRAPHY AND GEOLOGIC CONDITIONS BETWEEN BOREHOLES MAY VARY FROM THAT INDICATED ON THIS DRAWING.

0 2 5 10m

Vertical Scale 1:200

0 20 50 100m

Horizontal Scale 1:2000

CLIENT: THE CITY OF RED DEER

PROJECT: ENVIRONMENTAL RISK MANAGEMENT PLAN
HISTORIC WASTE DISPOSAL SITE
RIVERSIDE LIGHT INDUSTRIAL PARK

TITLE: CROSS SECTIONS C - C` AND D - D`

Tiamat Environmental Consultants Ltd.

SCALE:	DATE:	PROJECT NO.:	FIGURE NO.:
AS SHOWN	Feb. 5/15	12-435	FIGURE 3B
DRAWN BY: LCH	CHECKED BY: LTM	CAD FILE NO.: ERMP Sections v1.04	

APPENDIX D

LABORATORY ANALYTICAL REPORTS

CERTIFICATE OF ANALYSIS

Work Order	:	**CG2516682**			
Amendment	:	**1**			
Client	:	**Tetra Tech Canada Inc.**	Laboratory	:	ALS Environmental - Calgary
Contact	:	Kara Heckert	Account Manager	:	Patryk Wojciak
Address	:	110, 140 Quarry Park Blvd SE Calgary Alberta Canada T2C 3G3	Address	:	2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	:	204 954 6832	E-mail	:	patryk.wojciak@alsglobal.com
Project	:	SWM.SWOP04071-05.006	Telephone	:	+1 403 407 1800
PO	:	SWM.SWOP04071-05.006	Date Samples Received	:	13-Nov-2025 15:25
C-O-C number	:	CORD_RSLIP VWs	Date Analysis Commenced	:	18-Nov-2025
Sampler	:	WV	Issue Date	:	19-May-2026 09:55
Site	:	----			
Quote number	:	CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites			
No. of samples received	:	1			
No. of samples analysed	:	1			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Air Quality, Waterloo, Ontario
David Tremblett	VOC Section Supervisor	Air Quality, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
Inches Hg	inches of mercury
ppbv	parts per billion (volume/volume)
µg/m³	micrograms per cubic metre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (19-May-2026): Sample ID updated.

Sample Comments

Sample	*Client Id*	*Comment*
CG2516682-001	25VW-09	RRR - Detection Limit raised due to ALS-DQO failure.

Qualifiers

Qualifier	Description
AI	Analytical interferences may be present. Result may be biased high.
RRR	Refer to report comments for issues regarding this analysis.

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Field Tests										
ID, batch proof	----	EF001/WT	-	-		250927.104	----	----	----	----
ID, canister	----	EF001/WT	-	-		01400-0738	----	----	----	----
ID, regulator	----	EF001/WT	-	-		G431	----	----	----	----
Pressure on receipt	----	EF001/WT	0.10	inches Hg		-8.38	----	----	----	----
Permanent Gases										
Carbon dioxide	124-38-9	E629B-H/WT	0.050	%		7.98	----	----	----	----
Carbon monoxide	630-08-0	E629B-H/WT	0.050	%		<0.050	----	----	----	----
Methane	74-82-8	E629B-H/WT	0.050	%		<0.050	----	----	----	----
Nitrogen	7727-37-9	E629B-H/WT	1.0	%		71.5	----	----	----	----
Oxygen	7782-44-7	E629B-H/WT	0.10	%		14.1	----	----	----	----
Volatile Organic Compounds										
Acetone	67-64-1	E621B/WT	1.0	ppbv		7.8	----	----	----	----
Acetone	67-64-1	EC621B/WT	2.4	µg/m³		18.5	----	----	----	----
Allyl chloride	107-05-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Allyl chloride	107-05-1	EC621B/WT	0.63	µg/m³		<0.63	----	----	----	----
Benzene	71-43-2	E621B/WT	0.10	ppbv		0.22	----	----	----	----
Benzene	71-43-2	EC621B/WT	0.32	µg/m³		0.70	----	----	----	----
Benzyl chloride	100-44-7	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Benzyl chloride	100-44-7	EC621B/WT	1.0	µg/m³		<1.0	----	----	----	----
Bromodichloromethane	75-27-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Bromodichloromethane	75-27-4	EC621B/WT	1.3	µg/m³		<1.3	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Volatile Organic Compounds										
Bromoform	75-25-2	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Bromoform	75-25-2	EC621B/WT	2.1	µg/m³		<2.1	----	----	----	----
Bromomethane	74-83-9	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Bromomethane	74-83-9	EC621B/WT	0.78	µg/m³		<0.78	----	----	----	----
Butadiene, 1,3-	106-99-0	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Butadiene, 1,3-	106-99-0	EC621B/WT	0.44	µg/m³		<0.44	----	----	----	----
Carbon disulfide	75-15-0	E621B/WT	0.50	ppbv		13.1	----	----	----	----
Carbon disulfide	75-15-0	EC621B/WT	1.6	µg/m³		40.8	----	----	----	----
Carbon tetrachloride	56-23-5	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Carbon tetrachloride	56-23-5	EC621B/WT	1.30	µg/m³		<1.26	----	----	----	----
Chlorobenzene	108-90-7	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Chlorobenzene	108-90-7	EC621B/WT	0.92	µg/m³		<0.92	----	----	----	----
Chloroethane	75-00-3	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Chloroethane	75-00-3	EC621B/WT	0.53	µg/m³		<0.53	----	----	----	----
Chloroform	67-66-3	E621B/WT	0.20	ppbv		0.99	----	----	----	----
Chloroform	67-66-3	EC621B/WT	0.98	µg/m³		4.83	----	----	----	----
Chloromethane	74-87-3	E621B/WT	0.20	ppbv		0.20	----	----	----	----
Chloromethane	74-87-3	EC621B/WT	0.41	µg/m³		0.41	----	----	----	----
Cyclohexane	110-82-7	E621B/WT	0.20	ppbv		0.79	----	----	----	----
Cyclohexane	110-82-7	EC621B/WT	0.69	µg/m³		2.72	----	----	----	----
Dibromochloromethane	124-48-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Volatile Organic Compounds										
Dibromochloromethane	124-48-1	EC621B/WT	1.7	µg/m³		<1.7	----	----	----	----
Dibromoethane, 1,2-	106-93-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dibromoethane, 1,2-	106-93-4	EC621B/WT	1.5	µg/m³		<1.5	----	----	----	----
Dichlorobenzene, 1,2-	95-50-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichlorobenzene, 1,2-	95-50-1	EC621B/WT	1.2	µg/m³		<1.2	----	----	----	----
Dichlorobenzene, 1,3-	541-73-1	E621B/WT	0.20	ppbv		0.25	----	----	----	----
Dichlorobenzene, 1,3-	541-73-1	EC621B/WT	1.2	µg/m³		1.5	----	----	----	----
Dichlorobenzene, 1,4-	106-46-7	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichlorobenzene, 1,4-	106-46-7	EC621B/WT	1.2	µg/m³		<1.2	----	----	----	----
Dichlorodifluoromethane	75-71-8	E621B/WT	0.20	ppbv		0.79	----	----	----	----
Dichlorodifluoromethane	75-71-8	EC621B/WT	1.0	µg/m³		3.9	----	----	----	----
Dichloroethane, 1,1-	75-34-3	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichloroethane, 1,1-	75-34-3	EC621B/WT	0.81	µg/m³		<0.81	----	----	----	----
Dichloroethane, 1,2-	107-06-2	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichloroethane, 1,2-	107-06-2	EC621B/WT	0.81	µg/m³		<0.81	----	----	----	----
Dichloroethylene, 1,1-	75-35-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichloroethylene, 1,1-	75-35-4	EC621B/WT	0.79	µg/m³		<0.79	----	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	EC621B/WT	0.79	µg/m³		<0.79	----	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	EC621B/WT	0.79	µg/m³		<0.79	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID				
					25VW-09 ----	----	----	----	----
					Client sampling date / time				
					12-Nov-2025 12:16	----	----	----	----
					CG2516682-001	----	----	----	----
					Result	----	----	----	----
Volatile Organic Compounds									
Dichloromethane	75-09-2	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dichloromethane	75-09-2	EC621B/WT	0.69	µg/m³	<0.69	----	----	----	----
Dichloropropane, 1,2-	78-87-5	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dichloropropane, 1,2-	78-87-5	EC621B/WT	0.9	µg/m³	<0.9	----	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	EC621B/WT	0.9	µg/m³	<0.9	----	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	E621B/WT	0.30	ppbv	<0.30	----	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	EC621B/WT	1.3	µg/m³	<1.8	----	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	EC621B/WT	0.9	µg/m³	<0.9	----	----	----	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	EC621B/WT	1.4	µg/m³	<1.4	----	----	----	----
Dioxane, 1,4-	123-91-1	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Dioxane, 1,4-	123-91-1	EC621B/WT	0.72	µg/m³	<0.72	----	----	----	----
Ethyl acetate	141-78-6	E621B/WT	0.20	ppbv	<0.20	----	----	----	----
Ethyl acetate	141-78-6	EC621B/WT	0.72	µg/m³	<0.72	----	----	----	----
Ethylbenzene	100-41-4	E621B/WT	0.10	ppbv	0.75	----	----	----	----
Ethylbenzene	100-41-4	EC621B/WT	0.43	µg/m³	3.26	----	----	----	----
Ethyltoluene, 4-	622-96-8	E621B/WT	0.20	ppbv	0.23	----	----	----	----
Ethyltoluene, 4-	622-96-8	EC621B/WT	1.0	µg/m³	1.1	----	----	----	----
Heptane, n-	142-82-5	E621B/WT	0.20	ppbv	<0.20	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Volatile Organic Compounds										
Heptane, n-	142-82-5	EC621B/WT	0.82	µg/m³		<0.82	----	----	----	----
Hexachlorobutadiene	87-68-3	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Hexachlorobutadiene	87-68-3	EC621B/WT	2.1	µg/m³		<2.1	----	----	----	----
Hexane, n-	110-54-3	E621B/WT	0.20	ppbv		0.84	----	----	----	----
Hexane, n-	110-54-3	EC621B/WT	0.70	µg/m³		2.96	----	----	----	----
Hexanone, 2-	591-78-6	E621B/WT	1.0	ppbv		<1.0	----	----	----	----
Hexanone, 2-	591-78-6	EC621B/WT	4.10	µg/m³		<4.10	----	----	----	----
Isopropylbenzene	98-82-8	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Isopropylbenzene	98-82-8	EC621B/WT	1.0	µg/m³		<1.0	----	----	----	----
Methyl ethyl ketone [MEK]	78-93-3	E621B/WT	0.20	ppbv		<0.70 RRR	----	----	----	----
Methyl ethyl ketone [MEK]	78-93-3	EC621B/WT	0.59	µg/m³		<2.06	----	----	----	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Methyl isobutyl ketone [MIBK]	108-10-1	EC621B/WT	0.82	µg/m³		<0.82	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	EC621B/WT	0.72	µg/m³		<0.72	----	----	----	----
Naphthalene	91-20-3	E621B/WT	0.10	ppbv		<0.10	----	----	----	----
Naphthalene	91-20-3	EC621B/WT	0.52	µg/m³		<0.52	----	----	----	----
Propylene	115-07-1	E621B/WT	0.20	ppbv		4.96 AI	----	----	----	----
Propylene	115-07-1	EC621B/WT	0.34	µg/m³		8.54	----	----	----	----
Styrene	100-42-5	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Styrene	100-42-5	EC621B/WT	0.85	µg/m³		<0.85	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Volatile Organic Compounds										
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Tetrachloroethane, 1,1,2,2-	79-34-5	EC621B/WT	1.4	µg/m³		<1.4	----	----	----	----
Tetrachloroethylene	127-18-4	E621B/WT	0.20	ppbv		4.94	----	----	----	----
Tetrachloroethylene	127-18-4	EC621B/WT	1.4	µg/m³		33.5	----	----	----	----
Tetrahydrofuran	109-99-9	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Tetrahydrofuran	109-99-9	EC621B/WT	0.59	µg/m³		<0.59	----	----	----	----
Toluene	108-88-3	E621B/WT	0.10	ppbv		18.9	----	----	----	----
Toluene	108-88-3	EC621B/WT	0.38	µg/m³		71.2	----	----	----	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	EC621B/WT	1.5	µg/m³		<1.5	----	----	----	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trichlorobenzene, 1,2,4-	120-82-1	EC621B/WT	1.5	µg/m³		<1.5	----	----	----	----
Trichloroethane, 1,1,1-	71-55-6	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trichloroethane, 1,1,1-	71-55-6	EC621B/WT	1.1	µg/m³		<1.1	----	----	----	----
Trichloroethane, 1,1,2-	79-00-5	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trichloroethane, 1,1,2-	79-00-5	EC621B/WT	1.1	µg/m³		<1.1	----	----	----	----
Trichloroethylene	79-01-6	E621B/WT	0.20	ppbv		3.78	----	----	----	----
Trichloroethylene	79-01-6	EC621B/WT	1.1	µg/m³		20.3	----	----	----	----
Trichlorofluoromethane	75-69-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trichlorofluoromethane	75-69-4	EC621B/WT	1.1	µg/m³		<1.1	----	----	----	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B/WT	0.20	ppbv		0.81	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
						CG2516682-001	----	----	----	----
						Result	----	----	----	----
Volatile Organic Compounds										
Trimethylbenzene, 1,2,4-	95-63-6	EC621B/WT	1.0	µg/m³		4.0	----	----	----	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trimethylbenzene, 1,3,5-	108-67-8	EC621B/WT	1.0	µg/m³		<1.0	----	----	----	----
Trimethylpentane, 2,2,4-	540-84-1	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Trimethylpentane, 2,2,4-	540-84-1	EC621B/WT	0.9	µg/m³		<0.9	----	----	----	----
Vinyl acetate	108-05-4	E621B/WT	0.50	ppbv		<0.50	----	----	----	----
Vinyl acetate	108-05-4	EC621B/WT	1.8	µg/m³		<1.8	----	----	----	----
Vinyl bromide	593-60-2	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Vinyl bromide	593-60-2	EC621B/WT	0.9	µg/m³		<0.9	----	----	----	----
Vinyl chloride	75-01-4	E621B/WT	0.20	ppbv		<0.20	----	----	----	----
Vinyl chloride	75-01-4	EC621B/WT	0.51	µg/m³		<0.51	----	----	----	----
Xylene, m+p-	179601-23-1	E621B/WT	0.20	ppbv		2.58	----	----	----	----
Xylene, m+p-	179601-23-1	EC621B/WT	0.87	µg/m³		11.2	----	----	----	----
Xylene, o-	95-47-6	E621B/WT	0.10	ppbv		1.19	----	----	----	----
Xylene, o-	95-47-6	EC621B/WT	0.43	µg/m³		5.17	----	----	----	----
Xylenes, total	1330-20-7	E621B/WT	0.30	ppbv		3.77	----	----	----	----
Xylenes, total	1330-20-7	EC621B/WT	1.3	µg/m³		16.4	----	----	----	----
BTEX, total	----	E621B/WT	0.30	ppbv		23.6	----	----	----	----
BTEX, total	----	EC621B/WT	1.2	µg/m³		91.6	----	----	----	----
Hydrocarbons										
Aliphatic (C10-C12)	----	E593C/WT	15	µg/m³		260	----	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	----	----	----	----
					Client sampling date / time	12-Nov-2025 12:16	----	----	----	----
					CG2516682-001	----	----	----	----	----
					Result	----	----	----	----	----
Hydrocarbons										
Aliphatic (C12-C16)	----	E593C/WT	30	µg/m³	50	----	----	----	----	----
Aliphatic (C6-C8)	----	E593C/WT	15	µg/m³	120	----	----	----	----	----
Aliphatic (C8-C10)	----	E593C/WT	15	µg/m³	350	----	----	----	----	----
Aromatic (C10-C12)	----	E593C/WT	15	µg/m³	<15	----	----	----	----	----
Aromatic (C12-C16)	----	E593C/WT	30	µg/m³	<30	----	----	----	----	----
Aromatic (C6-C8)	----	E593C/WT	15	µg/m³	65	----	----	----	----	----
Aromatic (C8-C10)	----	E593C/WT	15	µg/m³	30	----	----	----	----	----
F1 (C6-C10)	----	E593A/WT	15	µg/m³	550	----	----	----	----	----
F1-BTEX	----	EC592A/WT	15	µg/m³	458	----	----	----	----	----
F2 (C10-C16)	----	E593A/WT	15	µg/m³	361	----	----	----	----	----
F2-Naphthalene	----	EC593D/WT	15	µg/m³	361	----	----	----	----	----
TVOC (C10-C12)	----	E593C/WT	15	µg/m³	260	----	----	----	----	----
TVOC (C12-C16)	----	E593C/WT	30	µg/m³	50	----	----	----	----	----
TVOC (C6-C8)	----	E593C/WT	15	µg/m³	185	----	----	----	----	----
TVOC (C8-C10)	----	E593C/WT	15	µg/m³	380	----	----	----	----	----
Hydrocarbons Surrogates										
Bromofluorobenzene, 4-	460-00-4	E593C/WT	1	%	95.6	----	----	----	----	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E621B/WT	0.20	%	97.2	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

ALS Canada Ltd.

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Quality Control Interpretive Report

Work Order	:	**CG2516682**		
Amendment	:	**1**		
Client	:	Tetra Tech Canada Inc.	Laboratory	: ALS Environmental - Calgary
Contact	:	Kara Heckert	Account Manager	: Patryk Wojciak
Address	:	110, 140 Quarry Park Blvd SE Calgary AB Canada T2C 3G3	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	:	204 954 6832	Telephone	: +1 403 407 1800
Project	:	SWM.SWOP04071-05.006	Date Samples Received	: 13-Nov-2025 15:25
PO	:	SWM.SWOP04071-05.006	Issue Date	: 19-May-2026 09:55
C-O-C number	:	CORD_RSLIP VWs		
Sampler	:	WV		
Site	:	----		
Quote number	:	CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites		
No. of samples received	:	1		
No. of samples analysed	:	1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Laboratory Control Sample Duplicate (LCSD) outliers occur
- No Matrix Spike outliers occur.
- No Matrix Spike Duplicate (MSD) outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and/or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Air

Evaluation: × = Holding time exceedance; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client sample ID	ALS Sample ID	QC Lot	Method	Sampling Date	Extraction / Preparation				Analysis			
					Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
						Rec	Actual			Rec	Actual	
Field Tests : Air Canister Information												
Air Canister												
25VW-09	001	2346469	EF001	12-Nov-2025	----	----	----		20-Nov-2025	----	----	
Hydrocarbons : TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)												
Air Canister												
25VW-09	001	2349659	E593C	12-Nov-2025	----	----	----		21-Nov-2025	30 days	9 days	✓
Hydrocarbons : TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)												
Air Canister												
25VW-09	001	2349658	E593A	12-Nov-2025	----	----	----		21-Nov-2025	30 days	9 days	✓
Permanent Gases : Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)												
Air Canister												
25VW-09	001	2342050	E629B-H	12-Nov-2025	----	----	----		18-Nov-2025	30 days	6 days	✓
Volatile Organic Compounds : VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)												
Air Canister												
25VW-09	001	2349629	E621B	12-Nov-2025	----	----	----		21-Nov-2025	30 days	9 days	✓

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: Air

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method / Lab	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2349658	1	14	7.1	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2349659	1	14	7.1	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2349629	1	14	7.1	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2342050	1	15	6.7	5.0	✓
Laboratory Control Samples (LCS)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2349658	1	14	7.1	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2349659	1	14	7.1	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2349629	1	14	7.1	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2342050	1	15	6.7	5.0	✓
Method Blanks (MB)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2349658	1	14	7.1	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2349659	1	14	7.1	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2349629	1	14	7.1	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2342050	1	15	6.7	5.0	✓
Air Canister Information	EF001 / WT	2346469	1	14	7.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Air Canister Information	EF001 ALS Environmental - Waterloo	Air	In-house	Air canister information provided by client and recorded on ALS report may affect the validity of results.
F1-BTEX in Canisters or Bags GC-MS (µg/m3)	EC592A ALS Environmental - Waterloo	Air	unit conversion	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
F2-Naphthalene in Canisters by GC-MS (ug/m3)	EC593D ALS Environmental - Waterloo	Air	CCME PHC	F2-PAH = CCME Fraction 2 (C10-C16) minus Naphthalene
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H ALS Environmental - Waterloo	Air	EPA Method 3C & ASTM D1946 (mod)	This analysis is performed using procedures adapted from EPA Method 3C & ASTM D1946. Air samples are collected into cleaned evacuated canisters. A volume of air is removed from the canister and injected by means of a gas-sampling/backflush valve onto a series of packed GC columns and measured using a thermal conductivity detector (TCD). Oxygen is not separated from Argon. Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Total Volatile Organic Compounds (TVOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Total Volatile Organic Compounds (TVOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Volatile Organic Compounds (VOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ug/m3)	EC621B ALS Environmental - Waterloo	Air	unit conversion	Convert ppbV to ug/m3

QUALITY CONTROL REPORT

Work Order	: **CG2516682**		
Amendment	: **1**		
Client	: Tetra Tech Canada Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Kara Heckert	Account Manager	: Patryk Wojciak
Address	: 110, 140 Quarry Park Blvd SE Calgary AB Canada T2C 3G3	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 204 954 6832	Telephone	: +1 403 407 1800
Project	: SWM.SWOP04071-05.006	Date Samples Received	: 13-Nov-2025 15:25
PO	: SWM.SWOP04071-05.006	Date Analysis Commenced	: 18-Nov-2025
C-O-C number	: CORD_RSLIP VWs	Issue Date	: 19-May-2026 09:55
Sampler	: WV		
Site	: ----		
Quote number	: CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Waterloo Air Quality, Waterloo, Ontario
David Tremblett	VOC Section Supervisor	Waterloo Air Quality, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key:
Anonymous=Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number=Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO=Data Quality Objective.
LOR=Limit of Reporting (detection limit).
RPD=Relative Percent Difference
# =Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Canister**

Laboratory Duplicate (DUP) Report											
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Permanent Gases(QC Lot: 2342050)											
CG2516680-001	Anonymous	Carbon dioxide	124-38-9	E629B-H	0.050	%	1.86	1.93	3.52 %	20%	---
		Carbon monoxide	630-08-0	E629B-H	0.050	%	<0.050	<0.050	0	Diff <2x LOR	---
		Methane	74-82-8	E629B-H	0.050	%	<0.050	<0.050	0	Diff <2x LOR	---
		Nitrogen	7727-37-9	E629B-H	1.0	%	73.4	69.4	5.60 %	20%	---
		Oxygen	7782-44-7	E629B-H	0.10	%	21.5	20.1	6.90 %	20%	---
Volatile Organic Compounds(QC Lot: 2349629)											
CG2516680-001	Anonymous	Acetone	67-64-1	E621B	1.1	ppbv	3.5	3.4	0.1	Diff <2x LOR	---
		Allyl chloride	107-05-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Benzene	71-43-2	E621B	0.11	ppbv	0.11	0.12	0.12	Diff <2x LOR	---
		Benzyl chloride	100-44-7	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Bromodichloromethane	75-27-4	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Bromoform	75-25-2	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Bromomethane	74-83-9	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Butadiene, 1,3-	106-99-0	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Carbon disulfide	75-15-0	E621B	0.54	ppbv	<0.54	<0.54	0	Diff <2x LOR	---
		Carbon tetrachloride	56-23-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Chlorobenzene	108-90-7	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Chloroethane	75-00-3	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Chloroform	67-66-3	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Chloromethane	74-87-3	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Cyclohexane	110-82-7	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dibromochloromethane	124-48-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dibromoethane, 1,2-	106-93-4	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichlorobenzene, 1,2-	95-50-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichlorobenzene, 1,3-	541-73-1	E621B	0.22	ppbv	0.22	<0.22	0.22	Diff <2x LOR	---
		Dichlorobenzene, 1,4-	106-46-7	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichlorodifluoromethane	75-71-8	E621B	1.00	ppbv	7.33	7.25	1.19 %	30%	---
		Dichloroethane, 1,1-	75-34-3	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloroethane, 1,2-	107-06-2	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloroethylene, 1,1-	75-35-4	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloroethylene, cis-1,2-	156-59-2	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloroethylene, trans-1,2-	156-60-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloromethane	75-09-2	E621B	0.22	ppbv	0.41	0.38	0.02	Diff <2x LOR	---

Sub-Matrix: Canister

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds(QC Lot: 2349629)											
		Dichloropropane, 1,2-	78-87-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichloropropylene, cis+trans-1,3-	542-75-6	E621B	0.31	ppbv	<0.31	<0.31	0	Diff <2x LOR	---
		Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Dichlorotetrafluoroethane, 1,2- [Freon	76-14-2	E621B	1.00	ppbv	4.73	4.38	0.35	Diff <2x LOR	---
		Dioxane, 1,4-	123-91-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Ethyl acetate	141-78-6	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Ethylbenzene	100-41-4	E621B	0.11	ppbv	0.51	0.51	0.004	Diff <2x LOR	---
		Ethyltoluene, 4-	622-96-8	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Heptane, n-	142-82-5	E621B	0.22	ppbv	0.23	0.29	0.06	Diff <2x LOR	---
		Hexachlorobutadiene	87-68-3	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Hexane, n-	110-54-3	E621B	0.22	ppbv	1.87	2.10	11.3 %	30%	---
		Hexanone, 2-	591-78-6	E621B	1.1	ppbv	<1.1	<1.1	0	Diff <2x LOR	---
		Isopropylbenzene	98-82-8	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Methyl ethyl ketone [MEK]	78-93-3	E621B	0.28	ppbv	<0.24	<0.28	0.04	Diff <2x LOR	---
		Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Naphthalene	91-20-3	E621B	0.11	ppbv	<0.11	<0.11	0	Diff <2x LOR	---
		Propylene	115-07-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Styrene	100-42-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Tetrachloroethylene	127-18-4	E621B	0.22	ppbv	1.52	1.54	1.35 %	30%	---
		Tetrahydrofuran	109-99-9	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Toluene	108-88-3	E621B	0.11	ppbv	1.24	1.15	7.17 %	30%	---
		Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Trichloroethane, 1,1,1-	71-55-6	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Trichloroethane, 1,1,2-	79-00-5	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Trichloroethylene	79-01-6	E621B	1.00	ppbv	7.75	7.55	2.55 %	30%	---
		Trichlorofluoromethane	75-69-4	E621B	0.22	ppbv	0.26	0.23	0.03	Diff <2x LOR	---
		Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.22	ppbv	0.82	0.80	0.02	Diff <2x LOR	---
		Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Trimethylpentane, 2,2,4-	540-84-1	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Vinyl acetate	108-05-4	E621B	0.54	ppbv	<0.54	<0.54	0	Diff <2x LOR	---
		Vinyl bromide	593-60-2	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---
		Vinyl chloride	75-01-4	E621B	0.22	ppbv	<0.22	<0.22	0	Diff <2x LOR	---

Sub-Matrix: Canister

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds(QC Lot: 2349629)											
		Xylene, m+p-	179601-23-1	E621B	0.22	ppbv	1.95	1.93	1.16 %	30%	---
		Xylene, o-	95-47-6	E621B	0.11	ppbv	0.73	0.73	0.009	Diff <2x LOR	---
Hydrocarbons(QC Lot: 2349658)											
CG2516680-001	Anonymous	F1 (C6-C10)	----	E593A	15	µg/m³	312	250	22.2 %	30%	---
		F2 (C10-C16)	----	E593A	15	µg/m³	68	53	15	Diff <2x LOR	---
Hydrocarbons(QC Lot: 2349659)											
CG2516680-001	Anonymous	Aromatic (C10-C12)	----	E593C	15	µg/m³	<15	<15	0	Diff <2x LOR	---
		Aromatic (C12-C16)	----	E593C	30	µg/m³	<30	<30	0	Diff <2x LOR	---
		Aromatic (C6-C8)	----	E593C	15	µg/m³	<15	<15	0	Diff <2x LOR	---
		Aromatic (C8-C10)	----	E593C	15	µg/m³	26	21	5	Diff <2x LOR	---
		TVOC (C10-C12)	----	E593C	15	µg/m³	62	52	10	Diff <2x LOR	---
		TVOC (C12-C16)	----	E593C	30	µg/m³	<30	<30	0	Diff <2x LOR	---
		TVOC (C6-C8)	----	E593C	15	µg/m³	56	61	5	Diff <2x LOR	---
		TVOC (C8-C10)	----	E593C	15	µg/m³	257	188	30.8 %	50%	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Field Tests(QC Lot: 2346469)						
ID, batch proof	----	EF001	----	-	251029.224	----
ID, canister	----	EF001	----	-	06000-0108	----
ID, regulator	----	EF001	----	-	NR	----
Pressure on receipt	----	EF001	0.1	inches Hg	-30.0	----
Permanent Gases(QC Lot: 2342050)						
Carbon dioxide	124-38-9	E629B-H	0.05	%	<0.050	----
Carbon monoxide	630-08-0	E629B-H	0.05	%	<0.050	----
Methane	74-82-8	E629B-H	0.05	%	<0.050	----
Nitrogen	7727-37-9	E629B-H	1	%	<1.0	----
Oxygen	7782-44-7	E629B-H	0.1	%	<0.10	----
Volatile Organic Compounds(QC Lot: 2349629)						
Acetone	67-64-1	E621B	1	ppbv	<1.0	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds(QC Lot: 2349629)						
Allyl chloride	107-05-1	E621B	0.2	ppbv	<0.20	----
Benzene	71-43-2	E621B	0.1	ppbv	<0.10	----
Benzyl chloride	100-44-7	E621B	0.2	ppbv	<0.20	----
Bromodichloromethane	75-27-4	E621B	0.2	ppbv	<0.20	----
Bromoform	75-25-2	E621B	0.2	ppbv	<0.20	----
Bromomethane	74-83-9	E621B	0.2	ppbv	<0.20	----
Butadiene, 1,3-	106-99-0	E621B	0.2	ppbv	<0.20	----
Carbon disulfide	75-15-0	E621B	0.5	ppbv	<0.50	----
Carbon tetrachloride	56-23-5	E621B	0.2	ppbv	<0.20	----
Chlorobenzene	108-90-7	E621B	0.2	ppbv	<0.20	----
Chloroethane	75-00-3	E621B	0.2	ppbv	<0.20	----
Chloroform	67-66-3	E621B	0.2	ppbv	<0.20	----
Chloromethane	74-87-3	E621B	0.2	ppbv	<0.20	----
Cyclohexane	110-82-7	E621B	0.2	ppbv	<0.20	----
Dibromochloromethane	124-48-1	E621B	0.2	ppbv	<0.20	----
Dibromoethane, 1,2-	106-93-4	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,2-	95-50-1	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,3-	541-73-1	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,4-	106-46-7	E621B	0.2	ppbv	<0.20	----
Dichlorodifluoromethane	75-71-8	E621B	0.2	ppbv	<0.20	----
Dichloroethane, 1,1-	75-34-3	E621B	0.2	ppbv	<0.20	----
Dichloroethane, 1,2-	107-06-2	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, 1,1-	75-35-4	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, cis-1,2-	156-59-2	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, trans-1,2-	156-60-5	E621B	0.2	ppbv	<0.20	----
Dichloromethane	75-09-2	E621B	0.2	ppbv	<0.20	----
Dichloropropane, 1,2-	78-87-5	E621B	0.2	ppbv	<0.20	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.2	ppbv	<0.20	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.2	ppbv	<0.20	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B	0.2	ppbv	<0.20	----
Dioxane, 1,4-	123-91-1	E621B	0.2	ppbv	<0.20	----
Ethyl acetate	141-78-6	E621B	0.2	ppbv	<0.20	----
Ethylbenzene	100-41-4	E621B	0.1	ppbv	<0.10	----
Ethyltoluene, 4-	622-96-8	E621B	0.2	ppbv	<0.20	----
Heptane, n-	142-82-5	E621B	0.2	ppbv	<0.20	----
Hexachlorobutadiene	87-68-3	E621B	0.2	ppbv	<0.20	----
Hexane, n-	110-54-3	E621B	0.2	ppbv	<0.20	----
Hexanone, 2-	591-78-6	E621B	1	ppbv	<1.0	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds(QC Lot: 2349629)						
Isopropylbenzene	98-82-8	E621B	0.2	ppbv	<0.20	----
Methyl ethyl ketone [MEK]	78-93-3	E621B	0.2	ppbv	<0.20	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.2	ppbv	<0.20	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.2	ppbv	<0.20	----
Naphthalene	91-20-3	E621B	0.1	ppbv	<0.10	----
Propylene	115-07-1	E621B	0.2	ppbv	<0.20	----
Styrene	100-42-5	E621B	0.2	ppbv	<0.20	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.2	ppbv	<0.20	----
Tetrachloroethylene	127-18-4	E621B	0.2	ppbv	<0.20	----
Tetrahydrofuran	109-99-9	E621B	0.2	ppbv	<0.20	----
Toluene	108-88-3	E621B	0.1	ppbv	<0.10	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B	0.2	ppbv	<0.20	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.2	ppbv	<0.20	----
Trichloroethane, 1,1,1-	71-55-6	E621B	0.2	ppbv	<0.20	----
Trichloroethane, 1,1,2-	79-00-5	E621B	0.2	ppbv	<0.20	----
Trichloroethylene	79-01-6	E621B	0.2	ppbv	<0.20	----
Trichlorofluoromethane	75-69-4	E621B	0.2	ppbv	<0.20	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.2	ppbv	<0.20	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.2	ppbv	<0.20	----
Trimethylpentane, 2,2,4-	540-84-1	E621B	0.2	ppbv	<0.20	----
Vinyl acetate	108-05-4	E621B	0.5	ppbv	<0.50	----
Vinyl bromide	593-60-2	E621B	0.2	ppbv	<0.20	----
Vinyl chloride	75-01-4	E621B	0.2	ppbv	<0.20	----
Xylene, m+p-	179601-23-1	E621B	0.2	ppbv	<0.20	----
Xylene, o-	95-47-6	E621B	0.1	ppbv	<0.10	----
Hydrocarbons(QC Lot: 2349658)						
F1 (C6-C10)	----	E593A	15	µg/m³	<15	----
F2 (C10-C16)	----	E593A	15	µg/m³	<15	----
Hydrocarbons(QC Lot: 2349659)						
Aromatic (C10-C12)	----	E593C	15	µg/m³	<15	----
Aromatic (C12-C16)	----	E593C	30	µg/m³	<30	----
Aromatic (C6-C8)	----	E593C	15	µg/m³	<15	----
Aromatic (C8-C10)	----	E593C	15	µg/m³	<15	----
TVOC (C10-C12)	----	E593C	15	µg/m³	<15	----
TVOC (C12-C16)	----	E593C	30	µg/m³	<30	----
TVOC (C6-C8)	----	E593C	15	µg/m³	<15	----
TVOC (C8-C10)	----	E593C	15	µg/m³	<15	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Permanent Gases(QC Lot: 2342050)									
Carbon dioxide	124-38-9	E629B-H	0.05	%	4.982 %	98.7	70.0	130	----
Carbon monoxide	630-08-0	E629B-H	0.05	%	0.747 %	112	70.0	130	----
Methane	74-82-8	E629B-H	0.05	%	14.95 %	104	70.0	130	----
Nitrogen	7727-37-9	E629B-H	1	%	50.41 %	98.7	70.0	130	----
Oxygen	7782-44-7	E629B-H	0.1	%	7.407 %	111	70.0	130	----
Volatile Organic Compounds(QC Lot: 2349629)									
Acetone	67-64-1	E621B	1	ppbv	1.03 ppbv	106	70.0	130	----
Allyl chloride	107-05-1	E621B	0.2	ppbv	1.04 ppbv	92.2	70.0	130	----
Benzene	71-43-2	E621B	0.1	ppbv	1.04 ppbv	102	70.0	130	----
Benzyl chloride	100-44-7	E621B	0.2	ppbv	0.99 ppbv	101	70.0	130	----
Bromodichloromethane	75-27-4	E621B	0.2	ppbv	1.07 ppbv	85.0	70.0	130	----
Bromoform	75-25-2	E621B	0.2	ppbv	1.03 ppbv	103	70.0	130	----
Bromomethane	74-83-9	E621B	0.2	ppbv	1.01 ppbv	96.4	70.0	130	----
Butadiene, 1,3-	106-99-0	E621B	0.2	ppbv	1.05 ppbv	91.7	70.0	130	----
Carbon disulfide	75-15-0	E621B	0.5	ppbv	0.99 ppbv	90.9	70.0	130	----
Carbon tetrachloride	56-23-5	E621B	0.2	ppbv	1.05 ppbv	100	70.0	130	----
Chlorobenzene	108-90-7	E621B	0.2	ppbv	1.03 ppbv	101	70.0	130	----
Chloroethane	75-00-3	E621B	0.2	ppbv	1.04 ppbv	90.7	70.0	130	----
Chloroform	67-66-3	E621B	0.2	ppbv	1.04 ppbv	108	70.0	130	----
Chloromethane	74-87-3	E621B	0.2	ppbv	1.03 ppbv	91.8	70.0	130	----
Cyclohexane	110-82-7	E621B	0.2	ppbv	1.06 ppbv	88.8	70.0	130	----
Dibromochloromethane	124-48-1	E621B	0.2	ppbv	1.05 ppbv	101	70.0	130	----
Dibromoethane, 1,2-	106-93-4	E621B	0.2	ppbv	1.04 ppbv	96.8	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E621B	0.2	ppbv	0.97 ppbv	103	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E621B	0.2	ppbv	0.99 ppbv	104	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E621B	0.2	ppbv	0.98 ppbv	101	70.0	130	----
Dichlorodifluoromethane	75-71-8	E621B	0.2	ppbv	1.05 ppbv	94.1	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E621B	0.2	ppbv	1.01 ppbv	92.7	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E621B	0.2	ppbv	1.04 ppbv	100	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E621B	0.2	ppbv	1.01 ppbv	96.6	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E621B	0.2	ppbv	1.04 ppbv	99.7	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E621B	0.2	ppbv	1.06 ppbv	94.7	70.0	130	----
Dichloromethane	75-09-2	E621B	0.2	ppbv	1.02 ppbv	97.0	70.0	130	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds(QC Lot: 2349629)									
Dichloropropane, 1,2-	78-87-5	E621B	0.2	ppbv	1.05 ppbv	82.2	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.2	ppbv	1.04 ppbv	86.3	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.2	ppbv	1.05 ppbv	76.4	70.0	130	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B	0.2	ppbv	0.96 ppbv	95.0	70.0	130	----
Dioxane, 1,4-	123-91-1	E621B	0.2	ppbv	1.05 ppbv	84.2	70.0	130	----
Ethyl acetate	141-78-6	E621B	0.2	ppbv	1.04 ppbv	103	70.0	130	----
Ethylbenzene	100-41-4	E621B	0.1	ppbv	1.04 ppbv	100	70.0	130	----
Ethyltoluene, 4-	622-96-8	E621B	0.2	ppbv	1.01 ppbv	99.4	70.0	130	----
Heptane, n-	142-82-5	E621B	0.2	ppbv	1.06 ppbv	82.5	70.0	130	----
Hexachlorobutadiene	87-68-3	E621B	0.2	ppbv	1.02 ppbv	108	70.0	130	----
Hexane, n-	110-54-3	E621B	0.2	ppbv	1.06 ppbv	100	70.0	130	----
Hexanone, 2-	591-78-6	E621B	1	ppbv	1.04 ppbv	94.3	70.0	130	----
Isopropylbenzene	98-82-8	E621B	0.2	ppbv	1 ppbv	104	70.0	130	----
Methyl ethyl ketone [MEK]	78-93-3	E621B	0.2	ppbv	1.05 ppbv	92.5	70.0	130	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.2	ppbv	0.99 ppbv	75.1	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.2	ppbv	1.06 ppbv	94.5	70.0	130	----
Naphthalene	91-20-3	E621B	0.1	ppbv	0.98 ppbv	91.4	70.0	130	----
Propylene	115-07-1	E621B	0.2	ppbv	1.02 ppbv	93.8	70.0	130	----
Styrene	100-42-5	E621B	0.2	ppbv	1.04 ppbv	100	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.2	ppbv	0.99 ppbv	102	70.0	130	----
Tetrachloroethylene	127-18-4	E621B	0.2	ppbv	1.04 ppbv	103	70.0	130	----
Tetrahydrofuran	109-99-9	E621B	0.2	ppbv	1.04 ppbv	100	70.0	130	----
Toluene	108-88-3	E621B	0.1	ppbv	1.04 ppbv	94.1	70.0	130	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B	0.2	ppbv	1.05 ppbv	98.3	70.0	130	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.2	ppbv	0.99 ppbv	98.0	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E621B	0.2	ppbv	1.05 ppbv	107	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E621B	0.2	ppbv	1.03 ppbv	92.8	70.0	130	----
Trichloroethylene	79-01-6	E621B	0.2	ppbv	1.01 ppbv	90.4	70.0	130	----
Trichlorofluoromethane	75-69-4	E621B	0.2	ppbv	1.04 ppbv	98.1	70.0	130	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.2	ppbv	1.05 ppbv	96.1	70.0	130	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.2	ppbv	1 ppbv	102	70.0	130	----
Trimethylpentane, 2,2,4-	540-84-1	E621B	0.2	ppbv	1.04 ppbv	75.9	70.0	130	----
Vinyl acetate	108-05-4	E621B	0.5	ppbv	1.05 ppbv	93.0	70.0	130	----
Vinyl bromide	593-60-2	E621B	0.2	ppbv	0.99 ppbv	88.2	70.0	130	----
Vinyl chloride	75-01-4	E621B	0.2	ppbv	1.04 ppbv	93.6	70.0	130	----
Xylene, m+p-	179601-23-1	E621B	0.2	ppbv	2.06 ppbv	101	70.0	130	----
Xylene, o-	95-47-6	E621B	0.1	ppbv	1.03 ppbv	101	70.0	130	----

Sub-Matrix: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Hydrocarbons(QC Lot: 2349658)									
F1 (C6-C10)	----	E593A	15	µg/m³	815 µg/m³	93.3	50.0	150	----
Hydrocarbons(QC Lot: 2349659)									
Aromatic (C10-C12)	----	E593C	15	µg/m³	60.75 µg/m³	86.9	50.0	150	----
Aromatic (C12-C16)	----	E593C	30	µg/m³	60.07 µg/m³	110	50.0	150	----
Aromatic (C6-C8)	----	E593C	15	µg/m³	60.06 µg/m³	95.7	50.0	150	----
Aromatic (C8-C10)	----	E593C	15	µg/m³	59.58 µg/m³	100	50.0	150	----
TVOC (C10-C12)	----	E593C	15	µg/m³	121.3 µg/m³	94.6	50.0	150	----
TVOC (C12-C16)	----	E593C	30	µg/m³	120.3 µg/m³	91.2	50.0	150	----
TVOC (C6-C8)	----	E593C	15	µg/m³	119.9 µg/m³	107	50.0	150	----
TVOC (C8-C10)	----	E593C	15	µg/m³	119 µg/m³	100.0	50.0	150	----
Hydrocarbons Surrogates(QC Lot: 2349659)									
Bromofluorobenzene, 4-	460-00-4	E593C	1	ppbv	4 ppbv	103	70	130	----
Volatile Organic Compounds Surrogates(QC Lot: 2349629)									
Bromofluorobenzene, 4-	460-00-4	E621B	0.2	ppbv	4 ppbv	109	70	130	----

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
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COC # CORD RSLIP VWs

Page 1 of 1

Report to:	Report Format / Distribution	Service Requested:
Company: Tetra Tech Canada Inc.	☐ Standard ☐ Other	☑ Regular Service (Default)
Contact: Kara Heckert	☑ PDF ☑ Excel ☐ Fax	☐ Rush Service (2-3 Days)
Address: 110, 140 Quarry Park Blvd SE, Calgary, AB T2C 3G3	Email 1: kara.heckert@tetratech.com	☐ Priority Service (1 Day or ASAP)
	Email 2: willem.verduyn@tetratech.com	☐ Emergency Service (<1 Day / Wkend) - Contact ALS
Phone: 431-554-1745 Fax:	ALS Digital Crosstab results	Analysis Request
Invoice To: ☑ Same as Report	Indicate Bottles: Filtered / Preserved (F/P) ⟶	
Company: SAME AS REPORT	Client / Project Information:	
Contact:	Job #: SWM.SWOP04071-05.006	
Address:	PO/AFE: SWM.SWOP04071-05.006	
Sample	Legal Site Description:	
Phone: Fax:	Quote #: CG22-EBAE100-0021	
Lab Work Order # (lab use only)	ALS Contact: Patryk Wojciak Sampler (Initials): WV	

Sample #	Sample Identification (This description will appear on the report)	Date dd-mmm-yy	Time hh:mm	Sample Type (Select from drop-down list)	EP592	S621E - Aliphatic and Aroma	S629B - Methane, CO2, CO	
	25VW-01	12-Nov-25	12:16	Air	X	X	X	
	~~25VW-02~~			Air	X	X	X	

Environmental Division Calgary
Work Order Reference
CG2516682

Telephone : +1 403 407 1800

Guidelines / Regulations	Special Instructions / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.

									Sample Condition (lab use only)	
Relinquished By:	Willem	Date & Time:		Received By:		Date & Time:	13/11	15:45	Temperature	Samples Received in Good Condition? Y / N (if no provided details)
Relinquished By:	Verduyn	Date & Time:		Received By:		Date & Time:			18.3	

CERTIFICATE OF ANALYSIS

Work Order	:	**CG2517660**			
Amendment	:	**1**			
Client	:	**Tetra Tech Canada Inc.**	Laboratory	:	ALS Environmental - Calgary
Contact	:	Kara Heckert	Account Manager	:	Patryk Wojciak
Address	:	110, 140 Quarry Park Blvd SE Calgary Alberta Canada T2C 3G3	Address	:	2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	:	204 954 6832	E-mail	:	patryk.wojciak@alsglobal.com
Project	:	SWM.SWOP04071-05.006	Telephone	:	+1 403 407 1800
PO	:	SWM.SWOP04071-05.006	Date Samples Received	:	04-Dec-2025 12:50
C-O-C number	:	CORD RSLIP VWs	Date Analysis Commenced	:	08-Dec-2025
Sampler	:	WV	Issue Date	:	19-May-2026 09:54
Site	:	----			
Quote number	:	CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites			
No. of samples received	:	2			
No. of samples analysed	:	2			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
David Tremblett	VOC Section Supervisor	Air Quality, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
Inches Hg	inches of mercury
ppbv	parts per billion (volume/volume)
µg/m³	micrograms per cubic metre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (19-May-2026): Sample IDs updated.

Qualifiers

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. Mass Spectrometry qualifier ion ratio did not meet acceptance criteria.

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: 25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time: 03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
					CG2517660-001	CG2517660-002	----	----	----
					Result	Result	----	----	----
Field Tests									
ID, batch proof	----	EF001/WT	-	-	251118.102	251016.217	----	----	----
ID, canister	----	EF001/WT	-	-	01400-0202	01400-0182	----	----	----
ID, regulator	----	EF001/WT	-	-	G468	G507	----	----	----
Pressure on receipt	----	EF001/WT	0.10	inches Hg	-9.80	-11.8	----	----	----
Permanent Gases									
Carbon dioxide	124-38-9	E629B-H/WT	0.050	%	7.49	3.95	----	----	----
Carbon monoxide	630-08-0	E629B-H/WT	0.050	%	<0.050	<0.050	----	----	----
Methane	74-82-8	E629B-H/WT	0.050	%	<0.050	<0.050	----	----	----
Nitrogen	7727-37-9	E629B-H/WT	1.0	%	73.9	78.4	----	----	----
Oxygen	7782-44-7	E629B-H/WT	0.10	%	13.5	18.7	----	----	----
Volatile Organic Compounds									
Acetone	67-64-1	E621B/WT	1.0	ppbv	3.1	111	----	----	----
Acetone	67-64-1	EC621B/WT	2.4	µg/m³	7.4	264	----	----	----
Allyl chloride	107-05-1	E621B/WT	0.20	ppbv	<0.20	<0.23	----	----	----
Allyl chloride	107-05-1	EC621B/WT	0.63	µg/m³	<0.63	<0.72	----	----	----
Benzene	71-43-2	E621B/WT	0.10	ppbv	0.19	4.50	----	----	----
Benzene	71-43-2	EC621B/WT	0.32	µg/m³	0.61	14.4	----	----	----
Benzyl chloride	100-44-7	E621B/WT	0.20	ppbv	<0.20	<0.23	----	----	----
Benzyl chloride	100-44-7	EC621B/WT	1.0	µg/m³	<1.0	<1.2	----	----	----
Bromodichloromethane	75-27-4	E621B/WT	0.20	ppbv	<0.20	<0.23	----	----	----
Bromodichloromethane	75-27-4	EC621B/WT	1.3	µg/m³	<1.3	<1.5	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Bromoform	75-25-2	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Bromoform	75-25-2	EC621B/WT	2.1	µg/m³		<2.1	<2.4	----	----	----
Bromomethane	74-83-9	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Bromomethane	74-83-9	EC621B/WT	0.78	µg/m³		<0.78	<0.89	----	----	----
Butadiene, 1,3-	106-99-0	E621B/WT	0.20	ppbv		<0.20	<0.35 DLQ	----	----	----
Butadiene, 1,3-	106-99-0	EC621B/WT	0.44	µg/m³		<0.44	<0.77	----	----	----
Carbon disulfide	75-15-0	E621B/WT	0.50	ppbv		7.29	20.4	----	----	----
Carbon disulfide	75-15-0	EC621B/WT	1.6	µg/m³		22.7	63.5	----	----	----
Carbon tetrachloride	56-23-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Carbon tetrachloride	56-23-5	EC621B/WT	1.30	µg/m³		<1.26	<1.45	----	----	----
Chlorobenzene	108-90-7	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Chlorobenzene	108-90-7	EC621B/WT	0.92	µg/m³		<0.92	<1.06	----	----	----
Chloroethane	75-00-3	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Chloroethane	75-00-3	EC621B/WT	0.53	µg/m³		<0.53	<0.61	----	----	----
Chloroform	67-66-3	E621B/WT	0.20	ppbv		0.60	14.4	----	----	----
Chloroform	67-66-3	EC621B/WT	0.98	µg/m³		2.93	70.3	----	----	----
Chloromethane	74-87-3	E621B/WT	0.20	ppbv		<0.20	<0.24 DLQ	----	----	----
Chloromethane	74-87-3	EC621B/WT	0.41	µg/m³		<0.41	<0.50	----	----	----
Cyclohexane	110-82-7	E621B/WT	0.20	ppbv		0.29	0.80	----	----	----
Cyclohexane	110-82-7	EC621B/WT	0.69	µg/m³		1.00	2.75	----	----	----
Dibromochloromethane	124-48-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Dibromochloromethane	124-48-1	EC621B/WT	1.7	µg/m³		<1.7	<2.0	----	----	----
Dibromoethane, 1,2-	106-93-4	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dibromoethane, 1,2-	106-93-4	EC621B/WT	1.5	µg/m³		<1.5	<1.8	----	----	----
Dichlorobenzene, 1,2-	95-50-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichlorobenzene, 1,2-	95-50-1	EC621B/WT	1.2	µg/m³		<1.2	<1.4	----	----	----
Dichlorobenzene, 1,3-	541-73-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichlorobenzene, 1,3-	541-73-1	EC621B/WT	1.2	µg/m³		<1.2	<1.4	----	----	----
Dichlorobenzene, 1,4-	106-46-7	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichlorobenzene, 1,4-	106-46-7	EC621B/WT	1.2	µg/m³		<1.2	<1.4	----	----	----
Dichlorodifluoromethane	75-71-8	E621B/WT	0.20	ppbv		0.61	0.29	----	----	----
Dichlorodifluoromethane	75-71-8	EC621B/WT	1.0	µg/m³		3.0	1.4	----	----	----
Dichloroethane, 1,1-	75-34-3	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloroethane, 1,1-	75-34-3	EC621B/WT	0.81	µg/m³		<0.81	<0.93	----	----	----
Dichloroethane, 1,2-	107-06-2	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloroethane, 1,2-	107-06-2	EC621B/WT	0.81	µg/m³		<0.81	<0.93	----	----	----
Dichloroethylene, 1,1-	75-35-4	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloroethylene, 1,1-	75-35-4	EC621B/WT	0.79	µg/m³		<0.79	<0.91	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	EC621B/WT	0.79	µg/m³		<0.79	<0.91	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	EC621B/WT	0.79	µg/m³		<0.79	<0.91	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Dichloromethane	75-09-2	E621B/WT	0.20	ppbv		<0.20	0.68	----	----	----
Dichloromethane	75-09-2	EC621B/WT	0.69	µg/m³		<0.69	2.36	----	----	----
Dichloropropane, 1,2-	78-87-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloropropane, 1,2-	78-87-5	EC621B/WT	0.9	µg/m³		<0.9	<1.1	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	EC621B/WT	0.9	µg/m³		<0.9	<1.0	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	E621B/WT	0.30	ppbv		<0.30	<0.33	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	EC621B/WT	1.3	µg/m³		<1.8	<2.1	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	EC621B/WT	0.9	µg/m³		<0.9	<1.0	----	----	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	EC621B/WT	1.4	µg/m³		<1.4	<1.6	----	----	----
Dioxane, 1,4-	123-91-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Dioxane, 1,4-	123-91-1	EC621B/WT	0.72	µg/m³		<0.72	<0.83	----	----	----
Ethyl acetate	141-78-6	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Ethyl acetate	141-78-6	EC621B/WT	0.72	µg/m³		<0.72	<0.83	----	----	----
Ethylbenzene	100-41-4	E621B/WT	0.10	ppbv		0.32	2.91	----	----	----
Ethylbenzene	100-41-4	EC621B/WT	0.43	µg/m³		1.39	12.6	----	----	----
Ethyltoluene, 4-	622-96-8	E621B/WT	0.20	ppbv		<0.20	0.67	----	----	----
Ethyltoluene, 4-	622-96-8	EC621B/WT	1.0	µg/m³		<1.0	3.3	----	----	----
Heptane, n-	142-82-5	E621B/WT	0.20	ppbv		<0.20	6.01	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Heptane, n-	142-82-5	EC621B/WT	0.82	µg/m³		<0.82	24.6	----	----	----
Hexachlorobutadiene	87-68-3	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Hexachlorobutadiene	87-68-3	EC621B/WT	2.1	µg/m³		<2.1	<2.5	----	----	----
Hexane, n-	110-54-3	E621B/WT	0.20	ppbv		<0.20	5.13	----	----	----
Hexane, n-	110-54-3	EC621B/WT	0.70	µg/m³		<0.70	18.1	----	----	----
Hexanone, 2-	591-78-6	E621B/WT	1.0	ppbv		<1.0	<5.0	----	----	----
Hexanone, 2-	591-78-6	EC621B/WT	4.10	µg/m³		<4.10	<20.5	----	----	----
Isopropylbenzene	98-82-8	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Isopropylbenzene	98-82-8	EC621B/WT	1.0	µg/m³		<1.0	<1.1	----	----	----
Methyl ethyl ketone [MEK]	78-93-3	E621B/WT	0.20	ppbv		0.26	7.92	----	----	----
Methyl ethyl ketone [MEK]	78-93-3	EC621B/WT	0.59	µg/m³		0.77	23.4	----	----	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B/WT	0.20	ppbv		<0.20	4.15	----	----	----
Methyl isobutyl ketone [MIBK]	108-10-1	EC621B/WT	0.82	µg/m³		<0.82	17.0	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	EC621B/WT	0.72	µg/m³		<0.72	<0.83	----	----	----
Naphthalene	91-20-3	E621B/WT	0.10	ppbv		<0.10	<0.11	----	----	----
Naphthalene	91-20-3	EC621B/WT	0.52	µg/m³		<0.52	<0.58	----	----	----
Propylene	115-07-1	E621B/WT	0.20	ppbv		<1.64 DLQ	<32.6 DLQ	----	----	----
Propylene	115-07-1	EC621B/WT	0.34	µg/m³		<2.82	<56.1	----	----	----
Styrene	100-42-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Styrene	100-42-5	EC621B/WT	0.85	µg/m³		<0.85	<0.98	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Tetrachloroethane, 1,1,2,2-	79-34-5	EC621B/WT	1.4	µg/m³		<1.4	<1.6	----	----	----
Tetrachloroethylene	127-18-4	E621B/WT	0.20	ppbv		2.78	19.0	----	----	----
Tetrachloroethylene	127-18-4	EC621B/WT	1.4	µg/m³		18.9	129	----	----	----
Tetrahydrofuran	109-99-9	E621B/WT	0.20	ppbv		<0.20	<1.29 DLQ	----	----	----
Tetrahydrofuran	109-99-9	EC621B/WT	0.59	µg/m³		<0.59	<3.80	----	----	----
Toluene	108-88-3	E621B/WT	0.10	ppbv		4.56	29.4	----	----	----
Toluene	108-88-3	EC621B/WT	0.38	µg/m³		17.2	111	----	----	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	EC621B/WT	1.5	µg/m³		<1.5	<1.8	----	----	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Trichlorobenzene, 1,2,4-	120-82-1	EC621B/WT	1.5	µg/m³		<1.5	<1.7	----	----	----
Trichloroethane, 1,1,1-	71-55-6	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Trichloroethane, 1,1,1-	71-55-6	EC621B/WT	1.1	µg/m³		<1.1	<1.3	----	----	----
Trichloroethane, 1,1,2-	79-00-5	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Trichloroethane, 1,1,2-	79-00-5	EC621B/WT	1.1	µg/m³		<1.1	<1.3	----	----	----
Trichloroethylene	79-01-6	E621B/WT	0.20	ppbv		3.09	72.4	----	----	----
Trichloroethylene	79-01-6	EC621B/WT	1.1	µg/m³		16.6	389	----	----	----
Trichlorofluoromethane	75-69-4	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Trichlorofluoromethane	75-69-4	EC621B/WT	1.1	µg/m³		<1.1	<1.3	----	----	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B/WT	0.20	ppbv		0.43	1.34	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time	03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
						CG2517660-001	CG2517660-002	----	----	----
						Result	Result	----	----	----
Volatile Organic Compounds										
Trimethylbenzene, 1,2,4-	95-63-6	EC621B/WT	1.0	µg/m³		2.1	6.6	----	----	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B/WT	0.20	ppbv		<0.20	0.47	----	----	----
Trimethylbenzene, 1,3,5-	108-67-8	EC621B/WT	1.0	µg/m³		<1.0	2.3	----	----	----
Trimethylpentane, 2,2,4-	540-84-1	E621B/WT	0.20	ppbv		<0.20	4.38	----	----	----
Trimethylpentane, 2,2,4-	540-84-1	EC621B/WT	0.9	µg/m³		<0.9	20.5	----	----	----
Vinyl acetate	108-05-4	E621B/WT	0.50	ppbv		<0.51	<0.56	----	----	----
Vinyl acetate	108-05-4	EC621B/WT	1.8	µg/m³		<1.8	<2.0	----	----	----
Vinyl bromide	593-60-2	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Vinyl bromide	593-60-2	EC621B/WT	0.9	µg/m³		<0.9	<1.0	----	----	----
Vinyl chloride	75-01-4	E621B/WT	0.20	ppbv		<0.20	<0.23	----	----	----
Vinyl chloride	75-01-4	EC621B/WT	0.51	µg/m³		<0.51	<0.59	----	----	----
Xylene, m+p-	179601-23-1	E621B/WT	0.20	ppbv		1.37	9.17	----	----	----
Xylene, m+p-	179601-23-1	EC621B/WT	0.87	µg/m³		5.95	39.8	----	----	----
Xylene, o-	95-47-6	E621B/WT	0.10	ppbv		0.53	2.61	----	----	----
Xylene, o-	95-47-6	EC621B/WT	0.43	µg/m³		2.30	11.3	----	----	----
Xylenes, total	1330-20-7	E621B/WT	0.30	ppbv		1.90	11.8	----	----	----
Xylenes, total	1330-20-7	EC621B/WT	1.3	µg/m³		8.2	51.1	----	----	----
BTEX, total	----	E621B/WT	0.30	ppbv		6.97	48.6	----	----	----
BTEX, total	----	EC621B/WT	1.2	µg/m³		27.4	189	----	----	----
Hydrocarbons										
Aliphatic (C10-C12)	----	E593C/WT	15	µg/m³		54	331	----	----	----

Analytical Results

Sub-Matrix: Canister
(Matrix: Air)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: 25VW-09 ----	25VW-10 ----	----	----	----
					Client sampling date / time: 03-Dec-2025 15:01	03-Dec-2025 14:39	----	----	----
					CG2517660-001	CG2517660-002	----	----	----
					Result	Result	----	----	----
Hydrocarbons									
Aliphatic (C12-C16)	----	E593C/WT	30	µg/m³	<30	<30	----	----	----
Aliphatic (C6-C8)	----	E593C/WT	15	µg/m³	41	631	----	----	----
Aliphatic (C8-C10)	----	E593C/WT	15	µg/m³	90	617	----	----	----
Aromatic (C10-C12)	----	E593C/WT	15	µg/m³	<15	<15	----	----	----
Aromatic (C12-C16)	----	E593C/WT	30	µg/m³	<30	<30	----	----	----
Aromatic (C6-C8)	----	E593C/WT	15	µg/m³	<15	116	----	----	----
Aromatic (C8-C10)	----	E593C/WT	15	µg/m³	<15	88	----	----	----
F1 (C6-C10)	----	E593A/WT	15	µg/m³	169	1400	----	----	----
F1-BTEX	----	EC592A/WT	15	µg/m³	142	1210	----	----	----
F2 (C10-C16)	----	E593A/WT	15	µg/m³	105	444	----	----	----
F2-Naphthalene	----	EC593D/WT	15	µg/m³	105	444	----	----	----
TVOC (C10-C12)	----	E593C/WT	15	µg/m³	54	331	----	----	----
TVOC (C12-C16)	----	E593C/WT	30	µg/m³	<30	<30	----	----	----
TVOC (C6-C8)	----	E593C/WT	15	µg/m³	41	747	----	----	----
TVOC (C8-C10)	----	E593C/WT	15	µg/m³	90	705	----	----	----
Hydrocarbons Surrogates									
Bromofluorobenzene, 4-	460-00-4	E593C/WT	1	%	97.6	92.7	----	----	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E621B/WT	0.20	%	90.6	85.8	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Quality Control Interpretive Report

Work Order	: **CG2517660**			
Amendment	: **1**			
Client	: Tetra Tech Canada Inc.	Laboratory	:	ALS Environmental - Calgary
Contact	: Kara Heckert	Account Manager	:	Patryk Wojciak
Address	: 110, 140 Quarry Park Blvd SE Calgary AB Canada T2C 3G3	Address	:	2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 204 954 6832	Telephone	:	+1 403 407 1800
Project	: SWM.SWOP04071-05.006	Date Samples Received	:	04-Dec-2025 12:50
PO	: SWM.SWOP04071-05.006	Issue Date	:	19-May-2026 09:54
C-O-C number	: CORD RSLIP VWs			
Sampler	: WV			
Site	: ----			
Quote number	: CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites			
No. of samples received	: 2			
No. of samples analysed	: 2			

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Laboratory Control Sample Duplicate (LCSD) outliers occur
- No Matrix Spike outliers occur.
- No Matrix Spike Duplicate (MSD) outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix :**Air**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result		Limits	Comment
Laboratory Control Sample (LCS) Recoveries									
Volatile Organic Compounds	QC-2381255--002	----	Chloromethane	74-87-3	E621B	69.7 %	LCS-L	70.0-130%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
LCS-L	*Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and/or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Air

Evaluation: × = Holding time exceedance; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client sample ID	ALS Sample ID	QC Lot	Method	Sampling Date	Extraction / Preparation				Analysis			
					Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
						Rec	Actual			Rec	Actual	
Field Tests : Air Canister Information												
Air Canister												
25VW-09	001	2378490	EF001	03-Dec-2025	----	----	----		10-Dec-2025	----	----	
25VW-10	002	2378490	EF001	03-Dec-2025	----	----	----		10-Dec-2025	----	----	
Hydrocarbons : TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)												
Air Canister												
25VW-09	001	2381251	E593C	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
25VW-10	002	2381251	E593C	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
Hydrocarbons : TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)												
Air Canister												
25VW-09	001	2381250	E593A	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
25VW-10	002	2381250	E593A	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
Permanent Gases : Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)												
Air Canister												
25VW-09	001	2374447	E629B-H	03-Dec-2025	----	----	----		08-Dec-2025	30 days	5 days	✓
25VW-10	002	2374447	E629B-H	03-Dec-2025	----	----	----		08-Dec-2025	30 days	5 days	✓

Matrix: Air

Evaluation: × = Holding time exceedance; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client sample ID	ALS Sample ID	QC Lot	Method	Sampling Date	Extraction / Preparation				Analysis			
					Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
						Rec	Actual			Rec	Actual	
Volatile Organic Compounds : VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)												
Air Canister												
25VW-09	001	2381255	E621B	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
25VW-10	002	2381255	E621B	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓
25VW-10	002	2381255	E621B	03-Dec-2025	----	----	----		11-Dec-2025	30 days	8 days	✓

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: Air

Evaluation: × = *QC frequency outside specification;* ✓ = *QC frequency within specification*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method / Lab*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2381250	1	5	20.0	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2381251	1	5	20.0	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2381255	1	5	20.0	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2374447	1	11	9.1	5.0	✓
Laboratory Control Samples (LCS)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2381250	1	5	20.0	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2381251	1	5	20.0	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2381255	1	5	20.0	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2374447	1	11	9.1	5.0	✓
Method Blanks (MB)							
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A / WT	2381250	1	5	20.0	5.0	✓
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C / WT	2381251	1	5	20.0	5.0	✓
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B / WT	2381255	1	5	20.0	5.0	✓
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H / WT	2374447	1	11	9.1	5.0	✓
Air Canister Information	EF001 / WT	2378490	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Air Canister Information	EF001 ALS Environmental - Waterloo	Air	In-house	Air canister information provided by client and recorded on ALS report may affect the validity of results.
F1-BTEX in Canisters or Bags GC-MS (µg/m3)	EC592A ALS Environmental - Waterloo	Air	unit conversion	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
F2-Naphthalene in Canisters by GC-MS (ug/m3)	EC593D ALS Environmental - Waterloo	Air	CCME PHC	F2-PAH = CCME Fraction 2 (C10-C16) minus Naphthalene
Permanent Gases (Methane, CO2, CO, N2, and O2) in Air (Routine Level, %)	E629B-H ALS Environmental - Waterloo	Air	EPA Method 3C & ASTM D1946 (mod)	This analysis is performed using procedures adapted from EPA Method 3C & ASTM D1946. Air samples are collected into cleaned evacuated canisters. A volume of air is removed from the canister and injected by means of a gas-sampling/backflush valve onto a series of packed GC columns and measured using a thermal conductivity detector (TCD). Oxygen is not separated from Argon. Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.
TVOC (C6-C16) Fractionation in Canisters or Bags by GC-MS (ug/m3)	E593C ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Total Volatile Organic Compounds (TVOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
TVOC (F1, F2) in Canisters or Bags by GC-MS (µg/m3)	E593A ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Total Volatile Organic Compounds (TVOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ppbV)	E621B ALS Environmental - Waterloo	Air	EPA TO-15 (mod)	Volatile Organic Compounds (VOC) in canisters (or bags) are transferred to a preconcentrator system and then thermally desorbed prior to injection into a GC-MS system for analysis.
VOCs (TO-15 List) in Air by Canister or Bag by GC-MS (ug/m3)	EC621B ALS Environmental - Waterloo	Air	unit conversion	Convert ppbV to ug/m3

QUALITY CONTROL REPORT

Work Order	: **CG2517660**		
Amendment	: **1**		
Client	: Tetra Tech Canada Inc.	Laboratory	: ALS Environmental - Calgary
Contact	: Kara Heckert	Account Manager	: Patryk Wojciak
Address	: 110, 140 Quarry Park Blvd SE Calgary AB Canada T2C 3G3	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 204 954 6832	Telephone	: +1 403 407 1800
Project	: SWM.SWOP04071-05.006	Date Samples Received	: 04-Dec-2025 12:50
PO	: SWM.SWOP04071-05.006	Date Analysis Commenced	: 08-Dec-2025
C-O-C number	: CORD RSLIP VWs	Issue Date	: 19-May-2026 09:54
Sampler	: WV		
Site	: ----		
Quote number	: CG22-EBAE100-0021 City of Red Deer (CORD) Pre-1972 Landfill Sites		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
David Tremblett	VOC Section Supervisor	Waterloo Air Quality, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key:

Anonymous=Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number=Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO=Data Quality Objective.

LOR=Limit of Reporting (detection limit).

RPD=Relative Percent Difference

=Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Canister**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Permanent Gases(QC Lot: 2374447)											
CG2517660-001	25VW-09	Carbon dioxide	124-38-9	E629B-H	0.050	%	7.49	7.72	3.10 %	20%	---
		Carbon monoxide	630-08-0	E629B-H	0.050	%	<0.050	<0.050	0	Diff <2x LOR	---
		Methane	74-82-8	E629B-H	0.050	%	<0.050	<0.050	0	Diff <2x LOR	---
		Nitrogen	7727-37-9	E629B-H	1.0	%	73.9	76.7	3.65 %	20%	---
		Oxygen	7782-44-7	E629B-H	0.10	%	13.5	14.1	4.65 %	20%	---
Volatile Organic Compounds(QC Lot: 2381255)											
CG2517660-001	25VW-09	Acetone	67-64-1	E621B	1.0	ppbv	3.1	3.3	0.2	Diff <2x LOR	---
		Allyl chloride	107-05-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Benzene	71-43-2	E621B	0.10	ppbv	0.19	0.19	0.004	Diff <2x LOR	---
		Benzyl chloride	100-44-7	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Bromodichloromethane	75-27-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Bromoform	75-25-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Bromomethane	74-83-9	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Butadiene, 1,3-	106-99-0	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Carbon disulfide	75-15-0	E621B	2.50	ppbv	7.29	7.43	0.14	Diff <2x LOR	---
		Carbon tetrachloride	56-23-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Chlorobenzene	108-90-7	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Chloroethane	75-00-3	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Chloroform	67-66-3	E621B	0.20	ppbv	0.60	0.60	0.004	Diff <2x LOR	---
		Chloromethane	74-87-3	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Cyclohexane	110-82-7	E621B	0.20	ppbv	0.29	0.29	0.004	Diff <2x LOR	---
		Dibromochloromethane	124-48-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dibromoethane, 1,2-	106-93-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichlorobenzene, 1,2-	95-50-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichlorobenzene, 1,3-	541-73-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichlorobenzene, 1,4-	106-46-7	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichlorodifluoromethane	75-71-8	E621B	0.20	ppbv	0.61	0.63	0.01	Diff <2x LOR	---
		Dichloroethane, 1,1-	75-34-3	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloroethane, 1,2-	107-06-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloroethylene, 1,1-	75-35-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloroethylene, cis-1,2-	156-59-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloroethylene, trans-1,2-	156-60-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloromethane	75-09-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---

Sub-Matrix: Canister

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds(QC Lot: 2381255)											
		Dichloropropane, 1,2-	78-87-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichloropropylene, cis+trans-1,3-	542-75-6	E621B	0.30	ppbv	<0.30	<0.30	0	Diff <2x LOR	---
		Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dichlorotetrafluoroethane, 1,2- [Freon	76-14-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Dioxane, 1,4-	123-91-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Ethyl acetate	141-78-6	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Ethylbenzene	100-41-4	E621B	0.10	ppbv	0.32	0.35	0.03	Diff <2x LOR	---
		Ethyltoluene, 4-	622-96-8	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Heptane, n-	142-82-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Hexachlorobutadiene	87-68-3	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Hexane, n-	110-54-3	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Hexanone, 2-	591-78-6	E621B	1.0	ppbv	<1.0	<1.0	0	Diff <2x LOR	---
		Isopropylbenzene	98-82-8	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Methyl ethyl ketone [MEK]	78-93-3	E621B	0.20	ppbv	0.26	0.25	0.004	Diff <2x LOR	---
		Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Naphthalene	91-20-3	E621B	0.10	ppbv	<0.10	<0.10	0	Diff <2x LOR	---
		Propylene	115-07-1	E621B	1.74	ppbv	<1.64	<1.74	0.10	Diff <2x LOR	---
		Styrene	100-42-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Tetrachloroethylene	127-18-4	E621B	0.20	ppbv	2.78	2.74	1.43 %	30%	---
		Tetrahydrofuran	109-99-9	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Toluene	108-88-3	E621B	0.50	ppbv	4.56	4.68	2.58 %	30%	---
		Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trichloroethane, 1,1,1-	71-55-6	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trichloroethane, 1,1,2-	79-00-5	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trichloroethylene	79-01-6	E621B	0.20	ppbv	3.09	3.11	0.531 %	30%	---
		Trichlorofluoromethane	75-69-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.20	ppbv	0.43	0.44	0.003	Diff <2x LOR	---
		Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Trimethylpentane, 2,2,4-	540-84-1	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Vinyl acetate	108-05-4	E621B	0.51	ppbv	<0.51	<0.51	0	Diff <2x LOR	---
		Vinyl bromide	593-60-2	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---
		Vinyl chloride	75-01-4	E621B	0.20	ppbv	<0.20	<0.20	0	Diff <2x LOR	---

Sub-Matrix: Canister

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds(QC Lot: 2381255)											
		Xylene, m+p-	179601-23-1	E621B	0.20	ppbv	1.37	1.37	0.489 %	30%	---
		Xylene, o-	95-47-6	E621B	0.10	ppbv	0.53	0.53	0.001	Diff <2x LOR	---
Hydrocarbons(QC Lot: 2381250)											
CG2517660-001	25VW-09	F1 (C6-C10)	----	E593A	15	µg/m³	169	181	6.87 %	30%	---
		F2 (C10-C16)	----	E593A	15	µg/m³	105	110	4.72 %	30%	---
Hydrocarbons(QC Lot: 2381251)											
CG2517660-001	25VW-09	Aromatic (C10-C12)	----	E593C	15	µg/m³	<15	<15	0	Diff <2x LOR	---
		Aromatic (C12-C16)	----	E593C	30	µg/m³	<30	<30	0	Diff <2x LOR	---
		Aromatic (C6-C8)	----	E593C	15	µg/m³	<15	<15	0	Diff <2x LOR	---
		Aromatic (C8-C10)	----	E593C	15	µg/m³	<15	<15	0	Diff <2x LOR	---
		TVOC (C10-C12)	----	E593C	15	µg/m³	54	56	2	Diff <2x LOR	---
		TVOC (C12-C16)	----	E593C	30	µg/m³	<30	<30	0	Diff <2x LOR	---
		TVOC (C6-C8)	----	E593C	15	µg/m³	41	46	5	Diff <2x LOR	---
		TVOC (C8-C10)	----	E593C	15	µg/m³	90	98	8.53 %	50%	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Field Tests(QC Lot: 2378490)						
ID, batch proof	----	EF001	----	-	251126.101	----
ID, canister	----	EF001	----	-	06000-0561	----
ID, regulator	----	EF001	----	-	NR	----
Pressure on receipt	----	EF001	0.1	inches Hg	-30.0	----
Permanent Gases(QC Lot: 2374447)						
Carbon dioxide	124-38-9	E629B-H	0.05	%	<0.050	----
Carbon monoxide	630-08-0	E629B-H	0.05	%	<0.050	----
Methane	74-82-8	E629B-H	0.05	%	<0.050	----
Nitrogen	7727-37-9	E629B-H	1	%	<1.0	----
Oxygen	7782-44-7	E629B-H	0.1	%	<0.10	----
Volatile Organic Compounds(QC Lot: 2381255)						
Acetone	67-64-1	E621B	1	ppbv	<1.0	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds(QC Lot: 2381255)						
Allyl chloride	107-05-1	E621B	0.2	ppbv	<0.20	----
Benzene	71-43-2	E621B	0.1	ppbv	<0.10	----
Benzyl chloride	100-44-7	E621B	0.2	ppbv	<0.20	----
Bromodichloromethane	75-27-4	E621B	0.2	ppbv	<0.20	----
Bromoform	75-25-2	E621B	0.2	ppbv	<0.20	----
Bromomethane	74-83-9	E621B	0.2	ppbv	<0.20	----
Butadiene, 1,3-	106-99-0	E621B	0.2	ppbv	<0.20	----
Carbon disulfide	75-15-0	E621B	0.5	ppbv	<0.50	----
Carbon tetrachloride	56-23-5	E621B	0.2	ppbv	<0.20	----
Chlorobenzene	108-90-7	E621B	0.2	ppbv	<0.20	----
Chloroethane	75-00-3	E621B	0.2	ppbv	<0.20	----
Chloroform	67-66-3	E621B	0.2	ppbv	<0.20	----
Chloromethane	74-87-3	E621B	0.2	ppbv	<0.20	----
Cyclohexane	110-82-7	E621B	0.2	ppbv	<0.20	----
Dibromochloromethane	124-48-1	E621B	0.2	ppbv	<0.20	----
Dibromoethane, 1,2-	106-93-4	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,2-	95-50-1	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,3-	541-73-1	E621B	0.2	ppbv	<0.20	----
Dichlorobenzene, 1,4-	106-46-7	E621B	0.2	ppbv	<0.20	----
Dichlorodifluoromethane	75-71-8	E621B	0.2	ppbv	<0.20	----
Dichloroethane, 1,1-	75-34-3	E621B	0.2	ppbv	<0.20	----
Dichloroethane, 1,2-	107-06-2	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, 1,1-	75-35-4	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, cis-1,2-	156-59-2	E621B	0.2	ppbv	<0.20	----
Dichloroethylene, trans-1,2-	156-60-5	E621B	0.2	ppbv	<0.20	----
Dichloromethane	75-09-2	E621B	0.2	ppbv	<0.20	----
Dichloropropane, 1,2-	78-87-5	E621B	0.2	ppbv	<0.20	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.2	ppbv	<0.20	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.2	ppbv	<0.20	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B	0.2	ppbv	<0.20	----
Dioxane, 1,4-	123-91-1	E621B	0.2	ppbv	<0.20	----
Ethyl acetate	141-78-6	E621B	0.2	ppbv	<0.20	----
Ethylbenzene	100-41-4	E621B	0.1	ppbv	<0.10	----
Ethyltoluene, 4-	622-96-8	E621B	0.2	ppbv	<0.20	----
Heptane, n-	142-82-5	E621B	0.2	ppbv	<0.20	----
Hexachlorobutadiene	87-68-3	E621B	0.2	ppbv	<0.20	----
Hexane, n-	110-54-3	E621B	0.2	ppbv	<0.20	----
Hexanone, 2-	591-78-6	E621B	1	ppbv	<1.0	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds(QC Lot: 2381255)						
Isopropylbenzene	98-82-8	E621B	0.2	ppbv	<0.20	----
Methyl ethyl ketone [MEK]	78-93-3	E621B	0.2	ppbv	<0.20	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.2	ppbv	<0.20	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.2	ppbv	<0.20	----
Naphthalene	91-20-3	E621B	0.1	ppbv	<0.10	----
Propylene	115-07-1	E621B	0.2	ppbv	<0.20	----
Styrene	100-42-5	E621B	0.2	ppbv	<0.20	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.2	ppbv	<0.20	----
Tetrachloroethylene	127-18-4	E621B	0.2	ppbv	<0.20	----
Tetrahydrofuran	109-99-9	E621B	0.2	ppbv	<0.20	----
Toluene	108-88-3	E621B	0.1	ppbv	<0.10	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B	0.2	ppbv	<0.20	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.2	ppbv	<0.20	----
Trichloroethane, 1,1,1-	71-55-6	E621B	0.2	ppbv	<0.20	----
Trichloroethane, 1,1,2-	79-00-5	E621B	0.2	ppbv	<0.20	----
Trichloroethylene	79-01-6	E621B	0.2	ppbv	<0.20	----
Trichlorofluoromethane	75-69-4	E621B	0.2	ppbv	<0.20	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.2	ppbv	<0.20	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.2	ppbv	<0.20	----
Trimethylpentane, 2,2,4-	540-84-1	E621B	0.2	ppbv	<0.20	----
Vinyl acetate	108-05-4	E621B	0.5	ppbv	<0.50	----
Vinyl bromide	593-60-2	E621B	0.2	ppbv	<0.20	----
Vinyl chloride	75-01-4	E621B	0.2	ppbv	<0.20	----
Xylene, m+p-	179601-23-1	E621B	0.2	ppbv	<0.20	----
Xylene, o-	95-47-6	E621B	0.1	ppbv	<0.10	----
Hydrocarbons(QC Lot: 2381250)						
F1 (C6-C10)	----	E593A	15	µg/m³	<15	----
F2 (C10-C16)	----	E593A	15	µg/m³	<15	----
Hydrocarbons(QC Lot: 2381251)						
Aromatic (C10-C12)	----	E593C	15	µg/m³	<15	----
Aromatic (C12-C16)	----	E593C	30	µg/m³	<30	----
Aromatic (C6-C8)	----	E593C	15	µg/m³	<15	----
Aromatic (C8-C10)	----	E593C	15	µg/m³	<15	----
TVOC (C10-C12)	----	E593C	15	µg/m³	<15	----
TVOC (C12-C16)	----	E593C	30	µg/m³	<30	----
TVOC (C6-C8)	----	E593C	15	µg/m³	<15	----
TVOC (C8-C10)	----	E593C	15	µg/m³	<15	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Permanent Gases(QC Lot: 2374447)									
Carbon dioxide	124-38-9	E629B-H	0.05	%	4.982 %	96.8	70.0	130	----
Carbon monoxide	630-08-0	E629B-H	0.05	%	0.747 %	105	70.0	130	----
Methane	74-82-8	E629B-H	0.05	%	14.95 %	101	70.0	130	----
Nitrogen	7727-37-9	E629B-H	1	%	50.41 %	92.7	70.0	130	----
Oxygen	7782-44-7	E629B-H	0.1	%	7.407 %	106	70.0	130	----
Volatile Organic Compounds(QC Lot: 2381255)									
Acetone	67-64-1	E621B	1	ppbv	1.03 ppbv	106	70.0	130	----
Allyl chloride	107-05-1	E621B	0.2	ppbv	1.04 ppbv	101	70.0	130	----
Benzene	71-43-2	E621B	0.1	ppbv	1.04 ppbv	104	70.0	130	----
Benzyl chloride	100-44-7	E621B	0.2	ppbv	0.99 ppbv	92.0	70.0	130	----
Bromodichloromethane	75-27-4	E621B	0.2	ppbv	1.07 ppbv	101	70.0	130	----
Bromoform	75-25-2	E621B	0.2	ppbv	1.03 ppbv	98.7	70.0	130	----
Bromomethane	74-83-9	E621B	0.2	ppbv	1.01 ppbv	101	70.0	130	----
Butadiene, 1,3-	106-99-0	E621B	0.2	ppbv	1.05 ppbv	97.7	70.0	130	----
Carbon disulfide	75-15-0	E621B	0.5	ppbv	0.99 ppbv	102	70.0	130	----
Carbon tetrachloride	56-23-5	E621B	0.2	ppbv	1.05 ppbv	107	70.0	130	----
Chlorobenzene	108-90-7	E621B	0.2	ppbv	1.03 ppbv	89.8	70.0	130	----
Chloroethane	75-00-3	E621B	0.2	ppbv	1.04 ppbv	95.2	70.0	130	----
Chloroform	67-66-3	E621B	0.2	ppbv	1.04 ppbv	106	70.0	130	----
Chloromethane	74-87-3	E621B	0.2	ppbv	1.03 ppbv	# 69.7	70.0	130	LCS-L
Cyclohexane	110-82-7	E621B	0.2	ppbv	1.06 ppbv	107	70.0	130	----
Dibromochloromethane	124-48-1	E621B	0.2	ppbv	1.05 ppbv	108	70.0	130	----
Dibromoethane, 1,2-	106-93-4	E621B	0.2	ppbv	1.04 ppbv	98.5	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E621B	0.2	ppbv	0.97 ppbv	88.0	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E621B	0.2	ppbv	0.99 ppbv	88.0	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E621B	0.2	ppbv	0.98 ppbv	84.2	70.0	130	----
Dichlorodifluoromethane	75-71-8	E621B	0.2	ppbv	1.05 ppbv	85.9	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E621B	0.2	ppbv	1.01 ppbv	106	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E621B	0.2	ppbv	1.04 ppbv	106	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E621B	0.2	ppbv	1.01 ppbv	97.9	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E621B	0.2	ppbv	1.04 ppbv	106	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E621B	0.2	ppbv	1.06 ppbv	103	70.0	130	----
Dichloromethane	75-09-2	E621B	0.2	ppbv	1.02 ppbv	101	70.0	130	----

Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds(QC Lot: 2381255)									
Dichloropropane, 1,2-	78-87-5	E621B	0.2	ppbv	1.05 ppbv	104	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E621B	0.2	ppbv	1.04 ppbv	100	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E621B	0.2	ppbv	1.05 ppbv	100	70.0	130	----
Dichlorotetrafluoroethane, 1,2- [Freon 114]	76-14-2	E621B	0.2	ppbv	0.96 ppbv	95.3	70.0	130	----
Dioxane, 1,4-	123-91-1	E621B	0.2	ppbv	1.05 ppbv	100	70.0	130	----
Ethyl acetate	141-78-6	E621B	0.2	ppbv	1.04 ppbv	106	70.0	130	----
Ethylbenzene	100-41-4	E621B	0.1	ppbv	1.04 ppbv	92.7	70.0	130	----
Ethyltoluene, 4-	622-96-8	E621B	0.2	ppbv	1.01 ppbv	91.8	70.0	130	----
Heptane, n-	142-82-5	E621B	0.2	ppbv	1.06 ppbv	108	70.0	130	----
Hexachlorobutadiene	87-68-3	E621B	0.2	ppbv	1.02 ppbv	97.5	70.0	130	----
Hexane, n-	110-54-3	E621B	0.2	ppbv	1.06 ppbv	112	70.0	130	----
Hexanone, 2-	591-78-6	E621B	1	ppbv	1.04 ppbv	102	70.0	130	----
Isopropylbenzene	98-82-8	E621B	0.2	ppbv	1 ppbv	94.7	70.0	130	----
Methyl ethyl ketone [MEK]	78-93-3	E621B	0.2	ppbv	1.05 ppbv	110	70.0	130	----
Methyl isobutyl ketone [MIBK]	108-10-1	E621B	0.2	ppbv	0.99 ppbv	102	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E621B	0.2	ppbv	1.06 ppbv	104	70.0	130	----
Naphthalene	91-20-3	E621B	0.1	ppbv	0.98 ppbv	86.0	70.0	130	----
Propylene	115-07-1	E621B	0.2	ppbv	1.02 ppbv	101	70.0	130	----
Styrene	100-42-5	E621B	0.2	ppbv	1.04 ppbv	88.2	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E621B	0.2	ppbv	0.99 ppbv	106	70.0	130	----
Tetrachloroethylene	127-18-4	E621B	0.2	ppbv	1.04 ppbv	98.6	70.0	130	----
Tetrahydrofuran	109-99-9	E621B	0.2	ppbv	1.04 ppbv	108	70.0	130	----
Toluene	108-88-3	E621B	0.1	ppbv	1.04 ppbv	104	70.0	130	----
Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113]	76-13-1	E621B	0.2	ppbv	1.05 ppbv	94.3	70.0	130	----
Trichlorobenzene, 1,2,4-	120-82-1	E621B	0.2	ppbv	0.99 ppbv	89.0	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E621B	0.2	ppbv	1.05 ppbv	103	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E621B	0.2	ppbv	1.03 ppbv	102	70.0	130	----
Trichloroethylene	79-01-6	E621B	0.2	ppbv	1.01 ppbv	103	70.0	130	----
Trichlorofluoromethane	75-69-4	E621B	0.2	ppbv	1.04 ppbv	101	70.0	130	----
Trimethylbenzene, 1,2,4-	95-63-6	E621B	0.2	ppbv	1.05 ppbv	91.7	70.0	130	----
Trimethylbenzene, 1,3,5-	108-67-8	E621B	0.2	ppbv	1 ppbv	92.2	70.0	130	----
Trimethylpentane, 2,2,4-	540-84-1	E621B	0.2	ppbv	1.04 ppbv	110	70.0	130	----
Vinyl acetate	108-05-4	E621B	0.5	ppbv	1.05 ppbv	101	70.0	130	----
Vinyl bromide	593-60-2	E621B	0.2	ppbv	0.99 ppbv	96.1	70.0	130	----
Vinyl chloride	75-01-4	E621B	0.2	ppbv	1.04 ppbv	93.5	70.0	130	----
Xylene, m+p-	179601-23-1	E621B	0.2	ppbv	2.06 ppbv	94.7	70.0	130	----
Xylene, o-	95-47-6	E621B	0.1	ppbv	1.03 ppbv	94.9	70.0	130	----

Sub-Matrix: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Hydrocarbons(QC Lot: 2381250)									
F1 (C6-C10)	----	E593A	15	µg/m³	815 µg/m³	116	50.0	150	----
Hydrocarbons(QC Lot: 2381251)									
Aromatic (C10-C12)	----	E593C	15	µg/m³	60.75 µg/m³	94.0	50.0	150	----
Aromatic (C12-C16)	----	E593C	30	µg/m³	60.07 µg/m³	120	50.0	150	----
Aromatic (C6-C8)	----	E593C	15	µg/m³	60.06 µg/m³	98.1	50.0	150	----
Aromatic (C8-C10)	----	E593C	15	µg/m³	59.58 µg/m³	110	50.0	150	----
TVOC (C10-C12)	----	E593C	15	µg/m³	121.3 µg/m³	94.9	50.0	150	----
TVOC (C12-C16)	----	E593C	30	µg/m³	120.3 µg/m³	102	50.0	150	----
TVOC (C6-C8)	----	E593C	15	µg/m³	119.9 µg/m³	103	50.0	150	----
TVOC (C8-C10)	----	E593C	15	µg/m³	119 µg/m³	96.6	50.0	150	----
Hydrocarbons Surrogates(QC Lot: 2381251)									
Bromofluorobenzene, 4-	460-00-4	E593C	1	ppbv	4 ppbv	96.1	70	130	----
Volatile Organic Compounds Surrogates(QC Lot: 2381255)									
Bromofluorobenzene, 4-	460-00-4	E621B	0.2	ppbv	4 ppbv	89.4	70	130	----

Qualifiers

Qualifier	Description
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

Batch Proof Report

Batch Proof ID: 251016.217
Canister ID: 01400-0182
Analysis Date: 11-Nov-25

right solutions.
right partner.

1,1,1-Trichloroethane	<0.02	ppb(V)	cis-1,3-Dichloropropene	<0.02	ppb(V)
1,1,1,2-Tetrachloroethane	<0.02	ppb(V)	Cyclohexane	<0.20	ppb(V)
1,1,2,2-Tetrachloroethane	<0.02	ppb(V)	Dibromochloromethane	<0.20	ppb(V)
1,1,2-Trichloroethane	<0.02	ppb(V)	Dichlorodifluoromethane	<0.20	ppb(V)
1,1-Dichloroethane	<0.02	ppb(V)	Ethyl Acetate	<0.20	ppb(V)
1,1-Dichloroethene	<0.02	ppb(V)	Ethyl Benzene	<0.02	ppb(V)
1,2,4-Trichlorobenzene	<0.20	ppb(V)	Freon 113	<0.20	ppb(V)
1,2,4-Trimethylbenzene	<0.20	ppb(V)	Freon 114	<0.20	ppb(V)
1,2-Dibromoethane	<0.01	ppb(V)	Hexachlorobutadiene	<0.02	ppb(V)
1,2-Dichlorobenzene	<0.02	ppb(V)	Isooctane	<0.20	ppb(V)
1,2-Dichloroethane	<0.01	ppb(V)	Isopropyl Alcohol	<1.0	ppb(V)
1,2-Dichloropropane	<0.02	ppb(V)	Isopropylbenzene	<0.20	ppb(V)
1,3,5-Trimethylbenzene	<0.20	ppb(V)	m&p-Xylene	<0.04	ppb(V)
1,3-Butadiene	<0.20	ppb(V)	Methyl Ethyl Ketone	<0.20	ppb(V)
1,3-Dichlorobenzene	<0.02	ppb(V)	Methylcyclohexane	<0.20	ppb(V)
1,4-Dichlorobenzene	<0.02	ppb(V)	Methyl Isobutyl Ketone	<0.20	ppb(V)
1,4-Dioxane	<0.20	ppb(V)	Methylene Chloride	<0.02	ppb(V)
2-Chlorophenol	<0.20	ppb(V)	MTBE	<0.20	ppb(V)
2-Hexanone	<1.0	ppb(V)	Naphthalene	<0.05	ppb(V)
4-Ethyltoluene	<0.20	ppb(V)	n-Decane	<0.20	ppb(V)
Acetone	<1.0	ppb(V)	n-Heptane	<0.20	ppb(V)
Acrolein	<0.10	ppb(V)	n-Hexane	<0.02	ppb(V)
Allyl Chloride	<0.20	ppb(V)	o-Xylene	<0.02	ppb(V)
Benzene	<0.02	ppb(V)	Propylene	<0.20	ppb(V)
Benzyl Chloride	<0.20	ppb(V)	Styrene	<0.02	ppb(V)
Bromodichloromethane	<0.20	ppb(V)	Tetrachloroethylene	<0.02	ppb(V)
Bromobenzene	<0.20	ppb(V)	Tetrahydrofuran	<0.20	ppb(V)
Bromoform	<0.02	ppb(V)	Toluene	<0.02	ppb(V)
Bromomethane	<0.20	ppb(V)	trans-1,2-Dichloroethene	<0.02	ppb(V)
Carbon Disulfide	<0.50	ppb(V)	trans-1,3-Dichloropropene	<0.02	ppb(V)
Carbon Tetrachloride	<0.02	ppb(V)	Trichloroethylene	<0.02	ppb(V)
Chlorobenzene	<0.20	ppb(V)	Trichlorofluoromethane	<0.20	ppb(V)
Chloroethane	<0.02	ppb(V)	Vinyl Acetate	<0.50	ppb(V)
Chloroform	<0.02	ppb(V)	Vinyl Bromide	<0.20	ppb(V)
Chloromethane	<0.20	ppb(V)	Vinyl Chloride	<0.02	ppb(V)
cis-1,2-Dichloroethene	<0.02	ppb(V)	4-Bromofluorobenzene	94.24	%

Batch Proof Report

Batch Proof ID: 251118.118
Canister ID: 01400-0099
Analysis Date: 26-Nov-25

right solutions.
right partner.

1,1,1-Trichloroethane	<0.02	ppb(V)	cis-1,3-Dichloropropene	<0.02	ppb(V)
1,1,1,2-Tetrachloroethane	<0.02	ppb(V)	Cyclohexane	<0.20	ppb(V)
1,1,2,2-Tetrachloroethane	<0.02	ppb(V)	Dibromochloromethane	<0.20	ppb(V)
1,1,2-Trichloroethane	<0.02	ppb(V)	Dichlorodifluoromethane	<0.20	ppb(V)
1,1-Dichloroethane	<0.02	ppb(V)	Ethyl Acetate	<0.20	ppb(V)
1,1-Dichloroethene	<0.02	ppb(V)	Ethyl Benzene	<0.02	ppb(V)
1,2,4-Trichlorobenzene	<0.20	ppb(V)	Freon 113	<0.20	ppb(V)
1,2,4-Trimethylbenzene	<0.20	ppb(V)	Freon 114	<0.20	ppb(V)
1,2-Dibromoethane	<0.01	ppb(V)	Hexachlorobutadiene	<0.02	ppb(V)
1,2-Dichlorobenzene	<0.02	ppb(V)	Isooctane	<0.20	ppb(V)
1,2-Dichloroethane	<0.01	ppb(V)	Isopropyl Alcohol	<1.0	ppb(V)
1,2-Dichloropropane	<0.02	ppb(V)	Isopropylbenzene	<0.20	ppb(V)
1,3,5-Trimethylbenzene	<0.20	ppb(V)	m&p-Xylene	<0.04	ppb(V)
1,3-Butadiene	<0.20	ppb(V)	Methyl Ethyl Ketone	<0.20	ppb(V)
1,3-Dichlorobenzene	<0.02	ppb(V)	Methylcyclohexane	<0.20	ppb(V)
1,4-Dichlorobenzene	<0.02	ppb(V)	Methyl Isobutyl Ketone	<0.20	ppb(V)
1,4-Dioxane	<0.20	ppb(V)	Methylene Chloride	<0.02	ppb(V)
2-Chlorophenol	<0.20	ppb(V)	MTBE	<0.20	ppb(V)
2-Hexanone	<1.0	ppb(V)	Naphthalene	<0.05	ppb(V)
4-Ethyltoluene	<0.20	ppb(V)	n-Decane	<0.20	ppb(V)
Acetone	<1.0	ppb(V)	n-Heptane	<0.20	ppb(V)
Acrolein	<0.10	ppb(V)	n-Hexane	<0.02	ppb(V)
Allyl Chloride	<0.20	ppb(V)	o-Xylene	<0.02	ppb(V)
Benzene	<0.02	ppb(V)	Propylene	<0.20	ppb(V)
Benzyl Chloride	<0.20	ppb(V)	Styrene	<0.02	ppb(V)
Bromodichloromethane	<0.20	ppb(V)	Tetrachloroethylene	<0.02	ppb(V)
Bromobenzene	<0.20	ppb(V)	Tetrahydrofuran	<0.20	ppb(V)
Bromoform	<0.02	ppb(V)	Toluene	<0.02	ppb(V)
Bromomethane	<0.20	ppb(V)	trans-1,2-Dichloroethene	<0.02	ppb(V)
Carbon Disulfide	<0.50	ppb(V)	trans-1,3-Dichloropropene	<0.02	ppb(V)
Carbon Tetrachloride	<0.02	ppb(V)	Trichloroethylene	<0.02	ppb(V)
Chlorobenzene	<0.20	ppb(V)	Trichlorofluoromethane	<0.20	ppb(V)
Chloroethane	<0.02	ppb(V)	Vinyl Acetate	<0.50	ppb(V)
Chloroform	<0.02	ppb(V)	Vinyl Bromide	<0.20	ppb(V)
Chloromethane	<0.20	ppb(V)	Vinyl Chloride	<0.02	ppb(V)
cis-1,2-Dichloroethene	<0.02	ppb(V)	4-Bromofluorobenzene	102.25	%

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # CORD RSLIP VWs

Page 1 of 1

Report to:	Report Format / Distribution	Service Requested:
Company: Tetra Tech Canada Inc.	☐ Standard ☐ Other	☑ Regular Service (Default)
Contact: Kara Heckert	☑ PDF ☑ Excel ☐ Fax	☐ Rush Service (2-3 Days)
Address: 110, 140 Quarry Park Blvd SE, Calgary, AB T2C 3G3	Email 1: kara.heckert@tetratech.com	☐ Priority Service (1 Day or ASAP)
	Email 2: willem.verduyn@tetratech.com	☐ Emergency Service (<1 Day / Wkend) - Contact ALS
Phone: 431-554-1745 Fax:	ALS Digital Crosstab results	Analysis Request
Invoice To: ☑ Same as Report	Indicate Bottles: Filtered / Preserved (F/P) →	
Company: SAME AS REPORT	**Client / Project Information:**	
Contact:	Job #: SWM.SWOP04071-05.006	
Address:	PO/AFE: SWM.SWOP04071-05.006	
Sample	Legal Site Description:	
Phone: Fax:	Quote #: CG22-EBAE100-0021	
Lab Work Order # (lab use only)	ALS Contact: Patryk Wojciak	Sampler (Initials): WV

Sample #	Sample Identification (This description will appear on the report)	Date dd-mmm-yy	Time hh:mm	Sample Type (Select from drop-down list)	EP592	S621E - Aliphatic and Aroma	S629B - Methane, CO2, CO	inated?	tainers
	25VW-01	03-Dec-25	15:01	Air	X	X	X		
	25VW-02		14:39	Air	X	X	X		

Environmental Division
Calgary
Work Order Reference
CG2517660

Telephone : +1 403 407 1800

Guidelines / Regulations	Special Instructions / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.

Relinquished By:	Date & Time:	Received By:	Date & Time:	Sample Condition (lab use only)
Willem Verduyn	Dec 4/25 12:45		12/9 1258	Temperature: 5
Relinquished By:	Date & Time:	Received By:	Date & Time:	Samples Received in Good Condition? Y / N (if no provided details)

APPENDIX E

HISTORICAL ANALYTICAL RESULTS

Table 1
Groundwater Monitoring and Soil Vapour Well Elevations

Test Location	Well Depth (m)	Elevations				Screen Length (m)
		Ground (m)	Top of Pipe (m)	Screen Interval		
				Bottom	Top	
MW-01	7.6	854.669	854.539	847.069	851.669	4.6
MW-02	8.4	855.257	855.097	846.857	851.457	4.6
MW-03	7.6	854.551	854.461	846.951	851.551	4.6
VW-01	4.6	854.444	854.243	849.844	850.144	0.3
VW-02	6.1	855.329	854.429	849.229	849.529	0.3
TH-01	NA	854.665	- -	- -	- -	- -
TH-04	NA	855.279	- -	- -	- -	- -
TH-07	NA	855.058	- -	- -	- -	- -
TH-08	NA	854.759	- -	- -	- -	- -
TH-10	NA	854.418	- -	- -	- -	- -

Notes:

1) Geodetic elevations are determined from multiple datums, ASCM Nos. 36574 and 124339.
2) MW - Monitoring Well.
3) VW - Soil Vapour Well.
4) TH - Testhole.
5) NA - Not Applicable.
6) - - No value established.

Table 2
Site Monitoring Results

Test Location	Elevations		Groundwater Elevation (m)		Headspace Vapour				Notes
					01/08/13				
	Ground (m)	Top of Pipe (m)	01/08/13		Combustible	Volatile	Combustible	Volatile	
MW-01	854.669	854.539	849.752		510	ND			
MW-02	855.257	855.097	850.004		155	ND			
MW-03	854.551	854.461	849.421		460	ND			
VW-01	854.444	- -	- -	- -	1,750	ND			
VW-02	855.329	- -	- -	- -	1,300	1			
TH-01	854.665	- -	- -	- -	- -	- -	- -	- -	- -
TH-04	855.279	- -	- -	- -	- -	- -	- -	- -	- -
TH-07	855.058	- -	- -	- -	- -	- -	- -	- -	- -
TH-08	854.759	- -	- -	- -	- -	- -	- -	- -	- -
TH-10	854.418	- -	- -	- -	- -	- -	- -	- -	- -

Notes:

1) Measurement of combustible and volatile vapours by RKI Eagle 2. Units ppmv.
   Combustible vapour sensor calibrated to hexane and photoionization detector calibrated to isobutylene.
2) ND - Not Detected, less than the limit of instrument detection.
3) - - No value established.

Table 3
Analytical Results - Soil - Drill Cuttings (Soil Bag)

Parameter	Detection Limit	Soil Bag		Class II Landfill Acceptance Criteria
		1 of 2	2 of 2	
pH	0.10	8.47	8.80	2-12.5
Flash Point (°C)	30.0	>75	>75	>61
Paint Filter Test	-	PASS	PASS	PASS
Total Organic Carbon	0.10	0.85	0.36	- -
Hydrocarbons				
Benzene	0.0050	ND	ND	0.5
Toluene	0.0050	ND	ND	0.5
Ethylbenzene	0.0050	ND	ND	0.5
Xylenes	0.0050	ND	ND	0.5
Leachable Metals				
Antimony (Sb)	5.0	ND	ND	500
Arsenic (As)	0.20	ND	ND	5
Barium (Ba)	5.0	ND	ND	100
Beryllium (Be)	0.50	ND	ND	5
Boron (B)	5.0	ND	ND	500
Cadmium (Cd)	0.050	ND	ND	1
Chromium (Cr)	0.50	ND	ND	5
Cobalt (Co)	5.0	ND	ND	100
Copper (Cu)	5.0	ND	ND	100
Iron (Fe)	5.0	ND	ND	1,000
Lead (Pb)	0.50	ND	ND	5
Mercury (Hg)	0.010	ND	ND	0.2
Nickel (Ni)	0.50	ND	ND	5
Selenium (Se)	0.20	ND	ND	1
Silver (Ag)	0.50	ND	ND	5
Thallium (Tl)	0.50	ND	ND	5
Uranium (U)	1.0	ND	ND	2
Vanadium (V)	5.0	ND	ND	100
Zinc (Zn)	5.0	ND	ND	500
Zirconium (Zr)	5.0	ND	ND	500

Notes:

1) Class II Landfill Acceptance Criteria - per Table 2, Part 4 Schedule to the Alberta User Guide for Waste Managers 3/95. Applicable waste screening for The City of Red Deer Class II Waste Managment Facility.
2) All units are mg/L unless otherwise stated.
3) ND - Not Detected
4) Soil Bags were sampled July 14, 2013.
5) For further laboratory information, refer to the specific laboratory report in Appendix A.

Table 4A
Groundwater Indices Measured Time of Sampling

Monitoring Well	pH	Electrical Conductivity (µS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Total Dissolved Solids (mg/L)	Redox (±mV)
MW-01	8.22	1,025	8.8	0.92	968.50	-11.9
MW-02	7.64	584	9.4	3.47	539.50	+45.1
MW-03	8.35	1,378	8.7	2.29	1,287.00	-68.1

Notes:

1) Samples collected on August 01, 2013.
2) Groundwater indices measured by YSI Pro Plus multi-meter.

Table 4B
Analytical Results - Groundwater - General Water Quality

Parameter	Unit	Detection Limit	MW-01	MW-02	MW-03	Tier 1 Guideline
			08/01/13			
General Water Quality						
Biochemical Oxygen Demand	mg/L	2.0	2.2	ND	2.2	- -
Chemical Oxygen Demand	mg/L	5.0	210	130	190	- -
Conductivity	µS/cm	1.0	1,800	910	2,300	- -
pH	Unitless	NA	7.07	7.48	7.23	6.5-8.5
Total Organic Carbon (C)	mg/L	0.50	5.2	2.9	16	- -
Dissolved Cadmium (Cd)	µg/L	0.0050	0.080	0.040	0.047	- -
Total Cadmium (Cd)	µg/L	0.0050	**0.810**	**0.470**	**0.460**	0.060*
Alkalinity ($CaCO_3$)	mg/L	0.50	620	350	940	- -
Bicarbonate (HCO_3)	mg/L	0.50	750	430	1,100	- -
Carbonate (CO_3)	mg/L	0.50	ND	ND	ND	- -
Hydroxide (OH)	mg/L	0.50	ND	ND	ND	- -
Sulphates (SO_4)	mg/L	1.0	160	39	34	- -
Chlorides (Cl)	mg/L	1.0	110	59	190	- -
Total Ammonia (NH_3-N)	mg/L	0.050 - 0.50	ND	ND	**16**	1.37*
Total Phosphorus (P)	mg/L	0.1	1.8	0.63	0.69	- -
Total Nitrogen (N)	mg/L	0.050	23	2.1	14	- -
Total Kjeldahl Nitrogen (TKN)	mg/L	0.050 - 0.50	2.4	0.86	14	- -
Nitrite (NO_2)	mg/L	0.0030	0.91	ND	ND	- -
Nitrate (NO_3)	mg/L	0.0030 - 0.030	19	1.3	ND	- -
Nitrate plus Nitrite (N)	mg/L	0.0030 - 0.030	20	1.3	ND	- -
Trace Organics						
Acetic Acid	mg/L	50	ND	ND	ND	- -
Formic Acid	mg/L	50	ND	ND	ND	- -
Propionic Acid	mg/L	50	ND	ND	ND	- -
Adsorbable Organic Halogen	mg/L	0.004 - 0.02	0.075	0.055	0.05	- -

Notes:

1) Tier 1 Guideline - Alberta Tier 1 Soil and Groundwater Remediation Guidelines, December 2010 and amendments. Coarse-grained criteria for commercial/industrial land use.
2) * Surface Water Quality Guidelines for Use in Alberta (AENV, 1999) on aquatic life pathway. Canadian Council of Ministers of the Environment (CCME) guidelines are referenced.
3) ND - Not Detected, less than the limit of method detection.
4) - - No value established in the reference criteria.
5) Bold & Shaded - Exceeds the referenced Alberta Tier 1 Guidelines and CCME guidelines.
6) For further laboratory information, refer to the specific laboratory report in Appendix A.

Table 4C
Analytical Results - Groundwater - Metals

Parameter	Detection Limit	MW-01	MW-02	MW-03	Tier 1 Guideline
		01/08/13			
Total Metals					
Aluminum (Al)	0.0030	**21**	**9.3**	**8.7**	0.1*
Antimony (Sb)	0.00060	0.00098	0.00079	0.00087	0.006
Arsenic (As)	0.00020	**0.035**	**0.018**	**0.017**	0.005
Barium (Ba)	0.010	**1.4**	0.53	0.95	1
Beryllium (Be)	0.0010	0.0018	ND	ND	- -
Boron (B)	0.020	0.12	0.061	0.17	1.5
Calcium (Ca)	0.30	350	150	250	- -
Chromium (Cr)	0.0010	**0.049**	**0.019**	**0.021**	0.001*
Cobalt (Co)	0.00030	0.019	0.010	0.017	- -
Copper (Cu)	0.00020	**0.072**	**0.031**	**0.025**	0.003*
Iron (Fe)	0.060	**62**	**24**	**30**	0.3
Lead (Pb)	0.00020	**0.034**	**0.014**	**0.015**	0.004*
Lithium (Li)	0.020	0.075	0.036	0.051	- -
Magnesium (Mg)	0.20	110	48	96	- -
Manganese (Mn)	0.0040	**1.6**	**0.68**	**2.2**	0.05
Molybdenum (Mo)	0.00020	0.0035	0.0030	0.0049	0.073*
Nickel (Ni)	0.00050	0.071	0.032	0.035	0.11*
Phosphorus (P)	0.10	1.8	0.63	0.69	- -
Potassium (K)	0.30	13	7.3	29	- -
Selenium (Se)	0.00020	**0.0020**	**0.0028**	0.00077	0.001
Silicon (Si)	0.10 - 0.50	59	27	31	- -
Silver (Ag)	0.00010	**0.00066**	**0.00031**	**0.00021**	0.0001*
Sodium (Na)	0.50	70	36	150	- -
Strontium (Sr)	0.020	1.2	0.63	1.7	- -
Sulphur (S)	0.20	47	10	11	- -
Thallium (Tl)	0.00020	0.0004	ND	ND	0.0008*
Tin (Sn)	0.0010	0.0012	ND	0.0015	- -
Titanium (Ti)	0.0010	0.29	0.15	0.16	- -
Uranium (U)	0.00010	0.0099	0.0040	0.0047	0.02
Vanadium (V)	0.0010	0.07	0.03	0.025	- -
Zinc (Zn)	0.0030	**0.19**	**0.094**	**0.1**	0.03
Dissolved Metals					
Aluminum (Al)	0.0030	ND	ND	ND	- -
Antimony (Sb)	0.00060	ND	ND	ND	- -
Arsenic (As)	0.00020	0.00033	0.00051	0.0059	- -
Barium (Ba)	0.010	0.15	0.20	0.55	- -
Beryllium (Be)	0.0010	ND	ND	ND	- -
Boron (B)	0.020	0.11	0.057	0.16	- -
Calcium (Ca)	0.30	230	110	210	- -
Chromium (Cr)	0.0010	ND	ND	ND	- -
Cobalt (Co)	0.00030	0.0015	0.00073	0.0092	- -
Copper (Cu)	0.00020	0.0019	0.0021	0.0012	- -
Iron (Fe)	0.060	0.08	ND	4.1	- -
Lead (Pb)	0.00020	ND	ND	ND	- -
Lithium (Li)	0.020	0.035	0.021	0.035	- -
Magnesium (Mg)	0.20	73	35	80	- -
Manganese (Mn)	0.0040	0.22	0.14	1.8	- -
Molybdenum (Mo)	0.00020	0.0013	0.0017	0.0039	- -
Nickel (Ni)	0.00050	0.0086	0.0022	0.012	- -
Phosphorus (P)	0.10	ND	ND	0.13	- -
Potassium (K)	0.30	7.5	4.7	26	- -
Selenium (Se)	0.00020	0.00047	0.0016	0.00028	- -
Silicon (Si)	0.10	6.8	5.2	8.1	- -
Silver (Ag)	0.00010	ND	ND	ND	- -
Sodium (Na)	0.50	68	36	140	- -
Strontium (Sr)	0.020	1.1	0.58	1.7	- -
Sulphur (S)	0.20	44	9.3	9.0	- -
Thallium (Tl)	0.00020	ND	ND	ND	- -
Tin (Sn)	0.0010	ND	ND	ND	- -
Titanium (Ti)	0.0010	ND	ND	ND	- -
Uranium (U)	0.00010	0.0078	0.0028	0.0035	- -
Vanadium (V)	0.0010	ND	ND	ND	- -
Zinc (Zn)	0.0030	ND	ND	0.0077	- -

Notes:

1) Tier 1 Guideline - Alberta Tier 1 Soil and Groundwater Remediation Guidelines, December 2010 and amendments. Coarse-grained criteria for commercial/industrial land use.
2) * Surface Water Quality Guidelines for Use in Alberta (AENV, 1999) on aquatic life pathway. Canadian Council of Ministers of the Environment (CCME) guidelines are referenced.
3) ND - Not Detected, less than the limit of method detection.
4) Unless specified all units are mg/L.
5) - - No value established in the reference criteria.
6) Bold & Shaded - Exceeds the referenced Alberta Tier 1 and CCME guidelines.
7) For further laboratory information, refer to the specific laboratory report in Appendix A.

Table 4D
Analytical Results - Groundwater - VOCs

Parameter	Detection Limit	MW-01	MW-02	MW-03	Tier 1 Guideline
		01/08/13			
Volatile Organic Compounds					
Benzene	0.00040	ND	ND	ND	0.005
Toluene	0.00040	ND	ND	ND	0.024
Ethylbenzene	0.00040	ND	ND	ND	0.0024
Xylenes (Total)	0.00080	ND	ND	ND	0.3
F1 (C_6-C_{10})	0.10	ND	ND	ND	2.2
F2 (C_{10}-C_{16})	0.10	ND	ND	ND	1.1
Trihalomethanes (THMs)	0.0020	ND	ND	ND	0.1
Bromodichloromethane	0.00050	ND	ND	ND	- -
Bromoform	0.00050	ND	ND	ND	- -
Bromomethane	0.0020	ND	ND	ND	- -
Carbon tetrachloride	0.00050	ND	ND	ND	0.005
Chlorobenzene	0.00050	ND	ND	ND	0.0013
Chlorodibromomethane	0.0010	ND	ND	ND	- -
Chloroethane	0.0010	ND	ND	ND	- -
Chloroform	0.00050	ND	ND	ND	0.0018
Chloromethane	0.0020	ND	ND	ND	- -
1,2-dibromoethane	0.00050	ND	ND	ND	- -
1,2-dichlorobenzene	0.00050	ND	ND	ND	0.0007
1,3-dichlorobenzene	0.00050	ND	ND	ND	- -
1,4-dichlorobenzene	0.00050	ND	ND	ND	0.001
1,1-dichloroethane	0.00050	ND	ND	ND	- -
1,2-dichloroethane	0.00050	ND	ND	ND	0.005
1,1-dichloroethene	0.00050	ND	ND	ND	0.014
cis-1,2-dichloroethene	0.00050	ND	ND	ND	- -
trans-1,2-dichloroethene	0.00050	ND	ND	ND	- -
Dichloromethane	0.0020	ND	ND	ND	0.05
1,2-dichloropropane	0.00050	ND	ND	ND	- -
cis-1,3-dichloropropene	0.00050	ND	ND	ND	- -
trans-1,3-dichloropropene	0.00050	ND	ND	ND	- -
Methyl methacrylate	0.00050	ND	ND	ND	0.47
Methyl-tert-butylether (MTBE)	0.00050	ND	ND	ND	0.015
Styrene	0.00050	ND	ND	ND	0.072
1,1,1,2-tetrachloroethane	0.0020	ND	ND	ND	- -
1,1,2,2-tetrachloroethane	0.0020	ND	ND	ND	- -
Tetrachloroethene	0.00050	ND	ND	ND	0.03
1,2,3-trichlorobenzene	0.0010	ND	ND	ND	0.008
1,2,4-trichlorobenzene	0.0010	ND	ND	ND	0.015
1,3,5-trichlorobenzene	0.00050	ND	ND	ND	0.014
1,1,1-trichloroethane	0.00050	ND	ND	ND	- -
1,1,2-trichloroethane	0.00050	ND	ND	ND	- -
Trichloroethene	0.00050	ND	ND	ND	0.005
Trichlorofluoromethane	0.00050	ND	ND	ND	- -
1,2,4-trimethylbenzene	0.00050	ND	ND	ND	- -
1,3,5-trimethylbenzene	0.00050	ND	ND	ND	- -
Vinyl chloride	0.00050	ND	ND	ND	0.002

Notes:

1) Tier 1 Guideline - Alberta Tier 1 Soil and Groundwater Remediation Guidelines, December 2010 and amendments. Coarse-grained criteria for commerical/industrial land use.
2) ND - Not Detected, less than the limit of method detection.
3) Unless specified all units are mg/L
4) - - No value established in the reference criteria.
5) Bold & Shaded - Exceeds the referenced Alberta Tier 1 Guidelines.
6) For further laboratory information, refer to the specific laboratory report in Appendix A.

Table 5A
Summary of Field Parameters Measured During Sampling of Soil Vapour

Parameter	Well Diameter (mm)	Screen Length (cm)	Well Depth (m)	Headspace Volume (cm^3)	Purge Rate (cm^3/min)	Purge Time (min)	Pressure (psi)	
							Ambient	Vapour Well
VW-01	25	30	4.6	2,558.02	943.3	3 min 7 sec	15.08	15.03
VW-02	25	30	6.1	2,994.33	943.3	3 min 36 sec	15.17	15.18

Notes:

1) Measurement of pressure by digital Cole-Parmer absolute pressure gauge.
2) Purge time is elapsed time prior to the collection of a soil vapour sample.
3) Screen set at base of well.
4) Soil vapour sampling was completed July 31, 2013.

Table 5B
Analytical Results - Soil Vapour - General Indices

Parameter	Unit	Detection Limit	VW-01	VW-02
Gauge Pressure				
Following sampling	psi	- -	-4.7	-5.0
Reported by laboratory	psi	- -	-3.6	-3.6
Fixed Gases				
Oxygen	% v/v	0.2 - 0.3	2	5
Nitrogen	% v/v	0.2 - 0.3	50.9	67.0
Carbon monoxide	% v/v	0.2 - 0.3	ND	ND
Methane	% v/v	0.2 - 0.3	27.4	17.6
Carbon dioxide	% v/v	0.2 - 0.3	19.8	10.4

Notes:

1) Soil vapour sample collected on Wednesday, July 31, 2013.
2) ND - Not Detected, less than the limit of method detection.
3) - - No value established in the detection limit and reference criteria.
4) For further information, the reader should refer to the laboratory report in Appendix A.

Table 5C
Analytical Results - Soil Vapour - VOCs

Parameter	Unit	Detection Limit	VW-01	VW-02
			07/31/2013	
Volatile Hydrocarbon Fractions				
Aliphatic >C_5-C_6	µg/m^3	5.0 - 13	205	2,530
Aliphatic >C_6-C_8	µg/m^3	5.0	483	651
Aliphatic >C_8-C_{10}	µg/m^3	5.0	176	106
Aliphatic >C_{10}-C_{12}	µg/m^3	5.0	412	185
Aliphatic >C_{12}-C_{16}	µg/m^3	5.0	125	91.1
Aromatic >C_7-C_8 (TEX Excluded)	µg/m^3	5.0	ND	ND
Aromatic >C_8-C_{10}	µg/m^3	5.0	86.0	47.5
Aromatic >C_{10}-C_{12}	µg/m^3	5.0	71.1	41.7
Aromatic >C_{12}-C_{16}	µg/m^3	5.0	ND	ND
Select Volatile Gases				
Acetylene	ppm	0.21 - 0.26	ND	ND
Ethane	ppm	0.21 - 0.26	1.7	1.3
Ethylene	ppm	0.21 - 0.26	ND	ND
n-Butane	ppm	0.41 - 0.51	ND	0.47
n-Pentane	ppm	0.21 - 0.26	ND	ND
Propane	ppm	0.21 - 0.26	1.1	0.69
Propene	ppm	0.21 - 0.26	ND	ND
Propyne	ppm	0.41 - 0.51	ND	ND
Volatile Organic Compounds				
Dichlorodifluoromethane (FREON 12)	ppbv	0.20 - 0.80	3.34	341
1,2-Dichlorotetrafluoroethane	ppbv	0.17	ND	ND
Chloromethane	ppbv	0.30	0.87	ND
Vinyl chloride	ppbv	0.18	0.60	ND
Chloroethane	ppbv	0.30	ND	ND
1,3-Butadiene	ppbv	0.50	ND	ND
Trichlorofluoromethane (FREON 11)	ppbv	0.20	ND	ND
Ethanol (ethyl alcohol)	ppbv	2.3	34.4	23.5
Trichlorotrifluoroethane	ppbv	0.15	ND	ND
2-Propanol	ppbv	3.0	11.5	6.1
2-Propanone	ppbv	0.80	32.0	19.8
Methyl ethyl ketone (MEK) (2-Butanone)	ppbv	3.0	16.8	12.2
Methyl isobutyl ketone	ppbv	3.2	ND	ND
Methyl butyl ketone (MBK) (2-Hexanone)	ppbv	2.0	ND	ND
Methyl t-butyl ether (MTBE)	ppbv	0.20	ND	ND
Ethyl acetate	ppbv	2.2	2.6	ND
1,1-Dichloroethylene	ppbv	0.25	ND	ND
cis-1,2-Dichloroethylene	ppbv	0.19	ND	ND
trans-1,2-Dichloroethylene	ppbv	0.20	ND	ND
Methylene chloride(Dichloromethane)	ppbv	0.80	ND	ND
Chloroform	ppbv	0.15	ND	ND
Carbon tetrachloride	ppbv	0.30	ND	ND
1,1-Dichloroethane	ppbv	0.20	ND	ND
1,2-Dichloroethane	**ppbv**	**0.20**	**ND**	**0.29**
Ethylene dibromide	ppbv	0.17	ND	ND
1,1,1-Trichloroethane	ppbv	0.30	ND	ND
1,1,2-Trichloroethane	ppbv	0.15	ND	ND
1,1,2,2-Tetrachloroethane	ppbv	0.20	ND	ND
cis-1,3-Dichloropropene	ppbv	0.18	ND	ND
trans-1,3-Dichloropropene	ppbv	0.17	ND	ND
1,2-Dichloropropane	ppbv	0.40	ND	ND
Bromomethane	ppbv	0.18	ND	ND
Bromoform	ppbv	0.20	ND	ND
Bromodichloromethane	ppbv	0.20	ND	ND
Dibromochloromethane	ppbv	0.20	ND	ND
Trichloroethylene (TCE)	ppbv	0.30	2.23	1.82
Tetrachloroethylene (PCE)	ppbv	0.20	0.64	ND
Benzene	ppbv	0.18	2.93	1.15
Toluene	ppbv	0.20	14.1	11.1
Ethylbenzene	ppbv	0.20	4.01	2.53
p+m-xylene	ppbv	0.37	11.6	7.03
o-xylene	ppbv	0.20	5.01	2.85
Styrene	ppbv	0.20	1.4	0.81
4-Ethyltoluene	ppbv	2.2	ND	ND
1,3,5-Trimethylbenzene	ppbv	3.6 - 8.3	ND	ND
1,2,4-Trimethylbenzene	ppbv	0.50	3.76	2.27
Chlorobenzene	ppbv	0.20	ND	ND
Benzyl chloride	ppbv	1.0	ND	ND
1,3-Dichlorobenzene	ppbv	0.40	ND	ND
1,4-Dichlorobenzene	ppbv	0.40	ND	ND
1,2-Dichlorobenzene	ppbv	0.40	ND	ND
1,2,4-Trichlorobenzene	ppbv	2.0	ND	ND
Hexachlorobutadiene	ppbv	3.0	ND	ND
Hexane	ppbv	0.30	11.4	7.70
Heptane	ppbv	0.30	3.79	1.87
Cyclohexane	ppbv	0.20	34.9	8.60
Tetrahydrofuran	ppbv	0.40	8.14	7.87
1,4-Dioxane	ppbv	2.0	ND	ND
Xylene (Total)	ppbv	0.60	16.6	9.88
Vinyl bromide	ppbv	0.20	ND	ND
Propene	ppbv	220 - 240	ND	ND
2,2,4-Trimethylpentane	ppbv	0.20	4.62	3.52
Carbon disulfide	ppbv	0.50	5.31	3.24
Vinyl acetate	ppbv	0.20	ND	ND

Notes:

1) Results are from sampling performed on Wednesday, July 31, 2013.
2) ND - Not Detected, less than the limit of method detection.
3) - - No value established in the detection limit and reference criteria.
4) For further information, the reader should refer to the laboratory report in Appendix A.

Table 5D
Analytics Results - Soil Vapour - Siloxanes

Parameter	Detection Limit		VW-01		VW-02	
			07/31/2013			
	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm
Trimethylsilyl Fluoride	- -	- -	ND	ND	ND	ND
Tetramethylsilane	0.0001	0.0001	ND	ND	ND	ND
Methoxytrimethylsilane	0.0032	0.0007	ND	ND	ND	ND
Ethoxytrimethylsilane	0.0030 - 0.0031	0.0006	ND	ND	ND	ND
Trimethylsilanol	- -	- -	0.0243	0.0066	0.0172	0.0047
Isopropoxytrimethylsilane	0.0013	0.0002	ND	ND	ND	ND
Trimethoxymethyl Silane #	- -	- -	ND	ND	ND	ND
Hexamethyl Disiloxane - L2	0.0001	0.0001	ND	ND	ND	ND
Propoxytrimethylsilane	0.0035	0.0006	ND	ND	ND	ND
1-Methylbutoxytrimethylsilane *	- -	- -	ND	ND	ND	ND
Butoxytrimethylsilane *	- -	- -	ND	ND	ND	ND
Trimethoxyvinyl Silane #	- -	- -	ND	ND	ND	ND
Hexamethyl Cyclotrisiloxane - D3	- -	- -	0.0212	0.0023	0.0141	0.0016
Octamethyl Trisiloxane - L3	0.0002	0.0001	ND	ND	ND	ND
Triethoxyvinyl Silane #	- -	- -	ND	ND	ND	ND
Triethoxyethyl Silane #	- -	- -	ND	ND	ND	ND
Octamethyl Cyclotetrasiloxane - D4	- -	- -	0.0580	0.0048	0.0250	0.0021
Decamethyl Tetrasiloxane - L4	- -	- -	0.0022	0.0002	0.0009	0.0001
Tetraethylsilicate #	- -	- -	ND	ND	ND	ND
Decamethyl Cyclopentasiloxane - D5	- -	- -	0.8254	0.0545	0.5350	0.3530
Dodecamethyl Pentasiloxane - L5	0.0030	0.0002	ND	ND	ND	ND
Dodecamethyl Cyclohexasiloxane - D6	- -	- -	0.6919	0.0381	0.3017	0.0166
Sum	- -	- -	1.6375	0.1089	0.9083	0.0628

Notes:

1) Soil vapour samples collected on Wednesday, July 31, 2013.
2) ND - Not Detected, less than the limit of method detection.
3) - - No value established in the detection limit and reference criteria.
4) V=200 mL, where V is volume of air/gas sampled.
5) * - Semiquanititative (response factor set at 5).
6) # - Unstable, poor detectability, commercial standards tested.
7) For further information, the reader should refer to the laboratory report in Appendix A.

APPENDIX F

BOREHOLE LOGS

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** TH-01
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger/ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.665 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/17/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Testhole is located in the grassed area at southwest corner of 46A Avenue and 61 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam - silty, sandy, moist, dark olive. (~ 15 cm thick).						
	Clay (fill) - firm, silty, trace sand, trace pebbles, trace loam, moist, olive.						
1.0	becomes olive grey at 1.1 m.						
	Sand - loose to compact, trace silt, trace oxides, trace gravel, moist, olive.						
2.0	timber fragments and trace glass fragments at 2.4 m.						
3.0	becomes loamy - firm, trace gravel, trace masonry brick fragments, musky odor, moist, dark olive to black.						
4.0	becomes sandy - compact, gravel, grey at 4.9 m.						
5.0	gravelly, sandy, trace wood fragments, musty odor, wet. becomes wet at 5.2 m.						
6.0	trace timber at 6.1 m.						
	Gravel (native) - compact, sandy, silty, some loam, trace wood fragments, wet, grey. switch to ODEX at 6.7 m.						
7.0							
8.0	Shale (bedrock) - soft, weak, highly weathered, damp, grey.						
	End of hole at 8.5 m. Backfilled with ~ 50:50 bentonite and silica sand to 0.3 m depth. Capped with loamy soil.						
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 8.5
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** VW-01
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.444 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/17/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Soil Vapour Well is at northwest corner of 46A Avenue and 61 Street, on grassed boulevard.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam - loose, silty, trace sand, moist, dark olive (~ 15 cm thick).						
	Clay (fill) - stiff, silty, loamy, some gravel, moist, olive.						
1.0	wood fragments with loam and sand at 2 m.						
2.0	Sand and gravel (fill) - compact, moist, olive.						
3.0	No obvious waste material.						
	Clay (fill) - firm, silty, some loam, trace loam, trace wood fragments, trace gravel, trace sand, moist, olive grey.						
4.0	End of hole at 4.6 m.						
	25 mm diameter 30 cm length 020 PVC screen.						
5.0	Flush mount bolt-down steel casing set in concrete.						
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 4.6
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** VW-02
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger/ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 855.329 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/17/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Soil Vapour Well is at 61 Street on grass boulevard across from 4622 - 61 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)	Well Details
0.0	Sod and loam - soft, sand, silty, trace rootlets, moist, olive brown. (~ 8 cm thick). Sand (fill) - loose, trace silts, moist, light olive.					
1.0	Loam - firm, silty, some sand, trace clay, moist, dark olive. wood fragments at 1.1 m. mixture of loam, sand, clay, silt, trace gravel, musty odor, moist, dark olive.					
2.0						
3.0	Sand - loose to compact, trace silt, damp, olive grey. No obvious waste material. becomes silty at 3.8 m.					
4.0						
5.0	Gravel (native) - dense, sandy, trace silt, damp to moist, dark olive.					
6.0	End of hole at 6.1 m. 25 mm diameter 30 cm length 020 PVC screen. Flush mount bolt-down steel casing set in concrete.					
7.0						
8.0						
9.0						
10.0						
11.0						
12.0						

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Slough : 0.9 m	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** TH-04
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 855.279 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/17/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Testhole is located on boulevard at Unit #1, 4622 - 61 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam - silty, sandy, trace rootlets, moist, dark olive. (~ 8 cm thick).						
	Sand (fill) - firm, silty, some loam, trace rootlets, moist, dark olive.						
	becomes silt, some loam, trace clay, trace gravel, moist, dark olive at 0.4 m.						
1.0	No obvious waste material.						
	Sand (fill) - loose, some loam, trace silt, damp, dark olive.						
2.0	becomes silty at 2 m to 2.3 m.						
	becomes light olive brown at 3 m.						
3.0							
4.0	No obvious waste material.						
	Gravel (native) - dense, sandy, moist to wet, olive.						
5.0							
6.0	End of hole at 6.1 m.						
	Backfilled with ~ 50:50 bentonite and silica sand to 0.3 m depth.						
	Capped with loamy sand, silt to surface.						
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** MW-01
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger/ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.669 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/18/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Groundwater Monitoring Well on 47 Avenue roadway, east of 61 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)	Well Details
0.0	Asphalt pavement (~ 7 cm thick). Gravel (fill) - compact, sandy, silty, some clay, moist, olive.					
1.0	Clay (fill) - stiff to firm, some loam, moist, olive. No obvious waste material.					
2.0	Sand (fill) - compact, silty, some pebbles, trace organics (rootlets, wood chips), moist, olive.					
	Sand (native) - compact, trace silt, moist, olive.					
3.0						
4.0	becomes silty at 4.1 m. becomes wet at 4.4 m.					
	Sand and gravel (native) - compact to dense, trace silt, wet, olive.					
5.0	Shale (bedrock) - weak, highly weathered, moist, blue-grey.					
6.0						
7.0						
	End of hole at 7.6 m.					
8.0	51 mm diameter 4.6 m length 010 PVC screen. Flush mount bolt-down steel casing set in concrete.					
9.0						
10.0						
11.0						
12.0						

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Slough :	Completion Depth (m): 7.6
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** MW-02
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger/ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 855.257 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/18/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Groundwater Monitoring Well is at Unit #6, 4669 - 62 Street ~ 0.5 m from curb face in gravel boulevard.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Gravel (fill) - compact, silty, some sand, moist, olive.						
	Sand (fill) - compact, silty, trace loam, moist, olive to dark olive.						
1.0	No obvious waste material.						
	Sand and gravel (native) - dense, trace silt, damp, olive.						
2.0							
3.0							
4.0							
5.0							
6.0	becomes wet at 6.1 m.						
	Clay - soft, trace silt, wet, olive.						
7.0							
8.0	Sand - compact, trace gravel, wet, olive.						
	End of hole at 8.4 m. 51 mm diameter 010 PVC screen. 3.0 m solid PVC pipe.						
9.0	Flush mount bolt-down steel casing set in concrete.						
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 8.4
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** TH-07
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 855.058 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/18/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Testhole is located in front of 4645 - 62 Street on grassed boulevard.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod - loam. (~ 8 cm thick).						
	Loam - gravelly, silty, trace clay, damp, olive.						
	Sand (fill) - compact, trace silt, moist, olive.						
1.0							
	Loamy gravel (fill) - compact, some sand, trace organics, trace silt, moist, dark olive.						
2.0	No obvious waste material.						
	Sand (native) - compact, trace silt, moist, olive.						
3.0	Sand and gravel (native) - dense, trace silt, damp, olive.						
4.0							
5.0	End of hole at 5.2 m. Backfilled with ~ 50:50 bentonite and silica sand to 0.3 m depth. Capped with loam, silt to surface.						
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 5.2
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** TH-08
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.759 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/18/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Testhole is located on grassed area, west side of 62 Street across from 4645 - 62 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod - loam. (~ 8 cm thick).						
	Loamy gravel - silty, some sand, trace organics, moist, dark olive.						
	Sand and gravel (fill) - compact, silty, moist, olive.						
	Sand (fill) - compact, silty, trace clay, moise, dark olive.						
1.0							
2.0	trace plastic fragments at 2.4 m.						
3.0	becomes loose and wet at 3.4 m. No obvious waste material.						
	trace oxides at 3.8 m.						
4.0							
	Sand (native) - compact, clean, wet, olive.						
5.0							
6.0	End of hole at 6.1 m. Backfilled with ~ 50:50 bentonite and silica sand to 0.3 m depth. Capped with loamy soil, silt to surface.						
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** MW-03
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger/ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.551 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/19/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Groundwater Monitoring Well on north side of 46 Avenue ~ 3 m west of the CN track R/W on grassed boulevard

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod - loam, silty, sandy, moist, dark olive. (~ 15 cm thick)						
	Sand and gravel (fill) - compact, trace organics, trace clay, moist, olive.						
1.0							
	Clay (fill) - firm, sandy, trace silts, trace organics, moist, olive.						
	wood fragments at 1.8 m to 2.4 m.						
2.0							
	Loam - firm, silty, sandy, damp, dark olive.						
	some oxides at 2.9 m. No obvious waste material.						
3.0	Sand (native) - loose to compact, trace silts, damp, light olive.						
	Sand and gravels - compact to dense, trace silt, olive.						
4.0							
5.0	Gravel - compact, wet at 5.2 m.						
	Clay at 5.5 m to 5.8 m.						
6.0							
7.0							
	End of hole at 7.6 m.						
8.0	51 mm diameter 4.6 m length 010 PVC screen.						
	3.0 m solid PVC pipe.						
	Flush mount bolt-down steel casing set in concrete.						
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 7.6
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

PROJECT: Phase II ESA Historic Waste Disposal Sites	**BOREHOLE No.:** TH-10
PROJECT No.: 12-435	**DRILL TYPE:** ODEX
LOCATION: Riverside Light Industrial Park	**GROUND ELEVATION:** 854.418 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/19/2013

Sample Type: Shelby Tube | Split Spoon | Core | Disturbed | No Recovery

Backfill Type: Bentonite | Silica Sand | Grout | Pea Gravel | Drill Cuttings | Bentonite : Sand

Notes: Testhole is on west side of 62 Street in grassed boulevard across from 4645 - 62 Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod - loam, silty, sandy, trace organics, moist, dark olive.						
	Clay (fill) - firm, silty, some gravel, trace sand, moist, light olive.						
1.0	trace wood fragments at 1.1 m.						
	Sandy loam - wood chips, trace organics, damp to moist, dark olive.						
	Clay (fill) - firm, trace sand, trace gravel, trace oxides, moist, olive.						
2.0	trace organics at 2.1 m.						
3.0							
4.0	No obvious waste material.						
	Silt (native) - firm, sand, moist, olive.						
5.0							
	Sand and gravel - compact, trace silt, wet, olive.						
6.0	End of hole at 6.1 m. Backfilled with ~ 50:50 bentonite and silica sand to 0.3 m depth. Capped with loamy soil to surface.						
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
Logged By: LTM	Page: 1 of 1

Borehole No: **22MW-04**

Project: 2023 Pre-1972 Site Monitoring Program	Project No: SWM.SWOP04071-03.009
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0	Solid stem auger	TOPSOIL - (200 mm thick)	Pipe stickup = 0.85 metres	0
		CLAY - silty, some gravel, damp, stiff, brown, coal and iron inclusions		
1		- some sand, moist, soft		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
2				
3		SAND - trace gravel		
		- gravelly, wet		
4				
		CLAY - silty, some gravel, moist, soft, grey		
5				
6		END OF BOREHOLE (6.00 metres) slough - 1.07 metres at 0 hrs. Monitoring well installed to 6.00 metres		
7				
7.5				

TETRA TECH

Contractor: CP Drilling	Completion Depth: 6 m
Equipment Type: Skid Steer	Start Date: 2022 December 10
Logged By: RM	Completion Date: 2022 December 10
Reviewed By:	Page 1 of 1

Borehole No: **22VW-01**

Project: 2023 Pre-1972 Site Monitoring Program	Project No: SWM.SWOP04071-03.009
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	

Depth (m)	Method	Soil Description	Notes and Comments	22VW-01	Depth (ft)
0					0
	Solid stem auger	TOPSOIL - (100 mm thick) CLAY - silty, trace gravel, dry to damp, coal inclusions	Flush mount		
1		- trace sand, damp, greyish black, no discernible odour - some gravel			
2					
3					
4		- 200 mm thick sand inclusion			
		END OF BOREHOLE (4.50 metres) slough - none at 0 hrs. Monitoring well installed to 4.50 metres			
5					
6					
7					
7.5					

Contractor: CP Drilling	Completion Depth: 4.5 m
Equipment Type: Skid Steer	Start Date: 2022 December 5
Logged By: RM	Completion Date: 2022 December 5
Reviewed By:	Page 1 of 1

Borehole No: **22VW-03**

Project: 2023 Pre-1972 Site Monitoring Program	Project No: SWM.SWOP04071-03.009
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	

Depth (m)	Method	Soil Description	Notes and Comments	22VW-03	Depth (ft)
0					0
	Solid stem auger	TOPSOIL - (200 mm thick)	Flush mount		
		CLAY (FILL) - silty, trace gravel, dry to damp, soft, brown			
1		- 1.00 metre thick sand seam - fine grained sand, moist, greyish brown, iron inclusions			
2		CLAY (ORGANIC) - damp, medium plastic, black			
3		END OF BOREHOLE (3.00 metres) slough - none at 0 hrs. Monitoring well installed to 3.00 metres			
4					
5					
6					
7					
7.5					

Contractor: CP Drilling	Completion Depth: 3 m
Equipment Type: Skid Steer	Start Date: 2022 December 5
Logged By: RM	Completion Date: 2022 December 5
Reviewed By:	Page 1 of 1

Borehole No: **22VW-04**

Project: 2023 Pre-1972 Site Monitoring Program	Project No: SWM.SWOP04071-03.009
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0				0
	Solid stem auger	TOPSOIL - (200 mm thick)	Pipe stickup = 1.00 metre	
		CLAY - silty, some sand, damp, soft, low plastic, brown		
1				1
				2
				3
				4
				5
				6
2		- trace gravel, sand inclusions		7
				8
				9
3		END OF BOREHOLE (3.00 metres) slough - none at 0 hrs. Monitoring well installed to 3.00 metres		10
				11
				12
4				13
				14
				15
5				16
				17
				18
6				19
				20
				21
7				22
				23
7.5				24

Contractor: CP Drilling	Completion Depth: 3 m
Equipment Type: Skid Steer	Start Date: 2022 December 10
Logged By: RM	Completion Date: 2022 December 10
Reviewed By:	Page 1 of 1

Borehole No: **22VW-05**

Project: 2023 Pre-1972 Site Monitoring Program	Project No: SWM.SWOP04071-03.009
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	

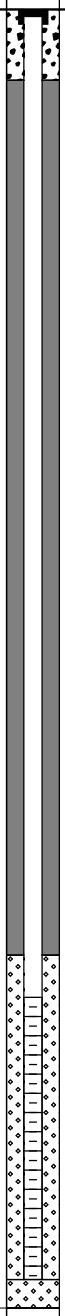
Depth (m)	Method	Soil Description	Notes and Comments	22VW-05	Depth (ft)
0					0
	Solid stem auger	SAND (FILL) - silty, trace gravel, dry, loose - trace wood chips			1 2 3 4 5 6
1 2		CLAY - silty, damp, medium plastic, trace orange, white and black inclusions - trace wood waste - some sand			7 8 9
3		END OF BOREHOLE (3.00 metres) slough - none at 0 hrs. Monitoring well installed to 3.00 metres			10 11 12
4					13 14 15
5					16 17 18
6					19 20 21
7					22 23
7.5					24

Contractor: CP Drilling	Completion Depth: 3 m
Equipment Type: Skid Steer	Start Date: 2022 December 5
Logged By: RM	Completion Date: 2022 December 5
Reviewed By:	Page 1 of 1

Borehole No: **24VW-06**

Project: Reiverside Light Industrial Park	Project No: SWM.SWOP04071-04.006
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	UTM: 308844 E; 5796561 N; Z 12

Depth (m)	Method	Soil Description	Notes and Comments
0	Hydrovac	Hyrdrovacced	Flush mount
1			
2	Solid Stem Auger	SAND - trace silt, trace clay, fine to medium grained sand, poorly graded, damp, soft, brown	
3		SILT - some sand, trace clay, trace gravel, fine to coarse grained sand, gravel to 10 mm diameter, well graded, moist, soft, non to low plastic, grey	
4			
5		END OF BOREHOLE (4.6 metres) Vapour well installed to 4.6 metres	



Depth (ft): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Contractor: Ernco Environmental Drilling & Coring Inc.	Completion Depth: 4.6 m
Equipment Type: GeoProbe 3230DT	Start Date: 2024 September 3
Logged By: LL	Completion Date: 2024 September 3
Reviewed By: CW	Page 1 of 1

Borehole No: **24VW-07**

Project: Reiverside Light Industrial Park	Project No: SWM.SWOP04071-04.006
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	UTM: 308687 E; 5796279 N; Z 12

Depth (m)	Method	Soil Description	Notes and Comments	24VW-07	Depth (ft)
0					0
	Solid Stem Auger	SAND - trace silt, trace clay, trace gravel, fine to coarse grained sand, gravel to 35 mm diameter, poorly graded, damp, soft to firm	Flush mount		
1					1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
2		- some gravel, subangular to subrounded gravel			
3					
4					
		END OF BOREHOLE (4.6 metres) slough - 1.67 metres Vapour well installed to 4.4 metres			
5					

TETRA TECH

Contractor: Ernco Environmental Drilling & Coring Inc.	Completion Depth: 4.6 m
Equipment Type: GeoProbe 3230DT	Start Date: 2024 September 3
Logged By: LL	Completion Date: 2024 September 3
Reviewed By: CW	Page 1 of 1

Borehole No: **24VW-08**

Project: Reiverside Light Industrial Park	Project No: SWM.SWOP04071-04.006
Location: NW 1/4, Sec. 21-38-27 W4M	
Red Deer, Alberta	UTM: 308567 E; 5796198 N; Z 12

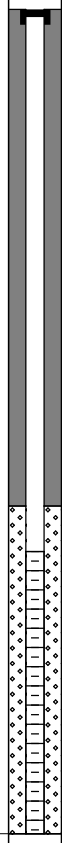
Depth (m)	Method	Soil Description	Notes and Comments	24VW-08	Depth (ft)
0		TOPSOIL AND ORGANICS - (150 mm thick)	Flush mount		0
		SAND - some silt, trace clay, trace gravel, subrounded gravel, well graded, damp, soft, dark brown			
		SILT - some sand, some clay, trace gravel, subangular to subrounded gravel to 20 mm diameter, well graded, damp, low plastic, dark brown			
		- grey clay lens			
1					1
					2
					3
					4
		SAND - trace silt, trace clay, fine to medium grained sand, poorly graded, damp, soft, brown			5
2	Solid Stem Auger				6
					7
					8
		- some silt			9
3					10
		SILT - some sand, trace clay, trace gravel, subangular to subrounded gravel to 30 mm diameter, well graded, damp, low plastic, brown			11
					12
					13
4					14
					15
		END OF BOREHOLE (4.6 metres) slough - 4.5 metres Vapour well installed to 4.5 metres			16
5					

TETRA TECH

Contractor: Ernco Environmental Drilling & Coring Inc.	Completion Depth: 4.6 m
Equipment Type: GeoProbe 3230DT	Start Date: 2024 September 4
Logged By: WV	Completion Date: 2024 September 4
Reviewed By: CW	Page 1 of 1

Borehole No: **25VW-09**

Project: Riverside Light Park Vapour Well Installation	Project No: SWM.SWOP04071-05.006
Location: 6204 46 Avenue	
Red Deer, Alberta	UTM: 308754 E; 5796610 N; Z 12

Depth (m)	Method	Soil Description	Notes and Comments	25VW-09	Depth (ft)
0					0
	Hydrovac	Borehole completed using hydro excavation methods due to buried facilities in the immediate vicinity of the borehole location	Pipe recess = 0.12 metres		
1					1
					2
					3
2					4
					5
					6
					7
					8
					9
3					10
		END OF BOREHOLE (3.04 metres) slough - none at completion water - dry at completion Vapour well installed to 3.04 metres			11
					12
					13
4					14
					15
					16
5					

TETRA TECH

Contractor: Ernco Environmental	Completion Depth: 3.04 m
Equipment Type: Truck mounted	Start Date: 2025 October 17
Logged By: WV	Completion Date: 2025 October 17
Reviewed By: CW	Page 1 of 1

Borehole No: **25VW-10**

Project: Riverside Light Park Vapour Well Installation	Project No: SWM.SWOP04071-05.006
Location: Greenspace North of 46 Avenue and 62 Street	
Red Deer, Alberta	UTM: 308932 E; 5796684 N; Z 12

Depth (m)	Method	Soil Description	Notes and Comments	25VW-10	Depth (ft)
0					0
	Hydrovac	SAND - some silt, some gravel, trace clay, fine grained sand, subangular to subrounded gravel, well graded, dry, loose, brown	Pipe recess = 0.16 metres		
		SILT - sandy, trace clay, fine grained sand, dry, soft, brown			
1					1
					2
					3
2					4
					5
					6
					7
					8
3					9
		END OF BOREHOLE (3.00 metres) slough - none at completion water - dry at completion Vapour well installed to 3.00 metres Note: Hydrovacced borehole in same hole as the hand augered 25VW-02A, therefore stratigraphy from 0.91 metres down is assumed.			10
					11
					12
4					13
					14
					15
					16
5					

TETRA TECH

Contractor: Ernco Environmental	Completion Depth: 3 m
Equipment Type: Truck mounted	Start Date: 2025 December 3
Logged By: WV	Completion Date: 2025 December 3
Reviewed By: CW	Page 1 of 1

APPENDIX G

HISTORICAL GROUNDWATER DATA

Table 1: Groundwater Monitoring Results

Monitoring Well		MW-01	MW-02	MW-03	22MW-04	MW-01 (Lot 4)	MW-02 (Lot 4)	MW-03 (Lot 4)
Total Drilled Depth (m)		7.6	8.4	7.6	6.0	7.0	5.8	6.9
Top of Screened Interval (mbg)		3.0	3.0	3.0	3.0	3.0	2.8	3.9
Bottom of Screened Interval (mbg)		7.6	8.4	7.6	6.0	7.0	5.8	6.9
Stick up (m)		-0.13	-0.16	-0.09	0.97	0.76	-	0.93
Ground Elevation (m)		854.67	855.26	854.55	851.35	853.62	-	853.12
TPC Elevation (m)		854.54	855.10	854.46	852.32	854.38	-	854.05
Depth to Groundwater (mBTPC)	Mar-13	-	-	-	-	5.20	4.79	4.84
	Apr-13	-	-	-	-	5.19	4.78	4.82
	Aug-13	4.92	5.25	5.13	-	-	-	-
	Jun-19	5.14	CNL	5.29	-	5.17	CNL	4.81
	Dec-19	5.32	CNL	5.15	-	5.20	CNL	4.83
	Apr-21	4.90	Destroyed	5.18	-	5.07	Destroyed	4.69
	Jul-21	4.86	Destroyed	5.16	-	5.06	Destroyed	4.68
	Nov-21	4.98	Destroyed	5.25	-	5.18	Destroyed	4.79
	May-23	5.04	Destroyed	5.26	4.41	5.18	Destroyed	4.80
	Sep-24	5.00	Destroyed	5.25	4.40	5.18	Destroyed	4.79
Groundwater Elevation (m)	Mar-13	-	-	-	-	849.18	-	849.21
	Apr-13	-	-	-	-	849.19	-	849.23
	Aug-13	849.62	849.84	849.33	-	-	-	-
	Jun-19	849.40	CNL	849.17	-	849.21	CNL	849.24
	Dec-19	849.22	CNL	849.32	-	849.18	CNL	849.22
	Apr-21	849.64	Destroyed	849.29	-	849.31	Destroyed	849.36
	Jul-21	849.68	Destroyed	849.30	-	849.32	Destroyed	849.37
	Nov-21	849.56	Destroyed	849.22	-	849.20	Destroyed	849.27
	May-23	849.50	Destroyed	849.20	847.91	849.20	Destroyed	849.25
	Sep-24	849.54	Destroyed	849.21	847.92	849.20	Destroyed	849.26
Volatile Organic Compounds* (VOCs) (ppm)	Aug-13	ND	ND	ND	-	-	-	-
	Jun-19	1	CNL	ND	-	ND	CNL	ND
	Dec-19	ND	CNL	1	-	ND	CNL	ND
Combustible Vapour Concentrations* (CVCs) (ppm)	Aug-13	510	155	460	-	-	-	-
	Jun-19	770	CNL	150	-	430	CNL	40
	Dec-19	5	CNL	10	-	ND	CNL	ND
Methane Concentrations (ppm)**	Apr-21	75	-	500		100	-	10
	Jul-21	5	-	280		ND	-	10
	Nov-21	640	-	110		100	-	65
	May-23	230	-	130	45	30	-	40
	Sep-24	ND	-	ND	ND	ND	-	ND

Notes:

mbg - Metres below grade.
mBTPC - Metres below top of plastic pipe casing.
N/A - Not applicable; prior to well installation.
CNL - Could not locate.
ND - Non-detect.
ppm - Parts per million.
*- Measured using an RKI Eagle II calibrated to hexane and isobutlene and operated in methane elimination mode.
**- Measured using an RKI Eagle II calibrated to methane.
- Not measured/information unavailable.

Table 2: Groundwater Analytical Results

Parameter	Unit	Tier 1 Guidelines[1,2]	MW-01		MW-01 (Lot 4)		MW-03				22MW-04		MW-03 (Lot 4)	
			05 Dec 2019	23 Nov 2021	05 Dec 2019	23 Nov 2021	05 Dec 2019	23 Nov 2021	31 May 2023	06 Sep 2024	31 May 2023	06 Sep 2024	05 Dec 2019	23 Nov 2021
Field Parameters														
Field pH	pH Units	6.5 to 8.5	7.50	6.90	7.79	7.45	8.35	6.92	6.88	6.74	7.08	6.77	7.78	6.98
Field Electrical Conductivity	µS/cm	-	1,201	1,166	1,066	1,129	1,367	1,604	2,480	2,380	1,763	1,705	1,409	900
Field Temperature	°C	-	6.5	8.2	7.2	7.4	5.8	7.2	9.0	11.0	9.3	15.6	7.4	8.3
Routine														
pH	pH Units	6.5 to 8.5	7.32	7.51	7.59	7.41	7.42	7.06	7.36	7.36	7.59	7.89	7.61	7.47
Electrical Conductivity (EC)	µS/cm	-	1,820	1,630	1,460	1,640	2,100	2,320	2,320	2,240	1,670	1,660	1,370	1,300
Total Dissolved Solids (TDS)	mg/L	500	**1,190**	**1,080**	**963**	**1,060**	**654**	**1,440**	**1,470**	**1,250**	**1,070**	**1,020**	**820**	**826**
Hardness	mg/L	-	881	759	874	788	831	807	851	715	600	574	658	626
Alkalinity	mg/L	-	692	633	559	688	1,040	1,170	1,110	1,040	781	762	591	584
Bicarbonate	mg/L	-	844	772	681	840	1,270	1,430	1,360	1,270	952	930	721	712
Carbonate	mg/L	-	<5	<1	<5	<1	<5	<1	<1.0	<1.0	<1.0	<1.0	<5	<1
Hydroxide	mg/L	-	<5	<1	<5	<1	<5	<1	<1.0	<1.0	<1.0	<1.0	<5	<1
Calcium	mg/L	-	229	197	220	195	190	179	182	151	156	147	157	152
Magnesium	mg/L	-	75.2	64.8	78.8	73.1	86.5	87.4	96.3	82.1	51.1	50.2	64.7	59.9
Potassium	mg/L	-	8.78	8.04	8.55	8.03	32.2	55.8	68.1	62.1	10.1	11.6	10.1	9.59
Sodium	mg/L	200	69.7	72.4	65	69.6	154	143	157	129	**211**	166	57.5	59.3
Chloride	mg/L	120	**125**	**127**	113	118	**168**	**171**	**172**	**160**	101	104	106	89.6
Fluoride	mg/L	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.218	<0.100	0.110	0.402	0.368	<0.1	0.116
Sulphate	mg/L	429[#1]	135	126	107	118	21.7	8.86	4.53	2.25	51.3	57.6	70.1	83.7
Anions Total (filtered)	meq/L	-	-	20.2	-	20.3	-	28.4	27.1	25.3	19.6	19.4	-	16
Cations Total (filtered)	meq/L	-	-	18.5	-	19	-	27.2	30	22.0	21.5	19.0	-	15.5
Ionic Balance	%	-	93.7	4.39	120	3.31	97.9	2.16	-5.08	87.0	-4.62	97.9	98.8	1.59
Nutrients														
Ammonia as N	mg/L	5.2[#2]	<0.05	0.0167	<0.05	0.0213	**19.1**	**40.8**	**51.3**	-	0.253	-	2.06	1.73
Nitrate (as NO3-N)	mg/L	3	**29.6**	**18.6**	**8.05**	**10.7**	0.44	0.142	0.063	<0.100	0.422	0.703	<0.1	0.124
Nitrite (as NO2-N)	mg/L	0.2[#3]	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.019	<0.050	<0.010	<0.050	<0.05	<0.05
Nitrate and Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	<0.112	-	0.703	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	-	<0.2	-	3.6	-	22.7	-	-	-	-	-	2.3	-
Hydrocarbons														
Benzene	mg/L	0.005	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Toluene	mg/L	0.021	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Ethylbenzene	mg/L	0.0016	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Xylene (o)	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Xylenes (m & p)	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Xylenes Total	mg/L	0.02	<0.00071	-	<0.00071	-	<0.00071	-	-	-	-	-	<0.00071	-
Styrene	mg/L	0.072	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
F1 (C6-C10_)	mg/L	0.81	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	<0.1	-
F1 (C6-C10) - BTEX	mg/L	0.81	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	<0.1	-
F2 (C10-C16 Hydrocarbons)	mg/L	1.1	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	<0.1	-
Dissolved Metals														
Aluminum	mg/L	0.05[#4]	**0.305**	<0.005	0.0187	<0.005	<0.005	<0.005	0.0014	<0.0020	0.002	0.0014	0.004	0.0059
Antimony	mg/L	0.006	<0.0005	<0.0005	0.00014	<0.0005	<0.0005	<0.0005	0.0001	<0.00020	0.0002	0.00024	<0.0001	<0.0005
Arsenic	mg/L	0.005	0.00053	<0.0005	0.0003	<0.0005	0.00123	**0.00675**	**0.0213**	**0.0154**	0.0009	0.00068	0.00046	<0.0005
Barium	mg/L	2	0.168	0.135	0.187	0.165	0.599	1.26	1.82	1.48	0.276	0.250	0.272	0.246
Beryllium	mg/L	-	-	<0.0001	-	<0.0001	-	<0.0001	-	-	-	-	-	<0.0001
Boron	mg/L	1.5	0.114	0.109	0.078	0.09	0.176	0.157	0.153	0.157	0.186	0.193	0.07	0.086
Cadmium	mg/L	0.00037[#1]	**0.000407**	0.000234	0.000155	0.000149	0.000033	0.000243	**0.00082**	0.000225	0.0000308	0.0000273	0.0000707	0.000045
Chromium	mg/L	0.05	<0.0005	<0.0025	<0.0001	<0.0025	<0.0005	<0.0025	<0.00050	<0.00100	<0.00050	<0.00050	<0.0001	<0.0025
Cobalt	mg/L	-	-	<0.0005	-	<0.0005	-	0.00678	-	-	-	-	-	0.0026
Copper	mg/L	0.007	0.0021	<0.001	0.00139	0.00201	<0.001	0.00124	0.0004	<0.00040	0.00117	0.00201	0.00055	0.00125
Iron	mg/L	0.3	**0.379**	<0.05	0.023	<0.05	<0.05	**13.8**	**19.9**	**14.8**	0.023	0.012	0.106	0.126
Lead	mg/L	0.007[#1]	0.00062	<0.00025	<0.00005	<0.00025	<0.00025	<0.00025	<0.000050	<0.000100	<0.000050	<0.000050	<0.00005	<0.00025
Lithium	mg/L	-	-	0.036	-	0.042	-	0.0386	-	-	-	-	-	0.0372
Manganese	mg/L	0.02	**0.095**	**0.0395**	**1.22**	**1.2**	**0.727**	**0.639**	**0.438**	**0.447**	**0.998**	**0.414**	**1.03**	**1.01**
Mercury	mg/L	0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	0.0000050	<0.000005	<0.000005
Molybdenum	mg/L	-	-	0.000966	-	0.00238	-	0.00453	-	-	-	-	-	0.00132
Nickel	mg/L	0.17[#1]	0.0061	0.00513	0.0102	0.0104	0.0108	0.013	0.0114	0.0122	0.00615	0.00626	0.00519	0.0051
Phosphorus	mg/L	-	0.0997	<0.25	2.4	<0.25	0.129	<0.25	-	-	-	-	0.399	<0.25
Selenium	mg/L	0.002	0.00056	0.000459	0.000106	<0.00025	<0.00025	0.00026	0.000353	0.000243	0.000316	0.000285	0.000088	<0.00025
Silicon	mg/L	-	-	6.59	-	6.24	-	10.3	-	<0.000020	-	<0.000010	-	6.48
Silver	mg/L	0.0001	<0.00005	<0.00005	<0.00001	<0.00005	<0.00005	<0.00005	<0.000010	-	<0.000010	-	<0.00001	<0.00005
Strontium	mg/L	-	-	0.919	-	1.12	-	2.1	-	-	-	-	-	0.988
Thallium	mg/L	-	-	0.000056	-	0.0001	-	<0.00005	-	-	-	-	-	0.000066
Tin	mg/L	-	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005
Titanium	mg/L	-	-	<0.0015	-	<0.0015	-	<0.0015	-	-	-	-	-	<0.0015
Uranium	mg/L	0.015	0.00766	0.00798	0.00967	0.00912	0.00539	0.00381	0.0019	0.00220	0.00293	0.00341	0.00551	0.00563
Vanadium	mg/L	-	-	<0.0025	-	<0.0025	-	<0.0025	-	-	-	-	-	<0.0025
Zinc	mg/L	0.03	0.0266	0.007	0.0019	<0.005	0.0125	0.0264	0.0139	**0.0342**	0.0012	0.0014	0.0015	<0.005
Volatile Organic Compounds (VOCs)														
Acetic Acid	mg/L	-	<10	-	<10	-	<10	-	-	-	-	-	<10	-
Butyric Acid	mg/L	-	<1	-	<1	-	<1	-	-	-	-	-	<1	-
Formic Acid	mg/L	-	<50	-	<50	-	<50	-	-	-	-	-	<50	-
Hexanoic Acid	mg/L	-	<1	-	<1	-	<1	-	-	-	-	-	<1	-
Valeric Acid	mg/L	-	<1	-	<1	-	<1	-	-	-	-	-	<1	-
Bromobenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Bromochloromethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Bromodichloromethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Bromoform	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Bromomethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
n-Butylbenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
sec-Butylbenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
tert-Butylbenzene	mg/L	-	<0.001	s	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Carbon tetrachloride	mg/L	0.0015	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Chlorobenzene	mg/L	0.0013	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Chloroethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Chloroform	mg/L	0.018	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Chloromethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
2-Chlorotoluene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
4-Chlorotoluene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Dibromochloromethane	mg/L	0.19	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2-Dibromo-3-chloropropane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,2-Dibromoethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Dibromomethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2-Dichlorobenzene	mg/L	0.0007	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,3-Dichlorobenzene	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,4-Dichlorobenzene	mg/L	0.001	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,1-Dichloroethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2-Dichloroethane	mg/L	0.005	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,1-Dichloroethene	mg/L	0.014	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-

Notes:

[1] Alberta Environment and Parks (AEP). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. Referenced guidelines are for coarse-textured soils under Residential/Parkland land use.

[2] Alberta Environment and Parks (AEP). Environmental Quality Guidelines for Alberta Surface Waters. March 2018. Table 1 Surface water quality guidelines for the protection of freshwater aquatic life (FAL). Most conservative values applied (chronic or acute).

#1 Guideline varies with hardness. Values shown based on site hardness range of 574 mg/L to 881 mg/L.

#2 Guideline varies with pH and temperature. Values shown based on pH range of 7.06 to 7.89 and temperature range of 5.8°C to 15.6°C.

#3 Guideline varies with chloride. Values shown based on site chloride range of 89.6 mg/L to 172 mg/L.

#4 Guideline varies with pH. Values shown based on site pH range of 7.06 to 7.89.

"-" No applicable guideline.

BOLD - Greater than Tier 1 Guideline.

Table 2: Groundwater Analytical Results

Parameter	Unit	Tier 1 Guidelines[1,2]	MW-01		MW-01 (Lot 4)		MW-03				22MW-04		MW-03 (Lot 4)	
			05 Dec 2019	23 Nov 2021	05 Dec 2019	23 Nov 2021	05 Dec 2019	23 Nov 2021	31 May 2023	06 Sep 2024	31 May 2023	06 Sep 2024	05 Dec 2019	23 Nov 2021
Volatile Organic Compounds (VOCs)														
1,2-Dichloroethene (cis)	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,2-Dichloroethene (trans)	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Dichlorodifluoromethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2-Dichloropropane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,3-Dichloropropane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
2,2-Dichloropropane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,1-Dichloropropene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,3-Dichloropropene [cis]	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,3-Dichloropropene [trans]	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Hexachlorobutadiene	mg/L	0.0013	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
p-Isopropyltoluene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Methylene Chloride	mg/L	0.05	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
iso-Propylbenzene (cumene)	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
iso-Butyric Acid	mg/L	-	<1	-	<1	-	<1	-	-	-	-	-	<1	-
Isovaleric acid	mg/L	-	<1	-	<1	-	<1	-	-	-	-	-	<1	-
Proponic Acid	mg/L	-	<5	-	<5	-	<5	-	-	-	-	-	<5	-
n-Propylbenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,1,1,2-Tetrachloroethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,1,2,2-Tetrachloroethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Tetrachloroethene	mg/L	0.01	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2,3-Trichlorobenzene	mg/L	0.008	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,2,4-Trichlorobenzene	mg/L	0.015	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,1,1-Trichloroethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,1,2-Trichloroethane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Trichloroethene	mg/L	0.005	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
Trichlorofluoromethane	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,2,3-Trichloropropane	mg/L	-	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-
1,2,4-Trimethylbenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
1,3,5-Trimethylbenzene	mg/L	-	<0.001	-	<0.001	-	<0.001	-	-	-	-	-	<0.001	-
Vinyl chloride	mg/L	0.0011	<0.0005	-	<0.0005	-	<0.0005	-	-	-	-	-	<0.0005	-

Notes:

[1] Alberta Environment and Parks (AEP). 2024. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. Referenced guidelines are for coarse-textured soils under Residential/Parkland land use.

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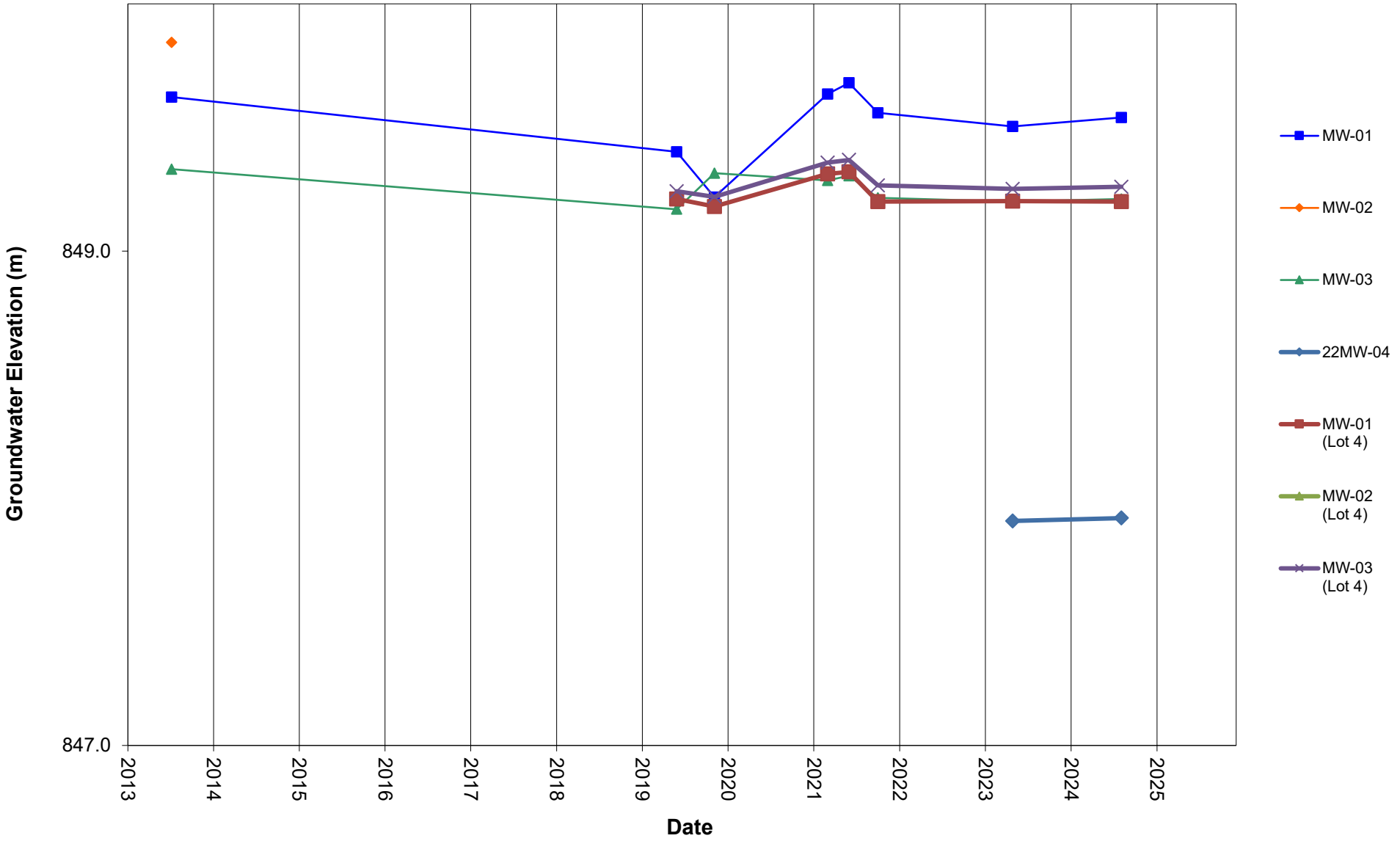
#4 Guideline varies with pH. Values shown based on site pH range of 7.06 to 7.89.

"-" No applicable guideline.

BOLD - Greater than Tier 1 Guideline.

FIGURE 3
HISTORICAL GROUNDWATER ELEVATIONS
(GROUNDWATER MONITORING WELLS)



TETRA TECH

LEGEND

- Monitoring Well
- Destroyed Monitoring Well
- Vapour Well
- Vapour Well Decommissioned
- Groundwater Elevation Contour (masl)
- (###.##) Groundwater Elevation (masl)
- Inferred Groundwater Flow Direction
- Site Boundary
- Historic Waste Disposal (Provided by Tiamat, 2014)
- Lot Boundary

NOTES
Base data source: Imagery provided by ESRI; Red Deer County (2025)
Roads from City of Red Deer Open Data, 2018

masl - metres above sea level

2025 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT RIVERSIDE LIGHT INDUSTRIAL PARK

Groundwater Elevation Contours 2024

PROJECTION 3TM 114	**DATUM** NAD83	**CLIENT**	
Scale: 1:3,000 (50 25 0 50 Metres)			
FILE NO. SWOP04071-05_Figure04_GW_2024mxd.mxd			
OFFICE Tt-EDM	**DWN** MRB / **CKD** SL / **APVD** CW / **REV** 0		**Figure 4**
DATE March 23, 2026	**PROJECT NO.** SWM.SWOP04071-05.006		

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