Cambridge Aggregates Inc.
West Edworthy Pit

Water Report / Maximum Predicted Water Table Report
Proposed Class A
Pit Above Water Table

Project Location:

Part of Lot 17, Concession 9, Township of North Dumfries

Prepared for:

Cambridge Aggregates Inc.
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MTE File No.: 46639-100

Engineers, Scientists, Surveyors.

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Executive Summary

Cambridge Aggregates Inc. (Cambridge Aggregates) retained MTE Consultants Inc. (MTE) to complete a Maximum Predicted Water Table Report to support a Class 'A' pit above-water-table *Aggregate Resources Act (R.S.O., 1990)* (ARA) license application for the property located on located on Part of Lots 16, 17 & 18 Concession 9, Township of North Dumfries, Region of Waterloo. **Figure 1** illustrates the Site location. The Site is located approximately 1.7 km southwest of the City of Cambridge at the corner of Line 37 and Road 108.

This report will also be submitted in support of Township of North Dumfries Zoning By-Law amendment.

This report considers the requirements of the Aggregate Resources of Ontario: Technical Reports and Information Standards, August 2020 and Region of Waterloo 2015 Draft Aggregate Assessment Guidelines.

The following summarizes the findings of the hydrogeological investigation:

- The water-table encountered on-Site is located in a sand and gravel formation that overlies a silty sand till. The sand and gravel formation represents the aggregate resource;
- The water table encountered on-Site is generally at an elevation of 306.5 metres above mean sea level (mAMSL);
- The sand and gravel formation represents an unconfined aquifer that supplies water to private water supply wells within the study area;
- A small portion of the Site exists within the Willard and Middleton Street Wellhead protection area;
- No surface water courses cross the Site;
- No wetlands are mapped within the proposed licensed area;
- The Site primarily contributes to the Cedar Creek Catchment (located within the Grand River Watershed);
- Groundwater elevations at the Site indicate that local horizontal groundwater flow in the water-table aquifer is southeast across the Site. The horizontal hydraulic gradient was calculated to be 0.0006 m/m;
- The estimated horizontal hydraulic conductivity for the saturated granular materials at the Site ranges from 6.1×10^{-5} m/sec (MW109-20) to 4.5×10^{-3} m/sec (MW101-20) with a calculated geometric mean of 7.1×10^{-4} m/sec which is consistent with published values for sand and gravel soils;
- In order to characterize background water quality conditions, water samples were collected from monitoring wells on-Site, and two nearby private wells;
- Since extraction is above the water table, no dewatering will occur. MTE also understands that no aggregate washing is proposed on-Site. As such a Permit to Take Water will not be required at this time;
- Based on the groundwater elevations on Site the pit floor will be set at an elevation of 309.25 mAMSL; and
- To address potential concerns related to impacts to nearby features MTE undertook a micro drainage analysis.

Based on the above hydrogeological investigation, MTE offers the following conclusions:

1. The maximum predicted water table elevation on-Site was estimated to be 307.75 mAMSL.
2. There will be no discharge to any surface water bodies or courses as a result of extraction activities.
3. As this application is for an above water table pit without active dewatering, MTE predicts that there will be no drawdown of the water table beyond the licence boundary.
4. Since both the Willard and Middleton Street Wells are completed within the bedrock and the Site will be extracting aggregate from the overburden aquifer above the water table, Site activities do not pose a threat to either well field.
5. Fluctuations in groundwater levels are expected to remain in the normal range of annual variation for the groundwater system throughout the life of the proposed pit.
6. As this application is for an above water table pit without active dewatering, MTE does not anticipate impacts to either the Galt Ridge Sudden Bog or Taylors Lake Wetland.
7. To account for climate change, a long-term monitoring program has been included on the Site Plans which will span the life of the proposed pit. This long-term monitoring program in combination with the mandated 1.5 m buffer above the established high water table elevation will be used to ensure the pit floor remains above water table.
8. No cumulative impacts with respect to water quantity or quality are anticipated.
9. As long as the recommendations provided in Section 12.0 of this report are implemented, then groundwater and surface water resources and their uses will not be impacted by the proposed pit.

Based on the above hydrogeological investigation, MTE offers the following recommendations:

Groundwater Monitoring Program:

1. Manual water levels shall be collected on a seasonal basis, three times per year, once in the spring, summer and fall, at all on-Site monitoring wells and participating domestic wells.
2. An annual groundwater monitoring program shall extend throughout the life of the operation so that confirmatory water table elevations can be obtained as the pit develops.
3. The results of the monitoring shall be retained on-file by Cambridge Aggregates so that it can be made available upon request by agencies such as the NDMNRF, MECP, Region of Waterloo or Township of North Dumfries.
4. Monitoring wells that may be destroyed by extraction activities shall be decommissioned according to the Wells Regulation (*O.Reg. 903)* and subsequently replaced (with the exception of MW102-20 and MW106-20) at a location that will ensure the new monitoring wells will remain intact to allow groundwater monitoring to continue.
5. MW101-20, MW103-20, MW104-20, MW107-20, MW108-20 & MW109-20 shall be sampled for water quality once per year during the summer for the life of the proposed pit to track trends in water quality. Samples shall be analyzed for general chemistry including select metals, petroleum hydrocarbons (PHC) in the F1 through F4 fraction, and benzene, toluene, ethylbenzene, and xylenes (BTEX).

Maximum Predicted Groundwater Table and the Proposed Pit Floor:

1. The maximum depth of extraction shall not occur within 1.5 m of the maximum predicted high water table (307.75 mAMSL).
2. Should the water table elevation occur at higher levels than anticipated based on the results of the ground water monitoring program, the depth of extraction shall be adjusted to ensure a minimum of 1.5 metres is maintained above the water table at all times.

Fuel Storage:

1. Cambridge Aggregates shall adopt their Spill Contingency Plan for the Site and that a QP be retained, in the unlikely event of a spill.
2. Temporary fuel storage facilities are located in designated area. The designated area will be located near the proposed entrance to the Site and outside of Wellhead Protection Areas.
3. All fueling activities will be in accordance with the Liquid Fuels Handling Code, Technical Standards and Safety Act, 2000, as amended.
4. Mobile vehicles will be fueled in a designated area located outside Wellhead Protection Areas. Immobile equipment may be re-fueled with a fuel delivery truck outside of Wellhead Protection Areas.
5. Fuel delivered to the Site will be stored within a horizontal double walled steel fuel tank meeting all current regulated standards, located near the proposed entrance.
6. Fuel hoses on fuel storage tanks will be locked when unattended.
7. Secondary containment measures will be added to the fuel intakes of crushing and screening equipment to protect against accidental spills while be fueled by a fuel truck in the active area of the pit.
8. Maintain a record of fuel deliveries noting the quantity and date of each transfer. A record of fuel deliveries will be maintained noting the quantity and date of fuel transfer.

Well Interference Complaint Procedure:

Cambridge Aggregates shall adopt the following Well Interference Complaint Procedure:

1. Owners of domestic and farm water supplies experiencing disruption or quality problems shall immediately notify Cambridge Aggregates Inc.
2. Cambridge Aggregates Inc., upon receipt of any water supply disruption compliant, shall retain the services of an independent Qualified Person (QP i.e. P.Geo. or P.Eng.) to investigate the cause of the interference compliant.
3. If, through the investigation, it is determined that pit operations have caused an adverse effect at the well in question, Cambridge Aggregates Inc. shall, at their expense, either restore or replace the affected water supply.
4. If, through the investigation, it is determined that pit operations have not caused an adverse effect to the well in question, Cambridge Aggregates Inc. shall provide a report documenting the results of the investigation to the well owner and retain a copy on-file so that it can be made available upon request by agencies such as the NDMNRF or MECP.

1.0 Introduction

MTE Consultants Inc. (MTE) has been retained by Cambridge Aggregates Inc. (Cambridge Aggregates) to complete a Maximum Predicted Water Table Report for a Class "A" pit above-water-table *Aggregate Resources Act (R.S.O., 1990)* (ARA) license application, located on Part of Lots 16, 17 & 18 Concession 9, Township of North Dumfries, Region of Waterloo hereby referred to as the "Site". The Site location is illustrated on **Figure 1**.

This report has been completed in accordance with the Ministry of Northern Developments, Mines, Natural Resources and Forestry (NDMNRF) Aggregate Resources Act (ARA) of Ontario for a Class A License Application for a Pit Above Water. The ARA requires a Maximum Predicted Water Table Report to determine the final extraction elevation relative to established groundwater table and demonstrate that the final depth of extraction is at least 1.5 metres above the water table. This report will also assess the potential for adverse effects to groundwater and surface water resources and their uses. Where the results of this report identify the potential for adverse effects to groundwater and/or surface water resources and their uses, the significance of the potential impact will be assessed. As such, this Maximum Predicted Water Table Report characterizes the hydrogeology of the Site and assesses the significance of the potential impacts of the proposed pit on surface water and groundwater resources and their uses.

This report has also been completed in accordance with the following local and municipal Official Plans:

1. Chapter 5, Section 5.2.4.1 (b) of the Official Plan for the Township of North Dumfries, which requires a hydrogeological study in accordance with the provisions of the Regional Implementation Guideline for Source Water Protection Studies, demonstrating, to the satisfaction of the Region, that the proposed operation will have no negative impacts on the quality and quantity of any surface water or groundwater resources; and
2. Chapter 9, Section 9.C.3 of the Official Plan for the Region of Waterloo, which requires a hydrogeological study in accordance with the provisions of the Regional Implementation Guideline for Source Water Protection Studies, demonstrating that the proposed operation will have no negative impacts on the quality and quantity of any surface water or groundwater resources.

1.1 Agency Pre-Consultation

Section 9.C.5 of the Official Plan for the Region of Waterloo and Section 5.2.4.2 of the Township of North Dumfries Official Plan requires the applicant to participate in a pre-submission consultation meeting with Area Municipalities and the Grand River Conservation Authority prior to the submission of any supporting studies.

Terms of Reference (TOR) for the Maximum Predicted Water Table Report (**Appendix A**) were developed based on the 2020 Reporting Standards issued by the Ministry of NDMNRF and the Regional Municipality of Waterloo (RMOW) Guidelines for Hydrogeological Assessments for Proposed Mineral Aggregate Resource Extraction. The TOR was submitted on November 18, 2021 by MHBC Planning Ltd to the Region of Waterloo, and the Township of North Dumfries. Comments regarding the TOR were received from the RMOW on January 21, 2022 with follow up emails on January 25th and January 26th. All correspondence related to the TOR are included in **Appendix A**.

1.2 Scope and Methodology

The purpose of this report is to assess geological, hydrogeological, and hydrological conditions at the Site and to identify any potential post-extraction adverse effects on water resources, water uses or the natural environment. In accordance with the TOR the scope of work included:

- A review of the Region of Waterloo's Official Plan.
- A review of the Township of North Dumfries Official Plan.
- A review of the Region of Waterloo 2015 Draft Aggregate Assessment Guidelines.
- A review of topography, physiographic, geological and hydrogeological mapping on file with NDMNRF.
- A review of the Approved Assessment Report for the Grand River Watershed Source Protection Area and vulnerability mapping.
- A review of the Provincial Policy Statement.
- A review of the Aggregate Resources Act, Provincial Standards for the preparation of a Maximum Predicted Water Table Report.
- An examination of water well records on file with the Ontario Ministry of the Environment, Conservation and Parks (MECP).
- Site specific field work that included:
    - Site Reconnaissance;
    - A private well survey of water supply wells within one kilometer of the Site;
    - Construction of nine overburden groundwater monitoring wells;
    - Single Well Hydraulic Response Tests on each monitoring well;
    - Groundwater samples to establish background groundwater chemistry;
    - Manual groundwater level measurements on a seasonal basis; and
    - On-going measurements of groundwater levels in select wells using dedicated pressure transducers (data loggers) programmed to record a water level every hour.
- Establishment of the water table elevation beneath the Site.
- Determination of groundwater flow patterns beneath the Site.
- Assessment of potential impacts to:
    - Private well owners;
    - Well Head Protection Areas; and
    - Natural Features.

2.0 Site Description

The study area, including the licensed boundary, extraction boundary, proposed phasing, MECP Well Record locations, monitoring locations and cross section locations are illustrated on **Figure 2**. For the purposes of this investigation, the study area is defined as the area 500 metres from the licensed boundary. The Site is currently designated as Prime Agricultural Area and protected countryside under the Region of Waterloo Official Plan and Township of North Dumfries Official Plan (Township of North Dumfries, 2018; Region of Waterloo, 2015).

The Site has a proposed licensed area of 45.7 hectares (ha) and a proposed extraction area of 35.2 ha.

The stormwater management design criteria for the subject site, as provided by the City of Cambridge and the Region of Waterloo are as follows:

- Attenuation of the post-development peak flows for the 5 and 100 year storm events to the pre-development (existing) peak flows; and
- Implementation of water quality controls to provide Level 1 (enhanced) treatment levels as per the MOECC SWM Practices Planning and Design Manual (2003).

2.1 Adjacent Land Use

Surrounding lands are primarily zoned as agriculture and industrial; however, the Taylors Lake Wetland is located east of the Site while the Galt Sudden Bog is located south of the Site. Cambridge Aggregates currently operates at the North Dumfries Pit (ARA License No. 607701) a Class A Pit which is located northeast of the Site. The Greenfield Rd. Pit (ARA License No. 625482) a Class A Pit licensed to Al's Stone Service Inc. is located east of the Site.

Nearby registered industrial water users include Cambridge Aggregates which currently holds a Permit to Take Water (PTTW) (Permit No. P-300-910971442) which allows for the taking of water from two source wells (TW3-09 and TW1-15) to recharge an on-site pond, and the taking of water from this pond for the purpose of aggregate washing. The maximum taking of water from the source wells was noted to be 1,445,760 L/day. The taking is limited to 290 days/year. Additionally, St. Mary's Cement holds PTTW 5682-B97RBG for the Cedar Street Pit Located approximately 1.7 km north of the Site.

2.2 Surface Water & Wetlands

An investigation into the surface water features within or intersecting the study area identified one minor creek (Glenburn Creek) and two provincially significant wetlands. The Taylors Lake Wetland is located east of the Site while the Galt Ridge Sudden Bog is located south of the Site (**Figure 2**). Additionally, three unnamed ponds are located northeast of the Site.

The Site is primarily located within the Cedar Creek Sub-catchment. Cedar Creek is a Tributary of the Nith River, which ultimately flows into the Grand River. A small area of the southern portion of the Site is directly within the Grand River Watershed (**Figure 3**).

2.3 Site Topography & Drainage

On-Site topography is slightly undulating with the highest topography (338 mAMSL) occurring at the western edge of the Site and the lowest (324 mAMSL) occurring at the northeastern extent of the Site (**Figure 4**).

3.0 Geology and Hydrogeology

3.1 Physiography

The Site is categorized as being within the Horseshoe Moraines Region with physiographic landforms consisting of till moraines (Chapman & Putnam, 1984).

3.2 Quaternary Geology

Regional Quaternary geology maps indicate the Site primarily consists of glaciofluvial gravel deposits, however Quaternary mapping also notes the presence of Wentworth Till within the center of the Site (**Figure 5**) (Karrow P. F., 1987). Organic deposits are noted to occur within the wetland areas south and east of the Site.

3.3 Paleozoic Geology

The Site is underlain by Paleozoic dolostone deposits of the Guelph Formation (Telford P. , 1979) which are expected to be encountered at depths in the order of 64 m below grade (based on MECP Well Record 6500512).

4.0 Source Water Protection

The Clean Water Act, 2006 establishes the framework for creating locally-developed Source Water Protection Plans to protect the quality and quantity of municipal drinking water sources. The Clean Water Act identifies specific activities that pose a risk of contamination, which are prescribed by the MECP. Under the Clean Water Act, Aggregate Operations are not identified as a Prescribed Threat.

The MECP lists 21 prescribed drinking water threats, of which only one applies to aggregate operations, which is the *handling and storage of fuel*. MTE understands that no permanent fuel storage facilities will be located on site; temporary fuel storage facilities are to be located in a designated area. The designated area will be located near the proposed entrance to the Site and outside of Wellhead Protection Areas.

4.1 Groundwater Recharge

Groundwater recharge occurs where precipitation and snowmelt infiltrate into the ground to feed aquifers, watercourses and wetlands. Significant recharge areas are typically associated with coarse-grained soils (i.e. sands and gravels) covering upland areas on the landscape. A significant groundwater recharge area (SGRA) represents an important area for groundwater to recharge the water table.

Approximately 12.6 ha (36%) of the extraction area is considered to be a SGRA with a vulnerability score of 2 (low vulnerability) while 22.7 ha (64%) of the Site is considered to have a vulnerability of 4 (moderate vulnerability) (**Figure 6**).

4.2 Well Head Protection Areas (WHPA)

Figure 7 identifies the closest Well Head Protection Areas (WHPA). These WHPAs are located northeast of the Site and are identified as:

- The Willard Well Field (2.8 km northeast of the Site); and
- The Middleton Street Well Field (3.7 km northeast of the Site).

Based on GRCA mapping, the northeast edge of the Site (0.58 ha (1.7%) of the extraction area) is located within the 25 year time of travel of the Willard Well Field. While the northeast corner of the licensed boundary (outside of the extraction area) is located marginally within the 25 year time of travel of the Middleton Street Well Field (Lake Erie Region Source Protection Committee, 2021).

4.3 Well Head Protection Area Vulnerability

The area of the Site located within the Willard WHPA is considered to have a low vulnerability (2) (**Figure 8**) (Lake Erie Region Source Protection Committee, 2021).

The area of the Site located within the Middleton Street WHPA is considered to have a low vulnerability (2), however this area has also been identified as an issue contributing area for Trichloroethylene (TCE), sodium and chloride (**Figure 8**) (Lake Erie Region Source Protection Committee, 2021).

4.4 Wellhead Protection Sensitivity Areas (WPSA)

Wellhead Protection Sensitivity Areas (WPSA) are delineated within WHPA's to prevent land uses involving hazardous chemicals and/or substances, disease causing organisms and land uses that increase the vulnerability of groundwater from becoming water quantity and/or quality risks to municipal drinking-water supply wells (Region of Waterloo, 2015). Based on Region of Waterloo mapping the majority of the Site is located within a WPSA 8 (GIS Locator, 2021). As stated in the Region of Waterloo Official Plan a WPSA-8 "delineates the area outside of the ten year time of travel to the limit of the total land area contributing water to a municipal drinking-water supply well." MTE notes that mineral aggregate operations may be permitted within a WPSA 8.

5.0 Field Program

5.1 Monitoring Well Installations

The Region of Waterloo Guidelines specify that a minimum of three monitoring wells are to be installed to determine geological and hydrogeological conditions. Based on a review of the Site, MTE choose nine locations to install monitoring wells to be used to predict the maximum water table elevation and characterize the unconfined aquifer beneath the Site.

Between April 20 and May 6, 2020 four monitoring wells (MW101-20, MW102-20, MW103-20 & MW104-20) were constructed by Les Forages L.B.M. Inc. (LBM) at the Site. Five additional monitoring wells (MW105-20, MW106-20, MW107-20, MW108-20 & MW109-20) were completed between October 27 and November 3, 2020 (**Figure 2**). Monitoring locations were chosen based on the following criteria:

- The size (ha) of the Site;
- Topography;
- Longevity – long-term monitoring (outside of the extraction area);
- Proximity to off-Site receptors such as existing groundwater users and natural features; and
- For the creation of a groundwater flow map across the Site.

Prior to drilling, in order to estimate the depth of monitoring wells MTE reviewed nearby MECP well records. Based on a review of the MECP well records MTE estimated the sand and gravel

deposit (which forms the unconfined aquifer) extends from approximately ground surface to a depth of 26 -30 m before encountering a >30 m sequence of fine grained material which forms an aquitard between the underlying bedrock and the unconfined aquifer above. As a result of the extent of the underlying aquitard and the fact that extraction will occur above the water table within the unconfined aquifer there is no potential to impact the underlying bedrock aquifer. As such, monitoring wells were completed and screened only within the unconfined aquifer. Monitoring well screen depths were based on saturated conditions within the unconfined aquifer noted during drilling.

The construction of on-Site monitoring wells was done through the use of a Duel Rotary DH-24HD Drill Rig. A MTE technical representative was present during drilling activities to record field and soil conditions. Observations of soil cuttings made during drilling were used to construct borehole logs for each of the monitoring wells (**Appendix B**). Monitoring wells were constructed using 50 mm schedule 40 PVC piping and equipped with 1.52 m length 10 slot well screen, secured with a locked monument casing grouted in place. Following installation, monitoring wells were developed with an air pump in an effort to purge any remaining sediment caused by drilling. Following installation all monitoring wells were geodetically surveyed for location and elevation.

5.2 Boreholes

Between October 13 and November 22, 2021, 17 boreholes were drilled to examine the underlying stratigraphy on-Site (**Figure 2**). Boreholes were drilled using a Sonic Drill down to a depth of 27.4 m with the exception of EW-21-02 which was drilled to 28.35 m. A representative from GRI Inc. was on-Site during the drilling of the borehole to log the soils encountered during drilling. Borehole logs can be found in **Appendix B**.

5.3 Private Wells

A review of the MECP well records indicates that there are 28 well records within the study area (**Figure 2**). The location, final status and primary use of each of these wells are presented in **Table 1**. The 28 wells are categorized as follows:

- 20 domestic;
- 2 livestock;
- 1 as irrigation;
- 3 as commercial;
- 1 as municipal; and
- 1 as abandoned.

Additional details regarding these wells are summarized below:

- One well is completed within the bedrock (MECP Well Record No.:6500425);
- One well alteration record (MECP Well Record No.: 6510326);
- One Test Well (MECP Well Record No.: 6505812);
- One well that services a municipal building (MECP Well Record No.: 6508235); and
- Two observation wells (MECP Well Record No.: 6510436 & 6510435).

Private Well Inventory

To augment the information collected from MECP well records, MTE conducted a private well survey of domestic wells within one kilometer of the Site (**Figure 9**) in December 2020. In total 46 private well inventories were delivered with 10 being returned to MTE. Completed MTE private well inspection forms and accompanying MECP Well Records (if available) can be seen in **Appendix C** and is further discussed in **Section 8.3.1** below.

5.4 Groundwater Levels and Elevations

Water level data was gathered in agreement with the Provincial Reporting Standards[1], the RMOW Guidelines[2] and the agreed Terms of Reference (November 18, 2021), which were submitted for approval to the Region of Waterloo, Township of Woolwich, and the GRCA. As per Section 2.3.3 the RMOW guidelines, water levels from wells must be measured for a minimum of one year. If through the impact assessment, it is determined that two years of data is required, then the second year of water level data will be submitted as an addendum report[3].

5.4.1 Groundwater Monitoring Frequency and Data Loggers

The RMOW Guidelines require a minimum of quarterly monitoring for a Stage One Field Program, and monthly monitoring as part of the Cumulative Impact Assessment for a Stage Two Field Program (see Table 2d of the RMOW Guideline). This guideline was exceeded by installing dedicated pressure transducers (data loggers) in five of the nine monitoring wells. A minimum of quarterly monitoring was completed at the remaining four monitoring wells. Details regarding the results of the monitoring are explained below.

Continuous groundwater monitoring in monitoring wells (MW103-20, MW104-20, MW105-20, MW107-20 & MW109-20) was accomplished using dedicated data loggers installed on June 2, 2020 (MW103-20, MW104-20) and November 19, 2020 (MW105-20, MW107-20 & MW109-20). Data loggers were programmed to measure groundwater levels every hour. In addition to data logger measurements, manual groundwater levels from on-Site monitoring wells (MW101-20 through MW109-20) were measured six times throughout 2020 and 2021. Manually measured groundwater levels are shown in **Table 2** and groundwater elevations are shown in **Table 3**. Groundwater elevations (both manual and data logger data) from on-Site monitoring wells are presented in **Hydrograph 1**, representing at least one year of water level monitoring. For readability, **Hydrograph 2** presents groundwater elevation data from monitoring wells with data loggers installed.

5.4.2 Groundwater Level Monitoring Results

Groundwater elevations were similar across the Site with the difference in groundwater elevations between monitoring wells generally being less than one meter. The similarity between groundwater elevations on-Site is reflective of the underlying course grained material. Groundwater fluctuations in on-Site monitoring wells were minimal (<1 m) throughout the monitoring period. Groundwater elevations in on-Site monitoring wells were observed to decrease between June 2020 and September 2021 with a slight rebound in October and November 2021. MTE notes that groundwater elevations in on-Site monitoring wells in 2021 did not exceed those observed in 2020. MTE interprets the lack of a “spring high water table” in

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[1] Aggregates Resources of Ontario: Technical Reports and Information Standards (August 2020).
[2] Regional Municipality of Waterloo - Guidelines for Hydrogeological Assessments for Proposed Mineral Aggregate Resource Extraction Projects (Date of Issue: August 2008).
[3] RMOW Guidelines - Section 2.3.3 - Monitoring Program - 1 year of monitoring data is required for a Stage One Field Program. A Stage 2 is triggered if impacts are identified or if extracting below water table occurs (see Table 2c). A Stage two requires 2 years of monitoring data (see Table 2c).
RMOW Guidelines - Section 3.0 - Stage Two: Detailed Hydrogeological Assessment - an application can be submitted prior to the full two years of monitoring is complete. An addendum submitted prior to initiating operations is required.

2021 as a result of the lack of precipitation received throughout the winter of 2021 (**Hydrograph 1**).

Groundwater Flow

Groundwater flows from areas of higher pressure (high groundwater elevation) to areas of lower pressure (low groundwater elevation). The slope of the water table as a result of these differences in pressure is known as the horizontal hydraulic gradient.

Groundwater flow mapping was conducted for the Site using the November 16, 2021 groundwater elevation data. Groundwater contours and flow patterns have been illustrated on **Figure 10**. Based on the groundwater elevation contours presented in **Figure 10** groundwater is interpreted to flow north to south.

The horizontal hydraulic gradient across the Site was calculated to be very low (0.0006 m/m).

High Water Table Elevation

Based on a review of groundwater elevations measured between June 2020 and November 2021 (**Hydrograph 1**) on-Site groundwater elevations in 2021 did not exceed groundwater elevations observed in June 2020. As such, the predicted high water table elevation will be based on the available groundwater elevation data collected in June 2020. As monitoring wells MW105-20, MW106-20, MW107-20, MW108-20 and MW109-20 were not constructed until fall 2020 groundwater elevation data is not available for these locations for June 2020. However, as observed on **Hydrograph 1** the highest on-Site groundwater elevation consistently occurs in MW103-20. As a result of the low horizontal hydraulic gradient across the Site (**Figure 10**) a high water table elevation based on groundwater elevations from MW103-20 will be sufficient.

The groundwater elevation in MW103-20 measured on June 2, 2020 represents the highest observed groundwater elevation over the monitoring period (307.37 mAMSL). Typically, groundwater elevations are highest during the early spring months in which large amounts of recharge from precipitation and snow melt raise groundwater elevations. As the earliest on-Site groundwater elevation in 2020 was not recorded until June 2, it's possible during the spring of 2020 the groundwater elevation was above that recorded. In an effort to estimate the maximum water table elevation, MTE reviewed Golder Associates Inc. (Golder) 2020 Monitoring Report for the North Dumfries Pit. The North Dumfries Pit operates as an above water table pit extracting material from the same unconfined overburden aquifer observed on-Site. As such, the North Dumfries Pit serves as a good proxy in regards to the trends in water levels to the Site.

Select figures from the Golder 2020 Monitoring Report can be found in **Appendix D.** Figure 2 from the Golder report indicates the two closest monitoring wells to the Site are MW2/03 and MW08-3. Based on a review of the hydrographs presented in Figures 3 & 4 of the Golder report the approximate difference between groundwater elevations during the spring high and early June is 0.2 m. Based on this information the spring high for MW103-20 in 2020 has been amended to be 307.58 mAMSL (307.38 AMSL + 0.2 m). In an effort to account for any additional uncertainty MTE conservatively estimates the maximum predicted water table elevation to be 307.75 mAMSL on-Site.

5.5 Pit Floor Elevation

Based on a maximum water table elevation of 307.75 mAMSL the maximum depth of the pit floor has been set at 309.25 mAMSL. The elevation of the pit floor accounts for the highest predicted groundwater elevation on-Site. As such, the majority of the pit floor will be in excess of 1.5 m above the maximum predicted water table elevation.

5.6 Geological Cross Section

Hydrogeological data related to private water supply wells in the study area were obtained from water well records on-file with the MECP along with data gathered during the installation of monitoring wells (MW) and boreholes (BH) on-Site. The location of geological cross-sections A-A' and B-B' as well as the locations of water well records on-file with the MECP, on-Site monitoring wells and boreholes are presented on **Figure 2**. Both these resources were used to construct geological cross-section A-A' (**Figure 11a**) and geological cross-section B-B' (**Figure 11b**).

The MW/BH name or MECP well record number are presented above the cross-section followed by the off-set distance from the cross-section line and well location. Wells further from the cross-section line may, in places, be displayed as having the borehole above or below ground surface. Similarly, static water levels at individual wells may be situated above or below the interpreted water table surface presented on the individual cross-section. As such, elevation variability of overburden units may occur along the cross-section line at individual boreholes and may differ from the professional geological interpretation presented on the cross-section.

Geological Cross-Section A-A'

Geological cross-section A-A' (**Figure 11a**), runs from approximately 525 m southwest of the Site to 525 m northeast of the Site. Moving southwest to northeast topography is somewhat undulating across the Site before dipping off towards two unnamed ponds, which are interpreted to be the surface expression of the water table. Cross-section A-A indicates that the Site is underlain by sand and gravel deposits with borehole data indicating thicknesses up to approximately 26 m. Based on surrounding MECP well records and one borehole on-Site EW-21-02 (not shown of cross-section A-A') the sand and gravel in underlain by a sandy silt till (Wentworth Till). Additionally, based on MECP well record 6500512 the depth to bedrock is approximately 64 m below ground surface.

MTE notes, the depth of topsoil/silt till appears to increase at the southwestern property extent. The water table elevation presented on **Figure 11a** is based on water levels obtained from on-Site wells on November 16, 2021.

Geological Cross-Section B-B'

Geological cross section B-B` (**Figure 11b**), runs from approximately 515 m west of the Site to 585 m east of the Site. Moving west to east topography is somewhat undulating across the Site before dipping off towards the Taylors Lake Wetland. Cross-section B-B' indicates similar stratigraphy as that seen in cross section A-A' with the thickness of the sand and gravel extending up to 29 m in certain locations (MW106-20). As with cross-section A-A' the sand and gravel is interpreted to be underlain by a silty sand till (Wentworth Till) followed by the Guelph Formation. The interpreted water table elevation presented on **Figure 11b** is based on water levels obtained from on-Site wells on November 16, 2021.

5.7 Well Performance Testing

In September 2020 and June, July & November 2021, single well hydraulic response tests were performed on MW101-20 through MW109-20.

Due to the coarse grained nature of the overburden material (sand & gravel) a pneumatic initiation system was used to perform the single well hydraulic response testing. A pneumatic initiation system uses air pressure to depress (lower) the water column in the well by a known amount. The test is then initiated by releasing the air pressure and the water level recovery is measured using a data logger.

The response tests were carried out a minimum of three times using different initiation pressures to assess the viability of the assumptions underlying single well response test analysis methods.

Prior to analysis the water level data collected during single well response tests from all wells was normalized by dividing the observed head change (Ho) by the expected head change (Ho*). Normalized data plots from repeat tests (at the same well) were compared to determine coincidence between tests. Coincidence between tests suggests assumptions underlying conventional analysis methods can be considered valid at that well (Butler et. al., 1996; Butler et. al., 2003). Coincidence between tests was found to occur within all wells.

Each test was analyzed using either the Bouwer and Rice or Butler High-K method in AquiferTest© Pro (Waterloo Hydrogeologic, 2015) to estimate the horizontal hydraulic conductivity of the saturated granular materials adjacent to each well screen. AquiferTest© data sheets are presented in **Appendix E**.

The estimated horizontal hydraulic conductivity for the saturated granular materials at the Site ranges from 6.1 x 10^{-5} m/s (MW109-20) to 4.5 x 10^{-3} m/s (MW101-20). The hydraulic conductivity geometric mean was calculated to be 7.1 x 10^{-4} m/s (**Table 4**). The estimated horizontal hydraulic conductivity values for the sand and gravel on-Site are consistent with average published values for sand & gravel soils (Freeze and Cherry, 1979).

6.0 Groundwater Quality

Water quality samples were collected from on-Site monitoring wells and two nearby domestic wells for background assessment purposes. On-Site monitoring wells groundwater samples were analyzed for general chemistry including select metals, petroleum hydrocarbons (PHC) in the F1 through F4 fraction, and benzene, toluene, ethylbenzene, and xylenes (BTEX). While samples collected from domestic wells were sampled for general chemistry and bacteria (related to the ODWS). All water quality results have been summarized in **Table 5.1 & 5.2** while Certificates of Analysis can be found in **Appendix F**. For comparison purposes water quality results from on-Site monitoring wells and domestic wells (groundwater) were compared to the Ontario Drinking Water Quality Standards (ODWS).

On-Site Monitoring Wells

Per the ROW Guidelines groundwater samples were collected from on-Site monitoring wells in early spring (April 18, 2021) and late summer (September 16, 2021). Prior to sample collection, all monitoring wells were purged to ensure that representative groundwater samples were collected. Following purging, groundwater samples were collected using dedicated Waterra™ tubing and foot valves, placed into laboratory supplied bottles and delivered, in an ice packed cooler to ALS Laboratory Group in Waterloo, ON.

Groundwater samples collected from on-site monitoring wells were within the chemical standards for the ODWS with the exception of sodium in groundwater samples collected from MW101-20, MW105-20 and MW107-20 during both groundwater sampling events. Elevated concentrations of sodium in MW101-20, MW105-20 & MW107-20 is likely related to road salt runoff as these monitoring wells are within close proximity of nearby roads.

In accordance with the ODWS “Consumption of sodium in excess of 10 grams per day by normal adults does not result in any apparent adverse health effects” (Ministry of the Environment, Conservation and Parks, 2006). As such, a maximum acceptable concentration

for sodium has not be specified. The referenced concentration of 20 mg/L is in regards to those individuals who are medically required to be on a reduced sodium diet.

Exceedances of aesthetic guidelines for colour, hardness, turbidity and alkalinity were noted in various groundwater samples across the Site, however aesthetic guidelines and are not health related.

Domestic Wells

In addition to on-Site monitoring wells, water quality samples were also collected from two nearby domestic wells (**Figure 12**) on November 16, 2021. Prior to sample collection, each domestic well was purged by running the water until the (submersible) pump turned on to ensure that representative groundwater samples were collected. Following purging, groundwater samples were collected in laboratory supplied bottles and delivered, in an ice packed cooler to ALS Laboratory Group in Waterloo, ON.

PW1 was found to exceed the ODWS for colour, turbidity, iron and manganese (**Table 5.2**). These exceedances are related to aesthetic guidelines as opposed to health related. With the exception of E. coli, PW2 was found to be within the ODWS. Each well owner was given a summary and a copy of the water quality results from their well(s).

7.0 Proposed Pit Operations

7.1 Proposed Pit Floor

As per Section 0.1 of the ARA Ontario Regulation 244-97, extraction of material for a Class “A” pit above-water-table extraction is restricted to aggregate material no closer than 1.5 metres above the established water table. As such, the pit floor has been set elevation at an elevation of 309.25 mAMSL.

7.2 Proposed Water Diversion, Storage, and Drainage Facilities on Site

Since the proposed pit is for an above-water-table extraction there will be no pumping or diversion of groundwater. Any water that may potentially accumulate in the pit will be as a result of precipitation. The proposed pit will expose highly permeable materials that will allow for the rapid infiltration of water into the local groundwater system. There will be no water storage at the Site.

7.3 Discharge to Surface Water

Since the proposed pit is to remain above water table, there will be no discharge to any existing surface water bodies or courses as a result of extraction activities.

8.0 Impact Assessment

The following section identifies potential impacts the proposed West Edworthy Pit may have on existing private water users, natural features, surface water bodies, groundwater recharge, aquifer vulnerability and well head protection areas. Potential impacts have been assessed below.

8.1 Micro Drainage Analysis

MTE completed a micro drainage analysis to assess potential hydrologic impacts to nearby features resulting from pit development. Details on the micro drainage analysis can be found in the technical memorandum presented in **Appendix G**.

Following extraction, runoff from the Site will be reduced to zero due to grading constraints of the lowered pit floor and as a result of the high infiltration rates provided from the exposed sand and gravel. However, the reduction in runoff will be off-set by the increase in infiltration. Additionally, the Site does not directly contribute to any surface water features. As such, MTE does not anticipate any adverse hydrologic impacts to nearby features as a result of the proposed pit development.

8.2 Groundwater Drawdown

As this application is for an above water table pit, MTE does not predict that there will be any drawdown of the water table.

8.3 Wetland Impact Assessment

8.3.1 Galt Ridge Sudden Bog

The Galt Ridge Sudden Bog is located approximately 300 m south of the Site. Based on groundwater mapping completed by MTE the Galt Ridge Sudden Bog is located down gradient with respect to groundwater flow from the Site (**Figure 13**). As this application is for an above water table pit, MTE does not predict any change to the local groundwater flow pattern. In regards to surface water flow, based on catchment area mapping as presented in **Appendix G** and **Figure 13**, the vast majority of the Site is within the Cedar Creek Catchment and does not contribute surface water flow to the Galt Sudden Ridge Bog. Additionally, the presence of Spragues Road prevents the direct connection of any surface water flow on-Site to the Galt Ridge Sudden Bog. As such, MTE does not predict any negative impacts to the Galt Ridge Sudden Bog as a result of proposed pit.

8.3.2 Taylors Lake Wetland

The Taylors Lake Wetland is located approximately 400 m southeast of the Site. Based on groundwater mapping completed by MTE the Taylors Lake Wetland is located cross gradient with respect to groundwater flow from the Site (**Figure 13**). As this application is for an above water table pit, MTE does not predict any change to the local groundwater flow pattern. In regards to surface water flow, based on catchment area mapping as presented in **Appendix G** and **Figure 13**, the vast majority of the Site is within the Cedar Creek Watershed and does not contribute surface water flow to the Taylors Lake Wetland. Additionally, the presence of Spragues Road prevents the direct connection of any surface water flow on-Site to the Taylors Lake Wetland. As such, MTE does not predict any negative impacts to the Taylors Lake Wetland as a result of proposed pit.

8.4 Local Groundwater Use – Private Wells

The proposed operation will extract aggregate from above the water table. A 1.5 m buffer of dry aggregate material will be maintained between the pit floor and the water table post-extraction. In addition, Best Management Practices will be employed by Cambridge Aggregates when operating the pit and handling fuels. A Spills Contingency Plan (**Section 9.3**) has been adopted to ensure groundwater is protected. MTE does not predict any adverse effects to water quantity or water quality to any private wells in the study area. However, this section will undertake a review of the surrounding wells within the study area.

8.4.1 Domestic Wells within the Study Area

Based on a review of the **Figure 2** there are 28 MECP well records identified within the study area (excluding MECP well records for on-Site monitoring wells). Of the wells located within the study area, 11 are located up or cross gradient (in regards to groundwater flow). As such, the impact in regards to water quality and quantity to these wells is interpreted to be negligible.

Details regarding the 17 MECP well records down gradient of the Site (in regards to groundwater flow) are shown in **Table 6** and summarized below:

- 11 are recorded as domestic;
- 2 are recorded as livestock, 1 of which is completed in bedrock (Well Record# 6500425);
- 2 are recorded as commercial (water supply, observation well);
- 1 is recorded as municipal; and
- 1 recorded as a well abandonment.

The livestock well completed within the bedrock (Well Record # 6500425), the observation well (Well Record # 6500512) and the abandoned well (Well Record # 6500512) are unrelated to water supply and or the overburden aquifer and as such will be excluded from any further impact assessment.

Additionally, the private well inventory identified four domestic wells south of the Site and one north of the Site which do not appear to have a MECP well record (**Figure 14**). Of these four wells, only two returned well survey forms to MTE as part of the private well inventory. As such, the exact characteristics of the other two wells is unknown, but based on surrounding domestic wells they are expected to be completed within the overburden aquifer.

As noted in **Section 5.3** the municipal water supply well (Well Record# 6508235) is specific to a municipal building rather than a Regional Drinking Water Supply.

Average Linear Groundwater Velocity

In order to assess the speed at which groundwater may travel from the Site to nearby domestic wells down gradient MTE estimated the average linear groundwater velocity by using Darcy's Law, as follows:

$$q = (-Ki)/n$$

Where:
q = average linear groundwater velocity (m/s)
K = effective hydraulic conductivity (7.1×10^{-4} m/s; geometric mean of calculated values from on-Site hydraulic conductivity testing)
i = horizontal hydraulic gradient (0.0006 m/m)
ne= effective soil porosity (0.35 typical for sand and gravel, Freeze and Cherry, 1979)

The average linear groundwater velocity (q) within the shallow groundwater at the Site is estimated to be 38.4 m/year.

As the closest domestic well (Well Record# 6505812) is 88 m from the Site (**Table 6**) it would take groundwater from the Site approximately 2.3 years to reach the residents well. As such, there is ample time to implement the Contingency Plans presented in **Section 10.0** if any unforeseen impacts to water quality occur.

To ensure private water supplies are protected during extraction, MTE recommends Cambridge Aggregates implement a Private Well Monitoring Program and invite those residences with water supply wells directly down-gradient (with respect to groundwater flow) from the Site

(**Figure 15**) to participate. The invitation must include a letter that provides contact information for Cambridge Aggregates and a Qualified Person, and include a well inspection form to be completed by the resident so that baseline information concerning the operational history, groundwater levels and quality can be recorded.

MTE also recommends groundwater samples be collected from select monitoring wells located on the down gradient boundary of the proposed pit (MW101-20, MW104-20, MW107-20, MW108-20 & MW109-20) and one on the up- gradient boundary (MW103-20) on an annual basis as described in **Section 9.0**.

8.4.2 Fueling Practices

MTE understands that mobile vehicles and equipment will be fueled outside of Wellhead Protection Areas (**Figure 7**). As outlined in **Section 9.3** a Spills Contingency Plan will be in place in the unlikely event of a spill within the extraction area. Additionally, there are four monitoring wells located on the southern boundary of the Site and upgradient of surrounding water supply wells which will be used to verify groundwater quality in the unlikely event of a spill.

8.5 Wellhead Protection Areas

As indicated in **Section 2.6** the closest WHPA's are the Willard Well Field (2.8 km northeast of the Site) and Middleton Street Well Field (3.7 km northeast of the Site). Both the Willard Well Field and the Middleton Street Well Field obtain water from a bedrock aquifer source. Further, the Willard Well Field screens the bedrock from an approximate elevation of 210 to 250 mAMSL while the Middleton Street Well Field screens the bedrock from approximately 204 to 235 mAMSL, the pit floor is generally around 309 mAMSL (~ 59 m vertical difference).

As such, and since this is an above water table pit with no active groundwater dewatering, the water quality and quantity of the Willard and Middleton Street Well Fields will not be jeopardized.

8.6 Groundwater Vulnerability

The area of the Site located within the Willard WHPA is considered to have a low vulnerability (2). As such, this area is not a threat to the municipal drinking water supply.

The area of the Site located within the Middleton Street WHPA is considered to have a low vulnerability (2), however this area has also been identified as an issue contributing area for Trichloroethylene (TCE), sodium and chloride (Lake Erie Region Source Protection Committee, 2021). The area of the Site within the Middleton Street WHPA will not have road salt applied and the threat of TCE is not applicable for this Site. As such, activities at this Site are not considered to be significant threats to the municipal drinking water supply.

Based on MECP Well Record 6500512 which is located directly east of the Site, the sand and gravel unconfined aquifer is underlain by approximately 38 m of fine grained material (aquitard) above bedrock. As extraction will remain above the water table (within the sand and gravel unit) no extraction will take place in the underlying aquitard. It is MTE's interpretation that this aquitard provides sufficient separation and hydraulic isolation from the underlying bedrock aquifer. As such, multi-level wells extending into the bedrock were not required.

8.7 Cumulative Effect Assessment

I would also note that all studies should continue to address/evaluate the cumulative impact policy of the Regional Official Plan (9.C.4) and should also be discussed in the submitted Planning Report.

As per the RMOW Guideline, cumulative effects must be assessed in light of the Regional Official Plan Policy number 9.C.4. The cumulative effects assessment must take into account the *potential cumulative impacts that may result from a proposed new mineral aggregate operation when added to other past, present and proposed future mineral aggregate operations in the vicinity of the proposed new operation.*

Cumulative effects in groundwater can occur when there is a combined effect caused by two or more operations within close proximity to each other. Since the proposed pit is to remain above water table, there is no potential for the pit to cause drawdown within the water table aquifer. There is only one other active aggregate pit operation within the Study Area, known as the Greenfield Road Pit (License No. 625482). MTE understands that this pit is extracting aggregate above water table and therefore no dewatering is occurring. As such, no cumulative impacts with respect to drawdown on the water table aquifer (water quantity) are anticipated.

Potential groundwater quality impacts will be managed through best management practices (e.g. a proven spills contingency plan). As long as this plan is adopted for the Site and followed, no cumulative effects with other active pits in the Study Area, with respect to water quality are anticipated.

MTE understands that the GRCA has produced cumulative assessment tool entitled: *Cumulative Effects Assessment (Water Quality and Quantity) Best Practices Paper for Below Water Sand and Gravel Extraction Operations in Priority Subwatersheds in the Grand River Watershed* (GRCA, 2010). However, this tool is not applicable to above water table applications.

8.8 Climate Change

The proponent should include an assessment of potential impacts to future groundwater elevations due to climate change.

Climate Change and Long-Term Monitoring

To account for climate change and the proposed pit floor, a long-term monitoring program has been included on the Site Plans which will span the life of the proposed pit. This long-term monitoring program will be used to ensure the pit floor remains 1.5 m above the reported high water table elevation.

As required under the ARA, all pits extracting aggregate above water table must set their pit floor elevation 1.5 m above the established high water table elevation. The purpose of this standard is to provide a 1.5 m buffer to account for possible fluctuations in the water table, thereby ensuring the proposed pit floor remains above the water table elevation. The 1.5 m buffer is established by the Province as a reasonable buffer to provide adequate distance to account for groundwater fluctuations.

The long-term monitoring program includes manual water levels measured on a seasonal basis, three times per year (once each in the spring, summer and fall) at all monitoring wells. Currently, five of the nine monitoring wells are instrumented with data loggers so that a continuous dataset is developed.

The Site Plans show that the proposed pit will be extracted in phases. This phasing, coupled with the data collected through the long-term monitoring program, will allow for adaptations to be made during extraction if necessary, thereby accounting for changes due to climate change.

Climate Change and Extreme Weather Events

When estimating the high water table across the proposed pit, MTE used the latest approved climate normal data from Environment Canada, which includes climate data for a 30-year period from 1981 to 2010. This data set includes all the extreme weather events that occurred during this 30-year period. As such, the high water table elevation is based on up-to-date water level data that reflects past and current climate change conditions.

9.0 Monitoring Program

MTE recommends that manual groundwater levels be collected three times per year, once in the spring, summer and fall, at on-Site monitoring wells. Monitoring will be done on an annual basis throughout the life of the operation to confirm the water table elevation with respect to the pit floor. MTE recommends groundwater levels in MW102-20 and MW106-20 be monitored until such a time that extraction activities compromise the location of the monitoring well at which time these wells shall be decommissioned in accordance to the *Wells Regulation* (O.Reg. 903).

MTE recommends that the groundwater level data be retained on-file by Cambridge Aggregates Inc. so that it can be made available upon request by agencies such as the NDMNRF, MECP, Region of Waterloo or Township of North Dumfries.

Monitoring wells that may be destroyed by extraction activities with the exception of MW102-20 and MW106-20 should be decommissioned according to the Wells Regulation (*O.Reg. 903)* and subsequently replaced at a location that will ensure the new monitoring well will remain intact to allow groundwater monitoring to continue.

MTE recommends that select monitoring wells located on the down gradient boundary of the proposed pit (MW101-20, MW104-20, MW107-20, MW108-20 & MW109-20) and one on the up-gradient boundary (MW103-20) be sampled for water quality once per year during the summer for the life of the proposed pit to track trends in water quality. Samples should be analyzed for general chemistry including select metals, petroleum hydrocarbons (PHC) in the F1 through F4 fraction, and benzene, toluene, ethylbenzene, and xylenes (BTEX).

10.0 Contingency Plan

Since the pit will not be going below the water table, no effect on the overall groundwater balance is expected. However, contingency measures are presented below in case shallow groundwater is adversely affected.

10.1 Well Interference Complaint Procedure

All existing supply wells are protected under the Ontario Water Resources Act. If a well interference is observed (i.e. current wells experience an unacceptable reduction in groundwater quantity and/or degradation in water quality), the person or organization responsible for the interference is responsible for returning the groundwater to its former condition.

On-site monitoring wells will be used to measure seasonal fluctuations of the water table. Any variations in water levels will be observed and trends will be documented.

Response Procedures:

1) Owners of domestic and farm water supplies experiencing disruption or quality problems shall immediately notify Cambridge Aggregates Inc.
2) Cambridge Aggregates Inc., upon receipt of any water supply disruption compliant, shall retain the services of an independent Qualified Person (QP i.e. P.Geo. or P.Eng.) to investigate the cause of the interference compliant.
3) If, through the investigation, it is determined that pit operations have caused an adverse effect at the well in question, Cambridge Aggregates Inc. shall, at their expense, either restore or replace the affected water supply.
4) If, through the investigation, it is determined that pit operations have not caused an adverse effect to the well in question, Cambridge Aggregates Inc. shall provide a report documenting the results of the investigation to the well owner and retain a copy on-file so that it can be made available upon request by agencies such as the NDMNRF or MECP.

10.2 On-Site Fuel Storage

With respect to on-Site fuel storage MTE makes the following recommendations:

- Cambridge Aggregates shall adopt their Spill Contingency Plan for the Site and that a QP be retained, in the unlikely event of a spill.
- temporary fuel storage facilities are to be located in designated area. The designated area will be located near the proposed entrance to the Site and outside of Wellhead Protection Areas.
- All fueling activities will be in accordance with the Liquid Fuels Handling Code, Technical Standards and Safety Act, 2000, as amended.
- Mobile vehicles will be fueled in a designated area located outside Wellhead Protection Areas. Immobile equipment may be re-fueled with a fuel delivery truck outside of Wellhead Protection Areas.
- Fuel delivered to the Site will be stored within a horizontal double walled steel fuel tank meeting all current regulated standards, located near the proposed entrance.
- Fuel hoses on fuel storage tanks will be locked when unattended.
- Secondary containment measures will be added to the fuel intakes of crushing and screening equipment to protect against accidental spills while be fueled by a fuel truck in the active area of the pit.
- Maintain a record of fuel deliveries noting the quantity and date of each transfer. A record of fuel deliveries will be maintained noting the quantity and date of fuel transfer.

10.3 Spills Contingency Plan

As with any aggregate extraction operation, there exists the possibility of an accidental release of petroleum hydrocarbons from equipment operating on the Site. The release of petroleum hydrocarbons at the Site has the potential to enter groundwater and impact water quality. **Appendix H** outlines Cambridge Aggregates Spills Plan. As such, any potential spills will be mitigated through the implementation of Cambridge Aggregates Spill Plan. In the unlikely event

of a spill, MTE recommends that a QP be retained as part of the “Initial Measures” listed in Cambridge Aggregates Spills Contingency Plan to assess the potential impact on nearby features and make recommendations for monitoring (if required).

11.0 Conclusions

Based on the above hydrogeological investigation, MTE offers the following conclusions:

1. The maximum predicted water table elevation on-Site was estimated to be 307.75 mAMSL.
2. There will be no discharge to any surface water bodies or courses as a result of extraction activities.
3. As this application is for an above water table pit without active dewatering, MTE predicts that there will be no drawdown of the water table beyond the licence boundary.
4. Since both the Willard and Middleton Street Wells are completed within the bedrock and the Site will be extracting aggregate from the overburden aquifer above the water table, Site activities do not pose a threat to either well field.
5. Fluctuations in groundwater levels are expected to remain in the normal range of annual variation for the groundwater system throughout the life of the proposed pit.
6. As this application is for an above water table pit without active dewatering, MTE does not anticipate impacts to either the Galt Ridge Sudden Bog or Taylors Lake Wetland.
7. To account for climate change, a long-term monitoring program has been included on the Site Plans which will span the life of the proposed pit. This long-term monitoring program in combination with the mandated 1.5 m buffer above the established high water table elevation will be used to ensure the pit floor remains above water table.
8. No cumulative impacts with respect to water quantity or quality are anticipated.
9. As long as the recommendations provided in Section 12.0 of this report are implemented, then groundwater and surface water resources and their uses will not be impacted by the proposed pit.

In summary, the nature of the proposed operation (above water-table pit) is predicted to not affect the overburden aquifers. As a result, there is no measurable risk to existing water supply wells, surface water features or to any of the local natural features or functions.

12.0 Recommendations

Based on the above hydrogeological investigation, MTE offers the following recommendations:

Groundwater Monitoring Program:

1. Manual water levels shall be collected on a seasonal basis, three times per year, once in the spring, summer and fall, at all on-Site monitoring wells and participating domestic wells.
2. An annual groundwater monitoring program shall extend throughout the life of the operation so that confirmatory water table elevations can be obtained as the pit develops.

3. The results of the monitoring shall be retained on-file by Cambridge Aggregates so that it can be made available upon request by agencies such as the NDMNRF, MECP, Region of Waterloo or Township of North Dumfries.
4. Monitoring wells that may be destroyed by extraction activities shall be decommissioned according to the Wells Regulation (*O.Reg. 903)* and subsequently replaced (with the exception of MW102-20 and MW106-20) at a location that will ensure the new monitoring wells will remain intact to allow groundwater monitoring to continue.
5. MW101-20, MW103-20, MW104-20, MW107-20, MW108-20 & MW109-20 shall be sampled for water quality once per year during the summer for the life of the proposed pit to track trends in water quality. Samples shall be analyzed for general chemistry including select metals, petroleum hydrocarbons (PHC) in the F1 through F4 fraction, and benzene, toluene, ethylbenzene, and xylenes (BTEX).

Maximum Predicted Groundwater Table and the Proposed Pit Floor:

1. The maximum depth of extraction shall not occur within 1.5 m of the maximum predicted high water table (307.75 mAMSL).
2. Should the water table elevation occur at higher levels than anticipated based on the results of the ground water monitoring program, the depth of extraction shall be adjusted to ensure a minimum of 1.5 metres is maintained above the water table at all times.

Fuel Storage:

1. Cambridge Aggregates shall adopt their Spill Contingency Plan for the Site and that a QP be retained, in the unlikely event of a spill.
2. Temporary fuel storage facilities are located in designated area. The designated area will be located near the proposed entrance to the Site and outside of Wellhead Protection Areas.
3. All fueling activities will be in accordance with the Liquid Fuels Handling Code, Technical Standards and Safety Act, 2000, as amended.
4. Mobile vehicles will be fueled in a designated area located outside Wellhead Protection Areas. Immobile equipment may be re-fueled with a fuel delivery truck outside of Wellhead Protection Areas.
5. Fuel delivered to the Site will be stored within a horizontal double walled steel fuel tank meeting all current regulated standards, located near the proposed entrance.
6. Fuel hoses on fuel storage tanks will be locked when unattended.
7. Secondary containment measures will be added to the fuel intakes of crushing and screening equipment to protect against accidental spills while be fueled by a fuel truck in the active area of the pit.
8. Maintain a record of fuel deliveries noting the quantity and date of each transfer. A record of fuel deliveries will be maintained noting the quantity and date of fuel transfer.

Well Interference Complaint Procedure:

Cambridge Aggregates shall adopt the following Well Interference Complaint Procedure:

1. Owners of domestic and farm water supplies experiencing disruption or quality problems shall immediately notify Cambridge Aggregates Inc.
2. Cambridge Aggregates Inc., upon receipt of any water supply disruption compliant, shall retain the services of an independent Qualified Person (QP i.e. P.Geo. or P.Eng.) to investigate the cause of the interference compliant.
3. If, through the investigation, it is determined that pit operations have caused an adverse effect at the well in question, Cambridge Aggregates Inc. shall, at their expense, either restore or replace the affected water supply.
4. If, through the investigation, it is determined that pit operations have not caused an adverse effect to the well in question, Cambridge Aggregates Inc. shall provide a report documenting the results of the investigation to the well owner and retain a copy on-file so that it can be made available upon request by agencies such as the NDMNRF or MECP.

13.0 Limitations

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and Cambridge Aggregates Inc. It was completed in accordance with the Scope of Work referred to in Section 1.2. As such, this report may not deal with all issues potentially applicable to the Site and may omit issues, which are or may be of interest to the reader. MTE makes no representation that the present report has dealt with any and all of the important features, including any or all important environmental features, except as provided in the Scope of Work. All findings and conclusions presented in this report are based on Site conditions as they existed during the time period of the investigation. This report is not intended to be exhaustive in scope or to imply a risk-free facility.

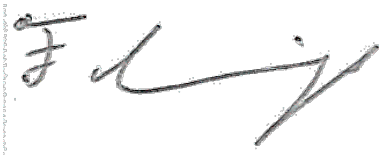
Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based upon this report. Others with interest in the Site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions of a property can change. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may re-assess the contents of this report.

Should you have any questions or concerns, please do not hesitate to contact us.

Respectfully submitted,

MTE Consultants Inc.



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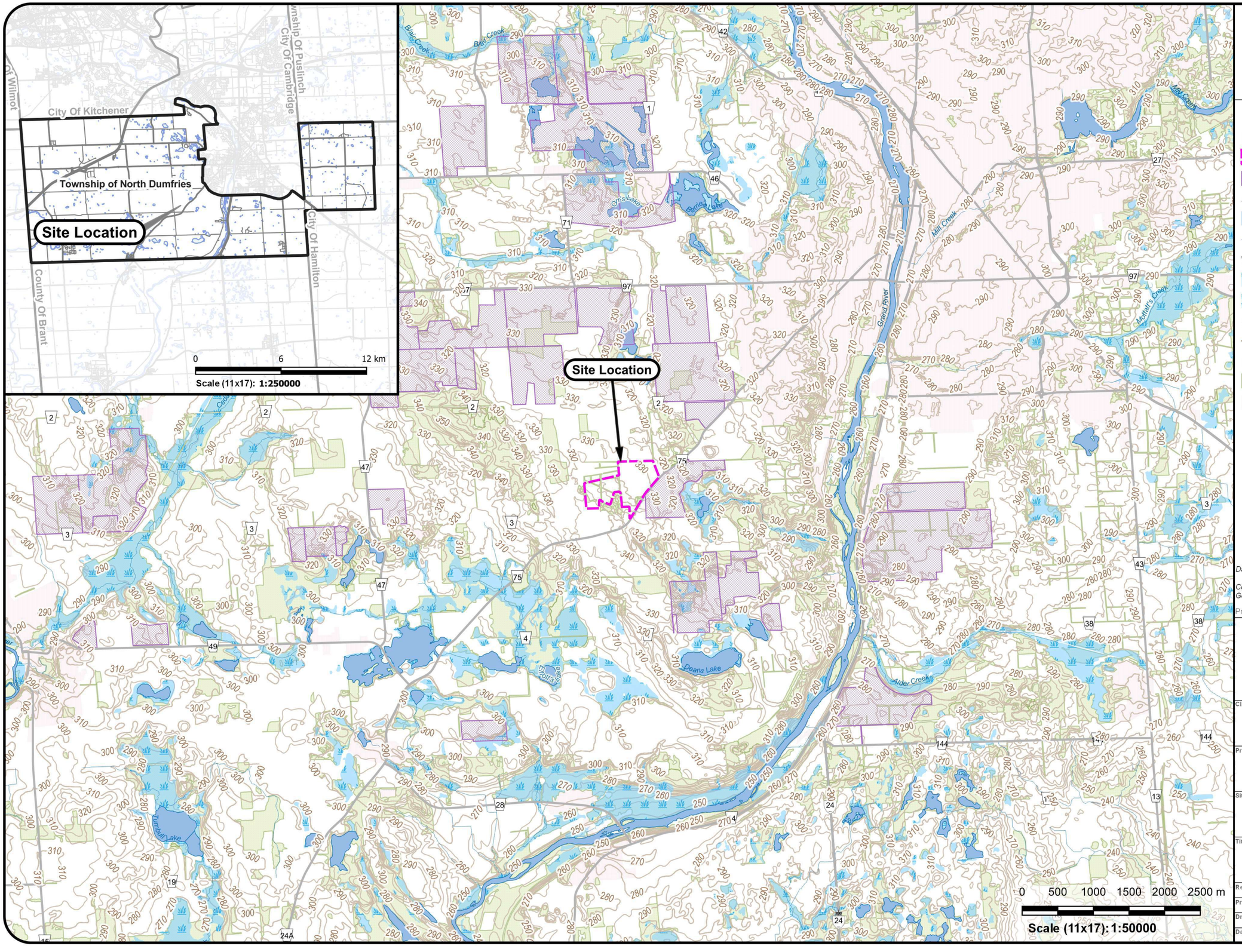
Ministry of Natural Resources and Forestry Science and Research Branch April 2019

Figures



N
NORTH

N
PROJECT NORTH

Legend

Boudaries
- License Boundary
- Active Aggregate Site

Surface Water
- Waterbody
- Watercourse

Wetlands
- Provincally Significant Wetland
- Non-Provincially Significant Wetland

Groundsurface
- Topographic Contour (mAMSL)

Landuse
- Wooded Area
- Built Up Area

Data Sources:

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Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

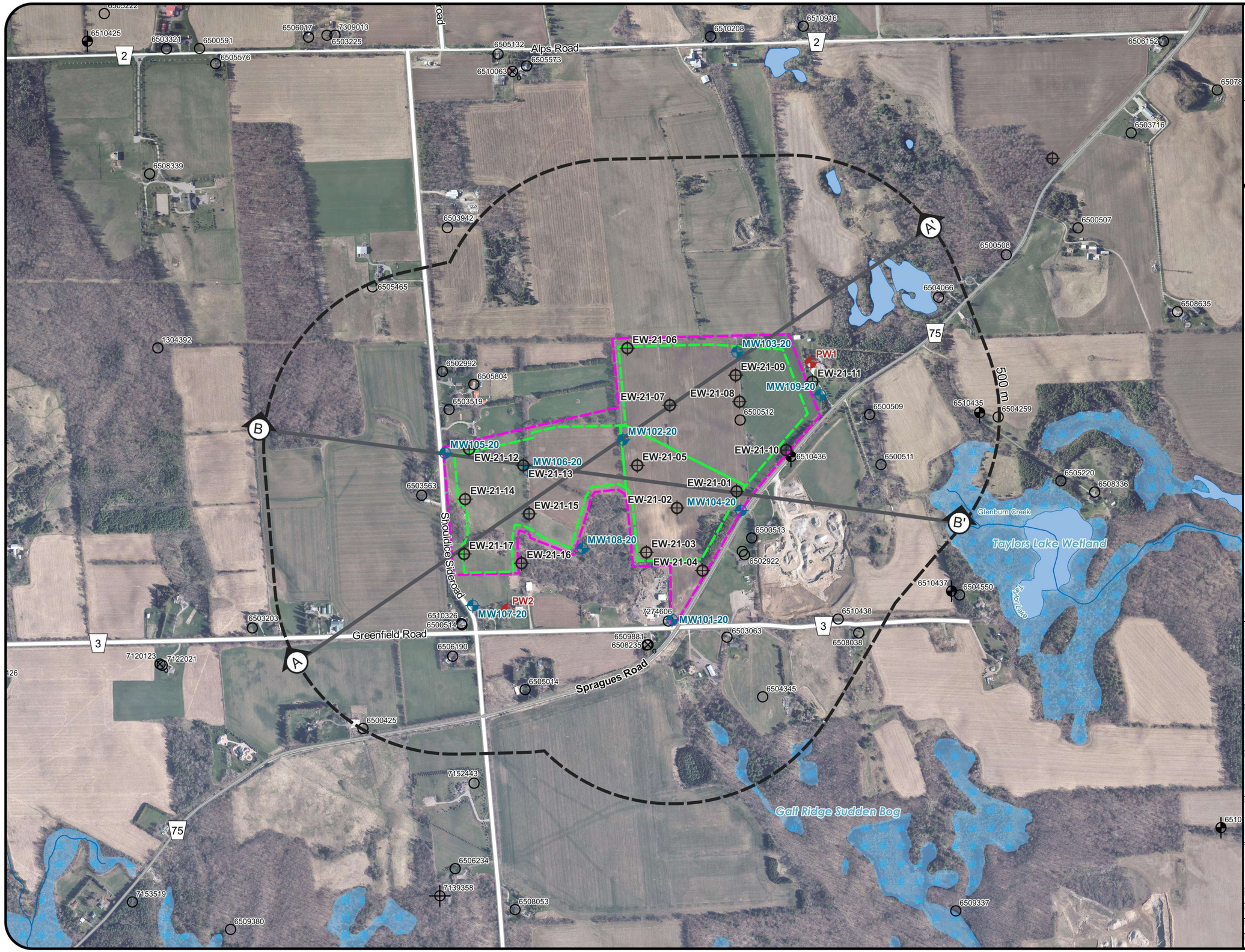
Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

Title: **Key Map**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	1
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz
AR2.1
December 21, 2021 - 21:45 - Plotted By: FCummings



Legend

Boundaries
- License Boundary
- Extraction Boundary
- Geological Cross Section Location

Study Area
- 500 m

Monitoring Locations
- Monitoring Well
- Sampled Private Wells (approximate location)
- Borehole

Surface Water
- Waterbody
- Watercourse

Wetlands
- Provincally Significant Wetland

MECP Well Records
- Water Supply
- Observation Wells
- Test Hole
- Abandoned-Other

Data Sources:

0 90 180 270 360 450 m

Scale (11x17):1:10000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

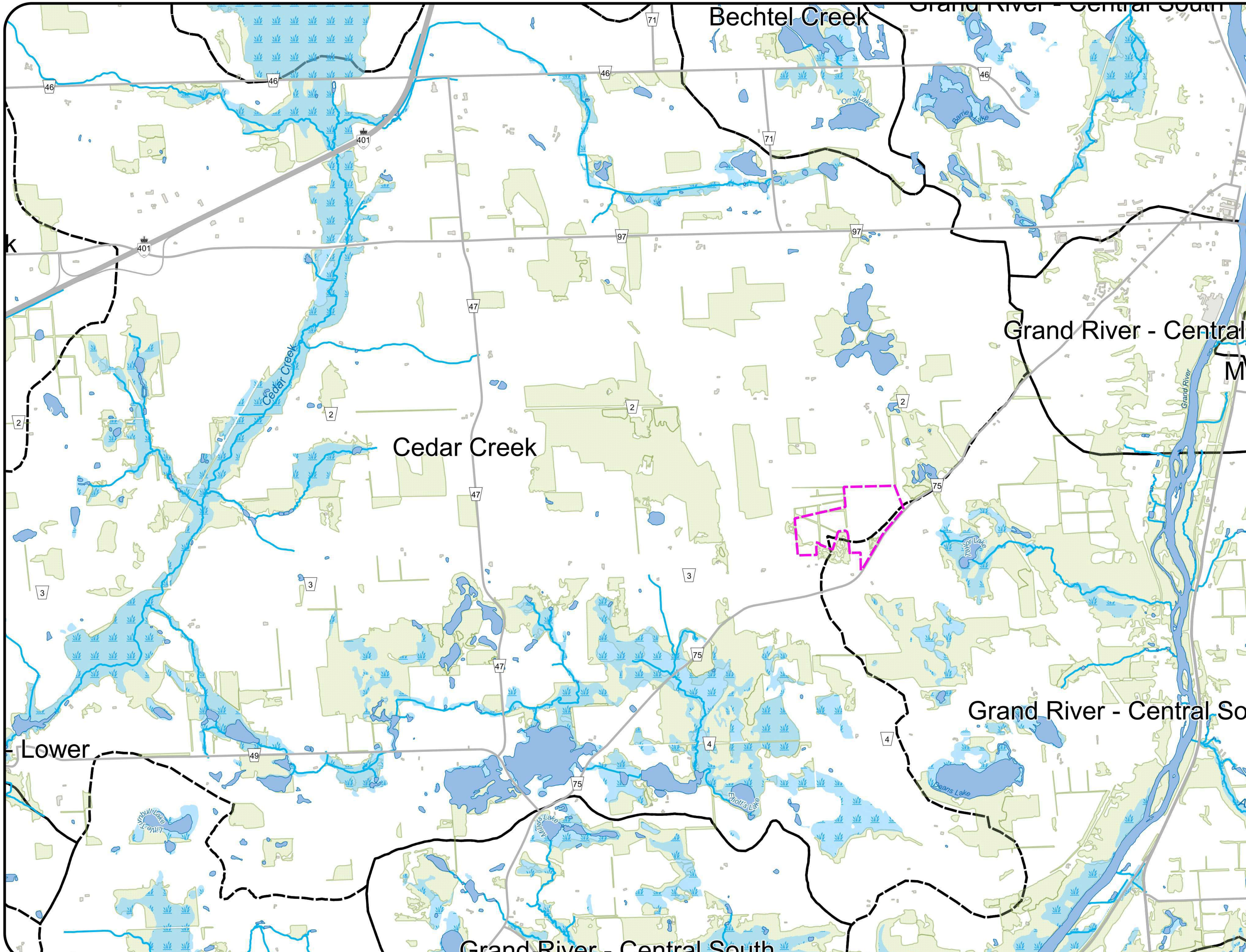
Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

Title: **Study Area Map**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	2
Date	February 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz
AR2.2
February 15, 2022 - 10:10 - Plotted By: FCummings



Legend

Boudaries
- License Boundary
- Subcatchment Areas

Surface Water
- Waterbody
- Watercourse

Wetlands
- Provincally Significant Wetland

Landuse
- Wooded Area

NORTH

PROJECT NORTH

Data Sources:

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0 300 600 900 1200 1500 m

Scale (11x17):1:35000

Project CRS: NAD83 / UTM zone 17N

MTE

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Ph. (519) 743-6500

Client	Cambridge Aggregates
Project	Proposed West Edworthy Pit
Site	Township of North Dumfries
Title	Subcatchment Areas

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	3
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.3

December 14, 2021 - 14:26 - Plotted By: FCummings

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.4

February 15, 2022 - 10:09 - Plotted By: FCummings

EW-21-06
MW103-20
PW1
EW-21-09
EW-21-11
MW109-20
EW-21-07
Phase 3
EW-21-08
MW102-20
MW105-20
EW-21-10
EW-21-05
EW-21-13
MW106-20
Phase 2
EW-21-01
Phase 1
EW-21-02
EW-21-14
MW104-20
EW-21-15
MW108-20
EW-21-03
EW-21-17
EW-21-16
EW-21-04
MW107-20
PW2
MW101-20
Sprague's Road
Greenfield Road

NORTH

PROJECT NORTH

Legend

Boudaries

- License Boundary
- Extraction Area

Monitoring Locations

- Monitoring Well
- Sampled Private Wells (approximate location)
- Borehole

Groundsurface

- Topographic Contours (mAMSL)

Data Sources:

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Topographic contours provided by Point of Interest Aerial

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0 30 60 90 120 150 m

Scale (11x17): 1:3500

Project CRS: NAD83 / UTM zone 17N

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Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

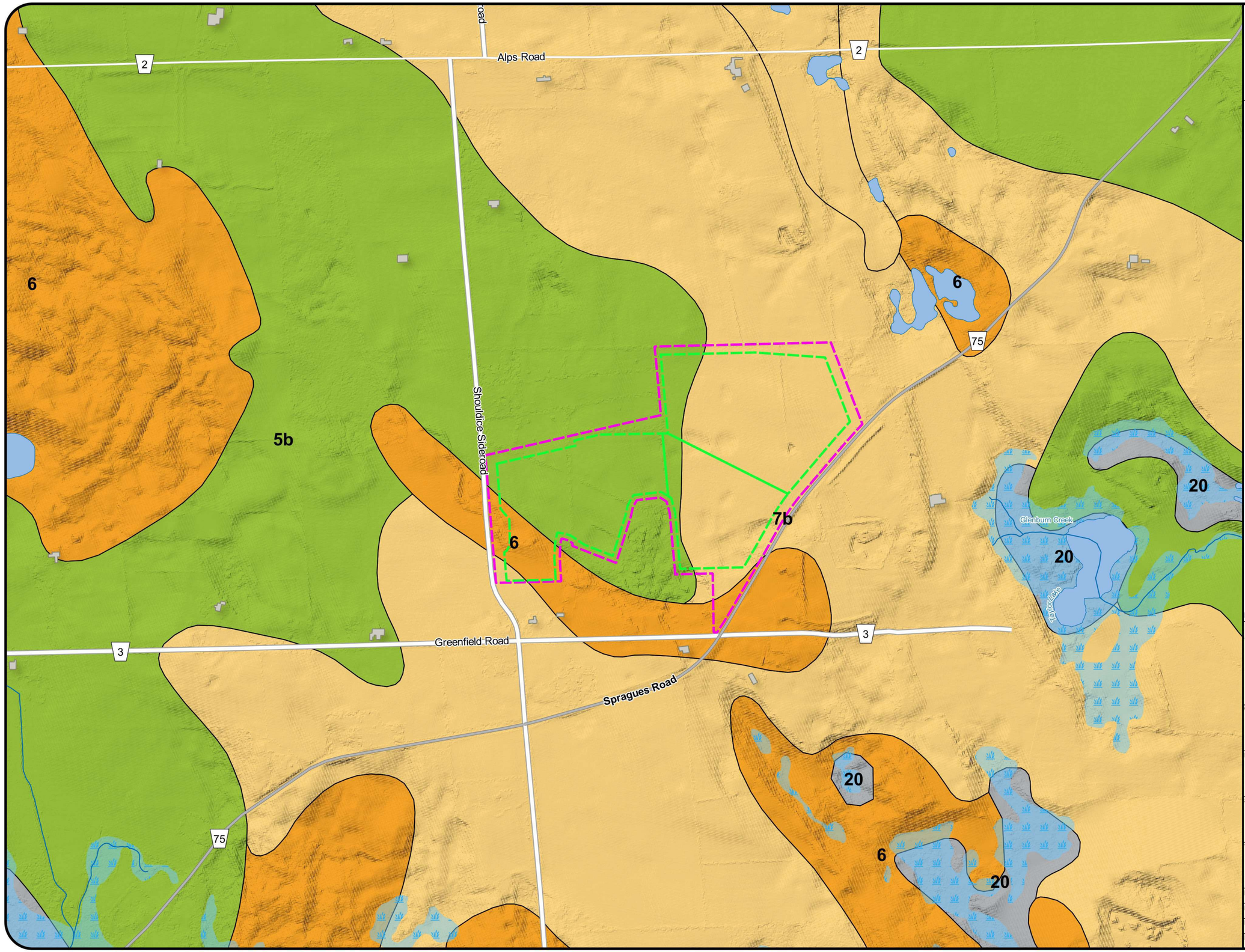
Title: **Site Map**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	4
Date	February 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.5

December 13, 2021 - 21:56 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boudaries

- License Boundary
- Extraction Area

Surface Water

- Watercourse
- Waterbody

Wetlands

- Provincally Significant Wetland

Quaternary Geology

- 20. Organic Deposits: peat, muck, marl
- 7a. Glaciofluvial deposits: Sandy deposits
- 7b. Glaciofluvial deposits: Gravelly deposits
- 6. Ice-contact stratified deposit: sand and gravel, minor silt, clay and till
- 5b. Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain

Data Sources:

Contains information licensed under the Open Government License Ontario.

Contains Information made available under Grand River Conservation Authority's Open Data Licence v2.0.

Karrow P. F. (1987). Quaternary geology Cambridge area southern Ontario. M2508. Ontario Geologic Survey.

0 90 180 270 360 450 m

Scale (11x17): 1:10000

Project CRS: NAD83 / UTM zone 17N

MTE

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Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

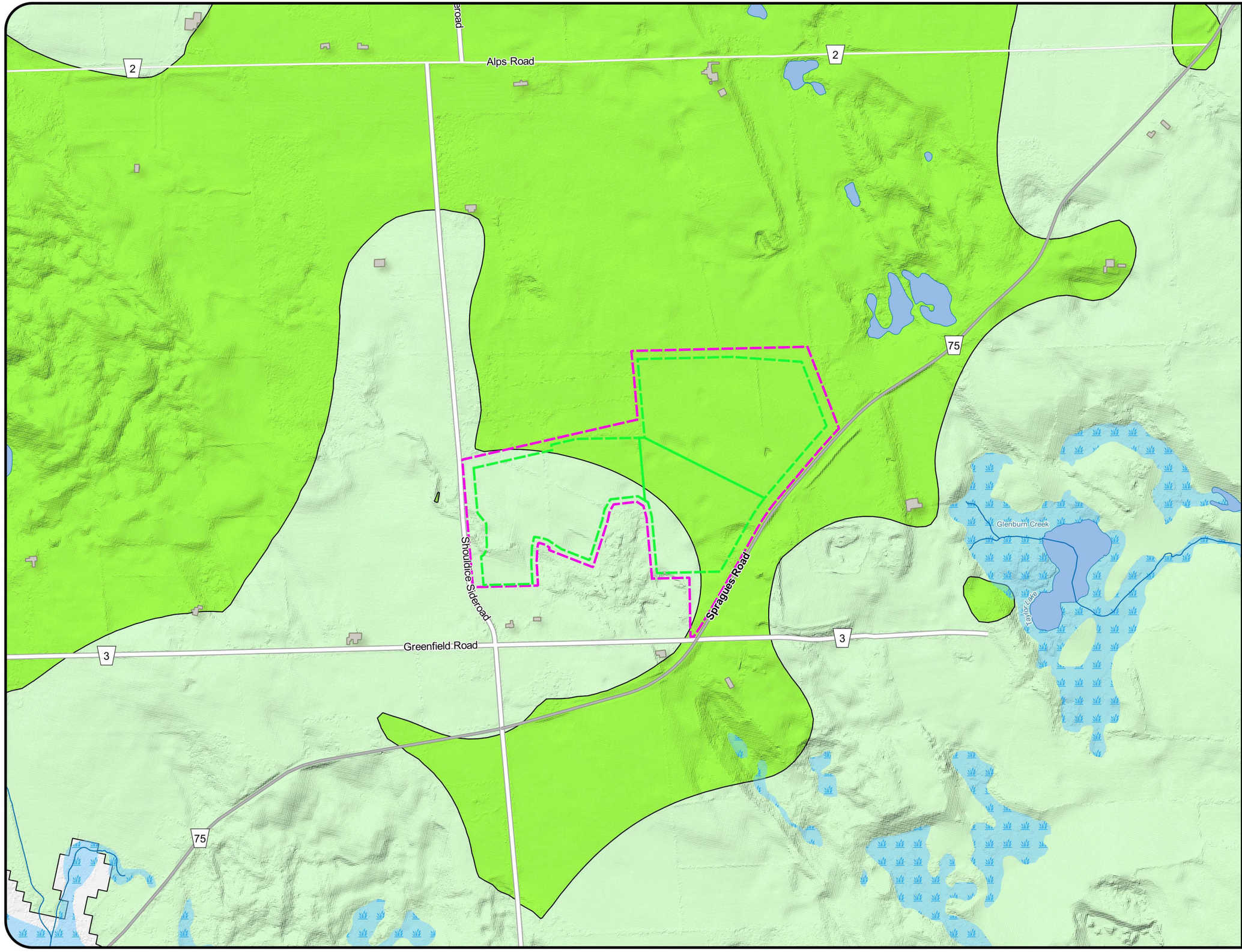
Title: Quaternary Geology

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	5
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.6

December 13, 2021 - 21:59 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boudaries

- License Boundary
- Extraction Area

Significant Groundwater Recharge Areas

- 2 - Low
- 4 - Medium

Surface Water

- Watercourse
- Waterbody

Wetlands

- Provincally Significant Wetland

Data Sources:

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0 90 180 270 360 450 m

Scale (11x17): 1:10000

Project CRS: NAD83 / UTM zone 17N

MTE

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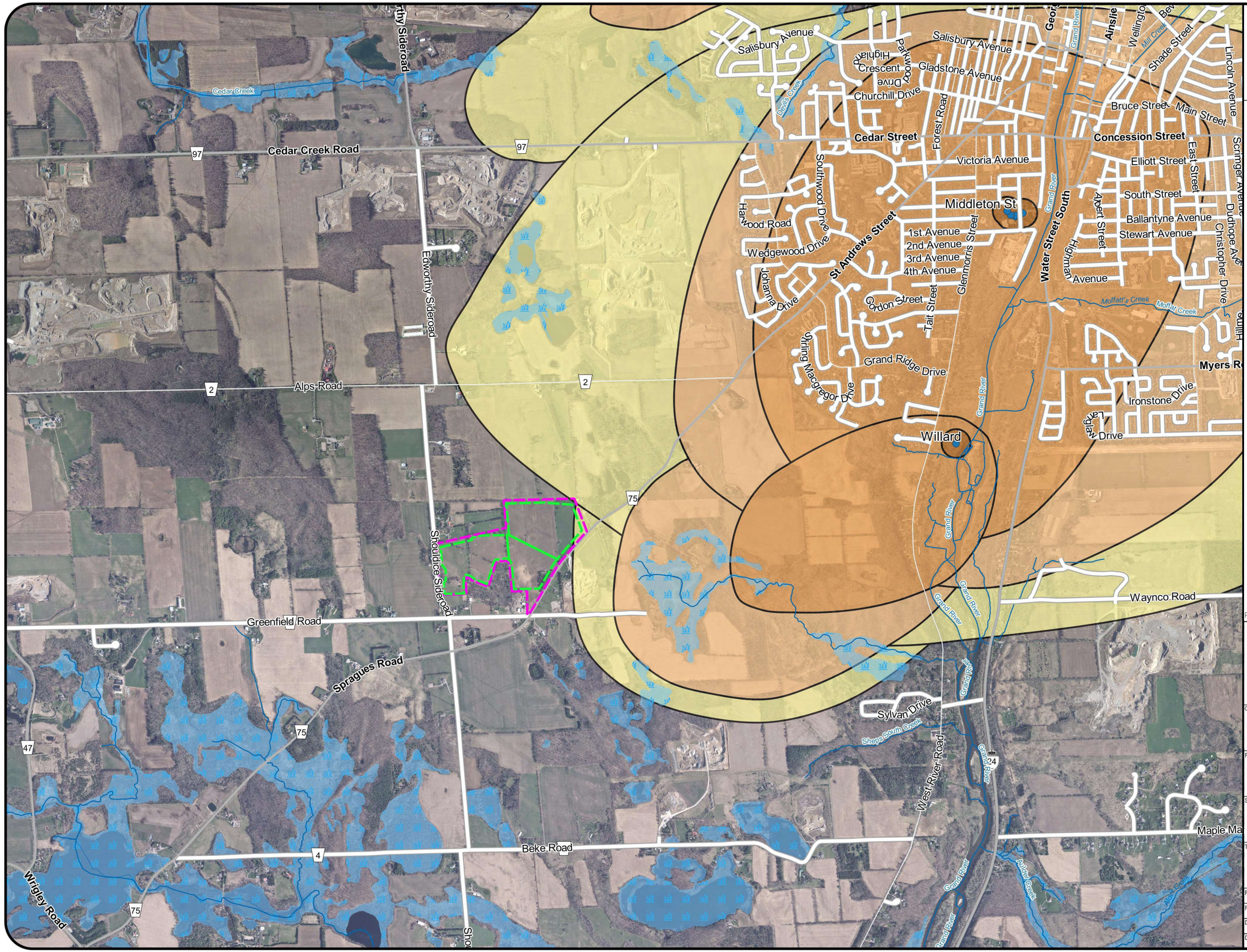
Ph. (519) 743-6500

Client	Cambridge Aggregates
Project	Proposed West Edworthy Pit
Site	Township of North Dumfries
Title	Significant Groundwater Recharge Areas
Reviewed By	PAG
Prepared By	TFC
Drawn By	TFC
Date	December 2021
Project No	46639-100
Figure No	6

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.7

December 14, 2021 - 14:32 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boudaries

- License Boundary
- Extraction Area

Source Water Protection

- Municipal Well

Wellhead Protection Area Zones

- A - 100 m radius exclusion zone
- B - 2 Year Travel Time
- C - 5 Year Travel Time
- D - 25 Year Travel Time

Surface Water

- Watercourse

Wetlands

- Provincally Significant Wetland

Data Sources:

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0 200 400 600 800 1000 m

Scale (11x17): 1:25000

Project CRS: NAD83 / UTM zone 17N

MTE

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Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

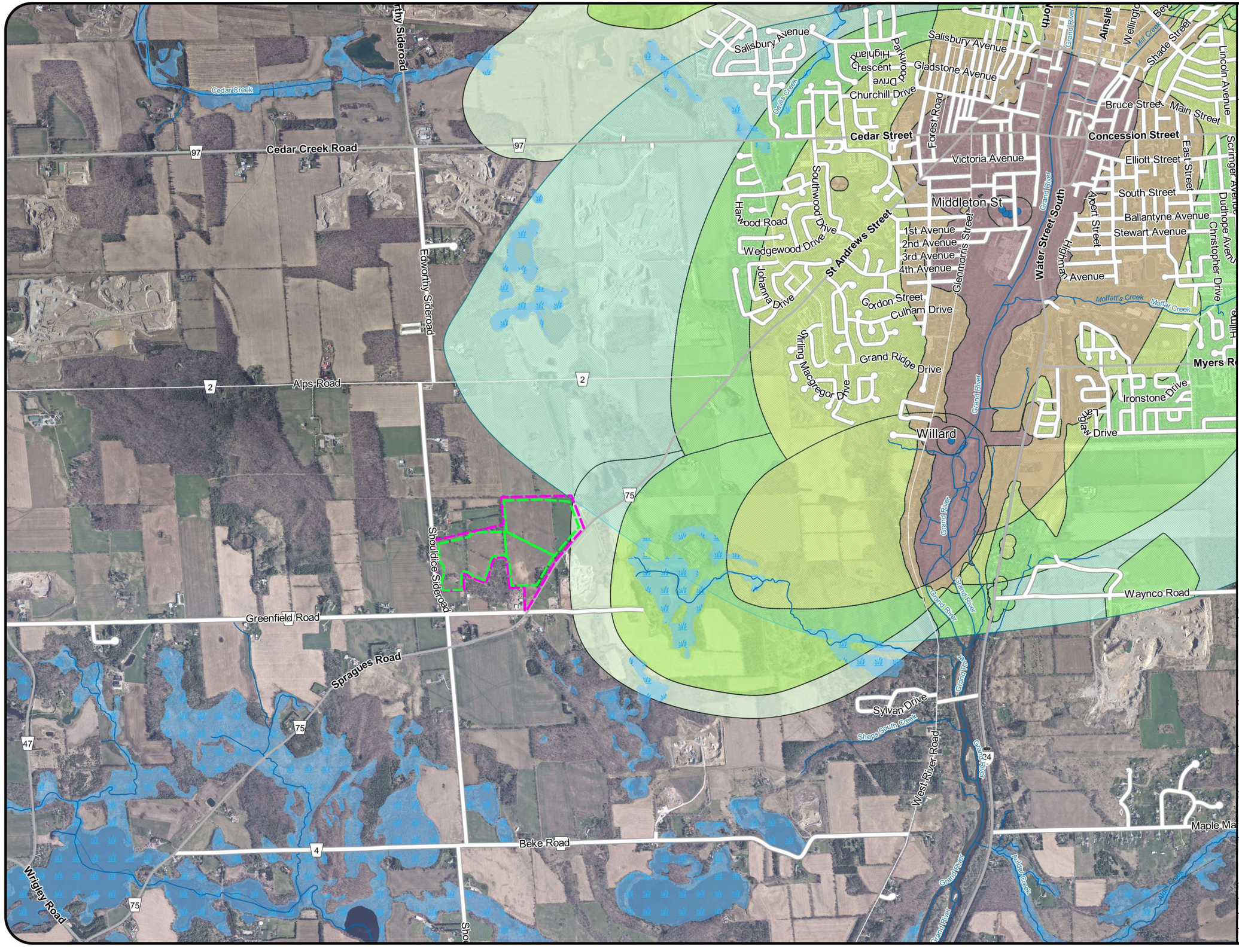
Title: Wellhead Protection Areas

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	7
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.8

December 07, 2021 - 13:11 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boudaries

- License Boundary
- Extraction Area

Source Water Protection

- Municipal Well

Wellhead Protection Area Vulnerability Scoring

- 2
- 4
- 6
- 8
- 10
- Issue Contributing Area

Surface Water

- Watercourse

Wetlands

- Provincally Significant Wetland

Data Sources:

0 200 400 600 800 1000 m

Scale (11x17): 1:25000

Project CRS: NAD83 / UTM zone 17N

MTE

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Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

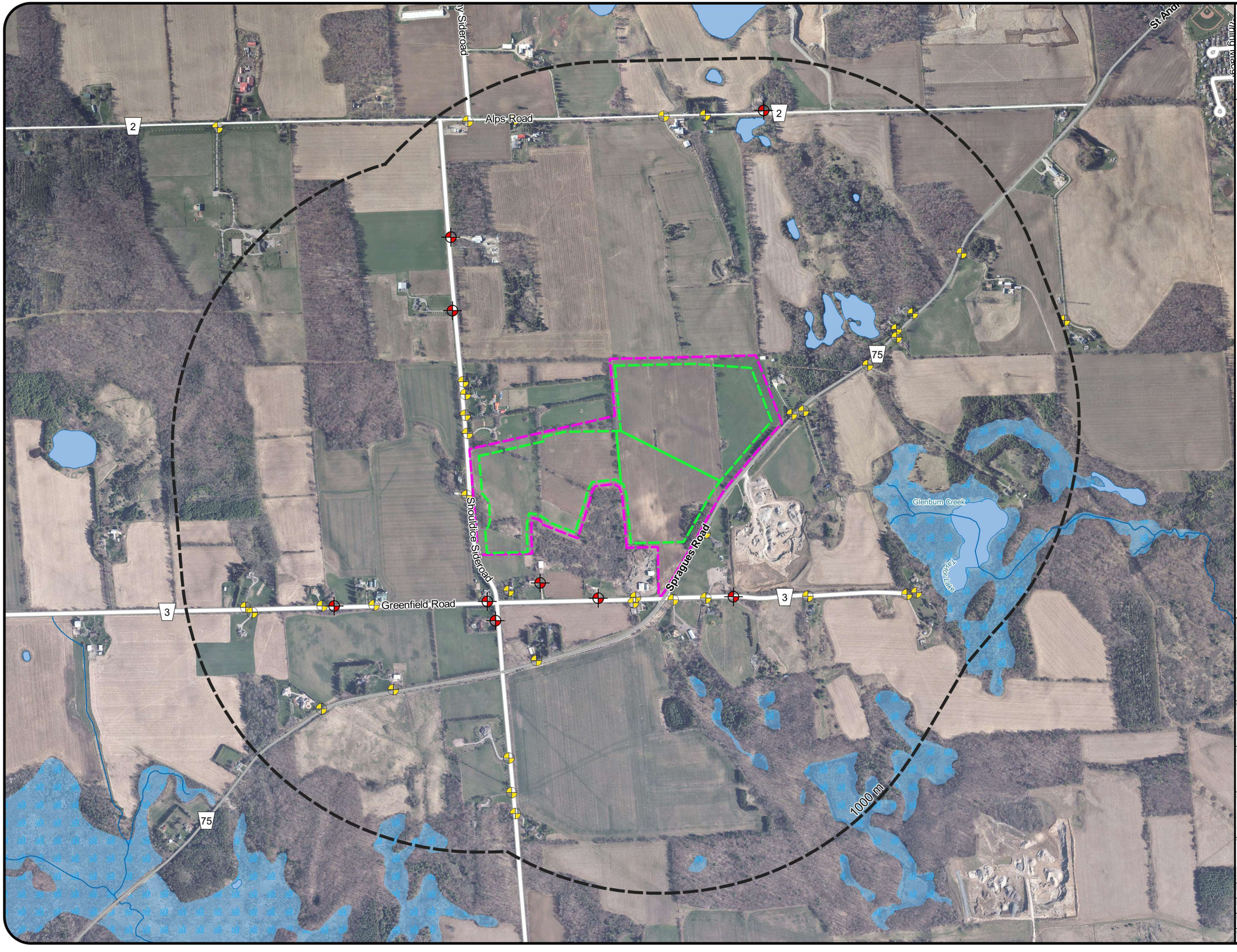
Title: Wellhead Protection Area Vulnerabilty

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	8
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.10

December 14, 2021 - 14:42 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries
- License Boundary
- Extraction Boundary

Delivered Private Well Inventories
- Received Response
- No Response

Surface Water
- Waterbody (GRCA)
- Watercourse (GRCA)

Wetlands
- Provincally Significant Wetland

Data Sources:

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0 100 200 300 400 500 m

Scale (11x17): 1:12000

Project CRS: NAD83 / UTM zone 17N

MTE
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Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

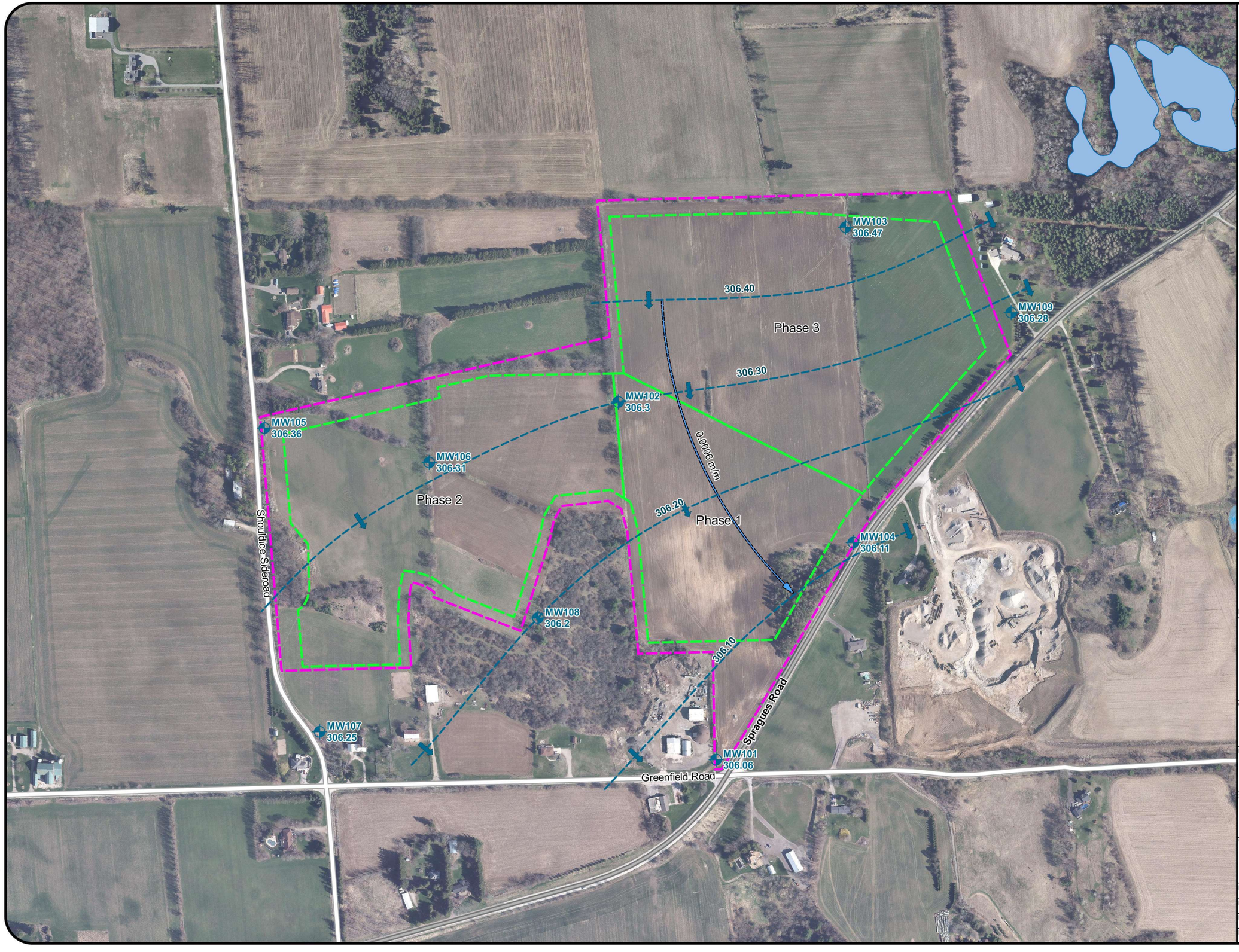
Title: **Private Well Inventory**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	9
Date	December 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.11

December 20, 2021 - 23:11 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries
- License Boundary
- Extraction Boundary

Monitoring Locations
- Monitoring Well & Groundwater Elevation (mAMSL)

Surface Water
- Waterbody
- Watercourse

Wetlands
- Provincally Significant Wetland

Horizontal Hydraulic Gradient

Data Sources:

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0 40 80 120 160 200 m

Scale (11x17): 1:5000

Project CRS: NAD83 / UTM zone 17N

MTE

Engineers,Scientists, Surveyors

Ph. (519) 743-6500

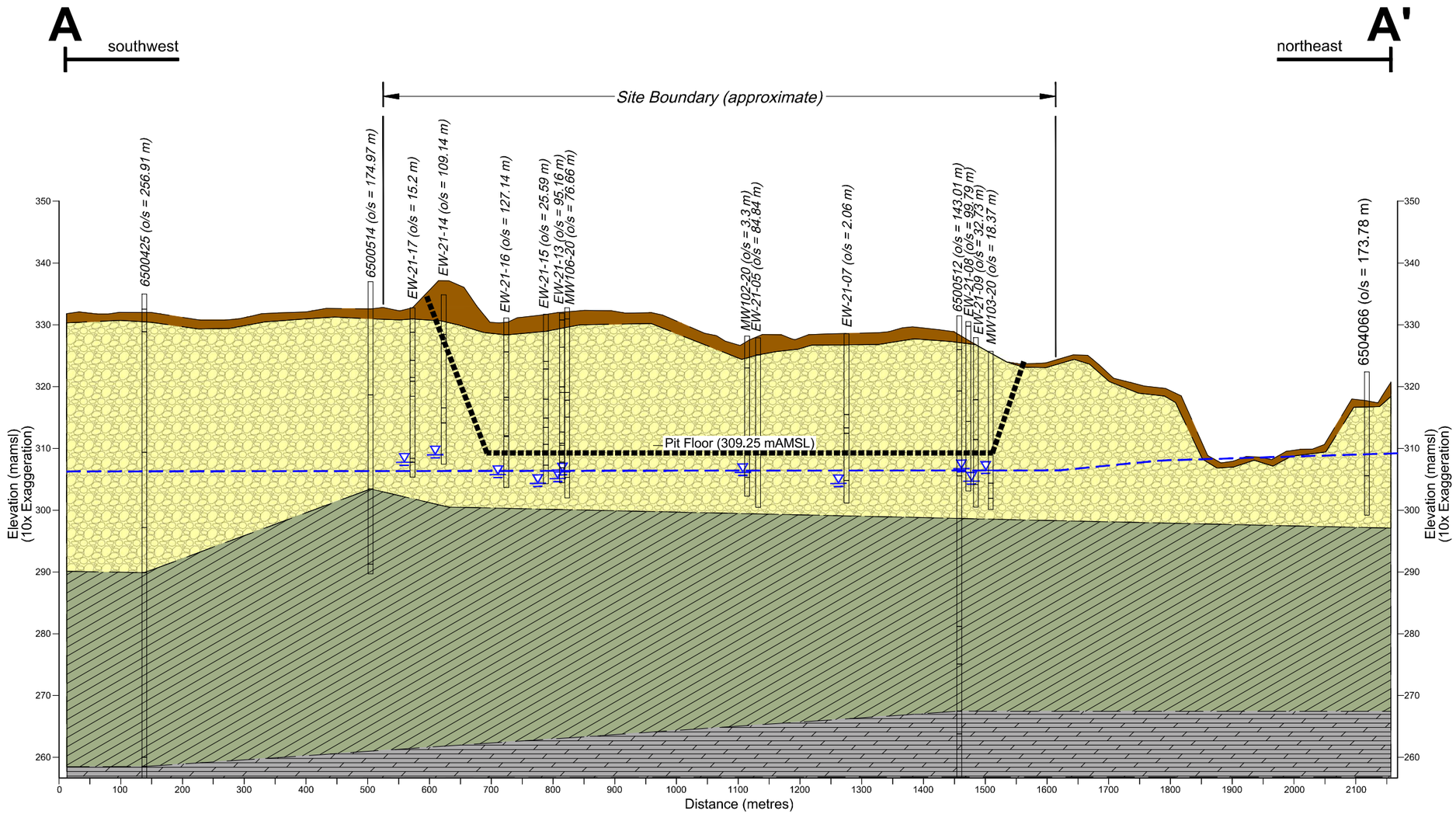
Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

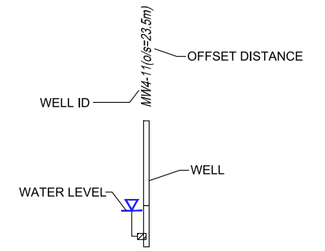
Title: **Groundwater Flow Map (Nov. 16, 2021)**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	10
Date	December 2021		



LEGEND

- Topsoil and Subsoil
- Sand and Gravel
- Till
- Bedrock
- Interpreted Water Table



0 75 150 225 300 375m

Scale(11x17): 1:7500

MTE
Engineers, Scientists, Surveyors
Ph. (519) 743-6500

CLIENT
Cambridge Aggregates

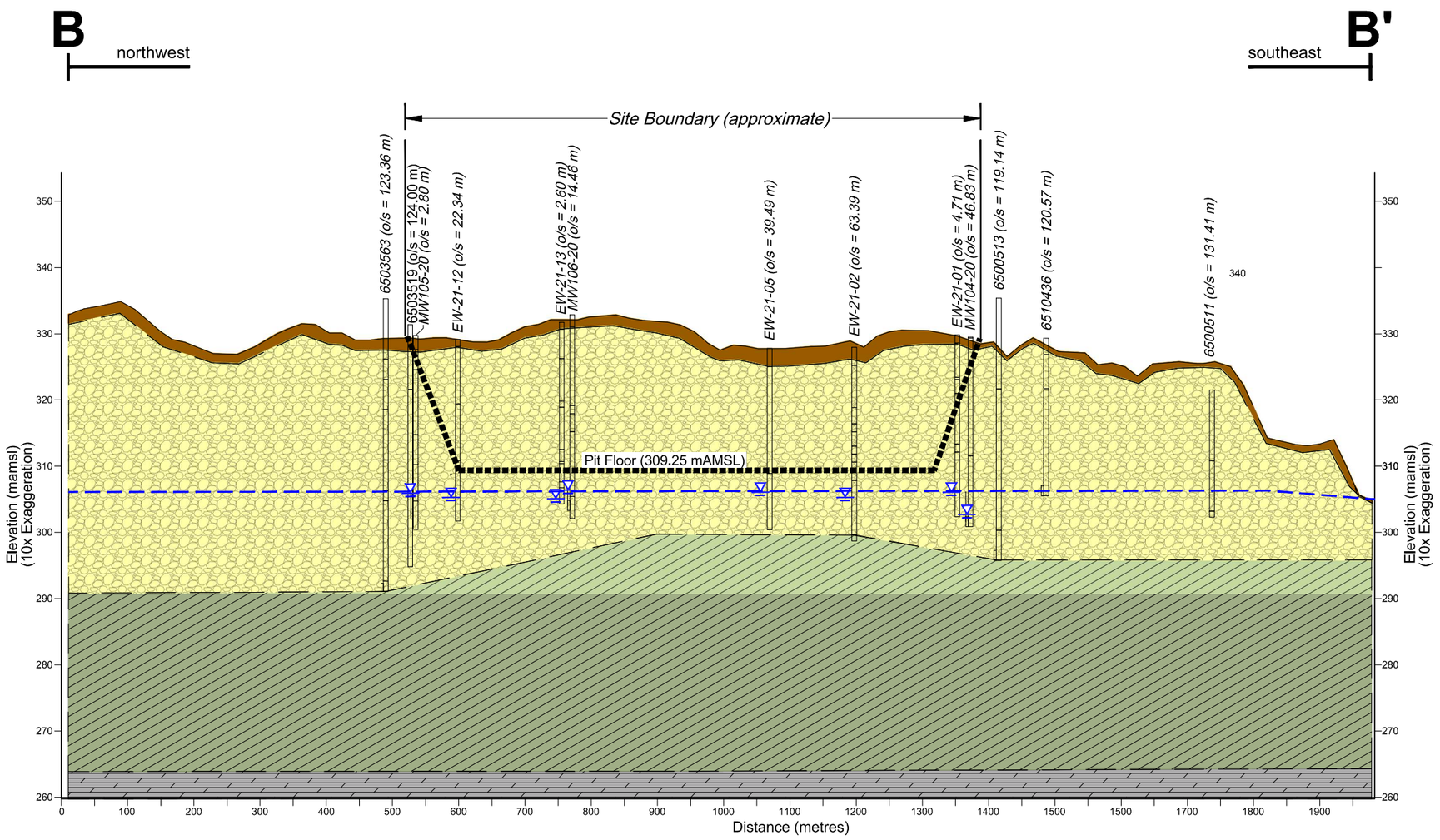
PROJECT
Proposed West Edworthy Pit

SITE
Township of North Dumfries

TITLE
Geological Cross-Section A-A'

Reviewed By	PAG		
Prepared By	TFC	Project No.	46639-100
Drawn By	EMM	Figure No.	11A
Date	March 2022		

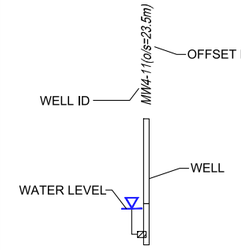
NOTE:
GEOLOGICAL SEQUENCE IS BASED ON PROFESSIONAL INTERPRETATION FROM THE OVERBURDEN SEDIMENTS ENCOUNTERED DURING DRILLING AND/OR REPORTED IN MECP WELL LOGS. ACTUAL GEOLOGICAL CONDITIONS MAY VARY.



NOTE:
GEOLOGICAL SEQUENCE IS BASED ON PROFESSIONAL INTERPRETATION FROM THE OVERBURDEN SEDIMENTS ENCOUNTERED DURING DRILLING AND/OR REPORTED IN MECP WELL LOGS. ACTUAL GEOLOGICAL CONDITIONS MAY VARY.

LEGEND

- Topsoil and Subsoil
- Sand and Gravel
- Till
- Bedrock
- Interpreted Water Table



0 75 150 225 300 375m
Scale(11x17): 1:7500

MTE
Engineers, Scientists, Surveyors
Ph. (519) 743-6500

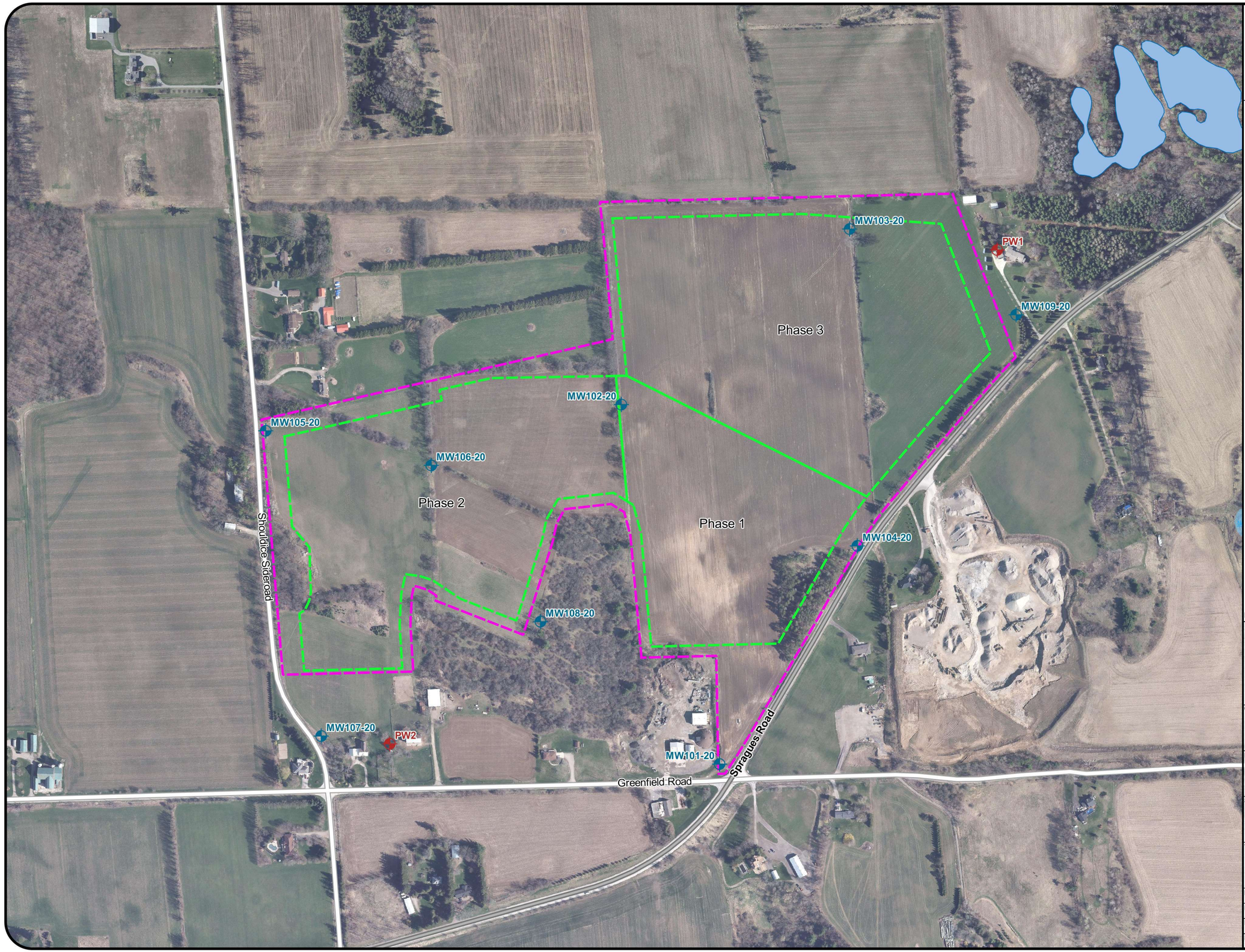
CLIENT
Cambridge Aggregates

PROJECT
Proposed West Edworthy Pit

SITE
Township of North Dumfries

TITLE
Geological Cross-Section B-B'

Reviewed By	PAG		
Prepared By	TFC	Project No.	46639-100
Drawn By	EMM	Figure No.	11B
Date	March 2022		



N
NORTH

N
PROJECT NORTH

Legend

Boundaries
- License Boundary
- Extraction Boundary

Monitoring Locations
- Monitoring Well
- Sampled Private Wells (approximate location)
- Borehole

Surface Water
- Waterbody

Data Sources:

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0 40 80 120 160 200 m

Scale (11x17): 1:5000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

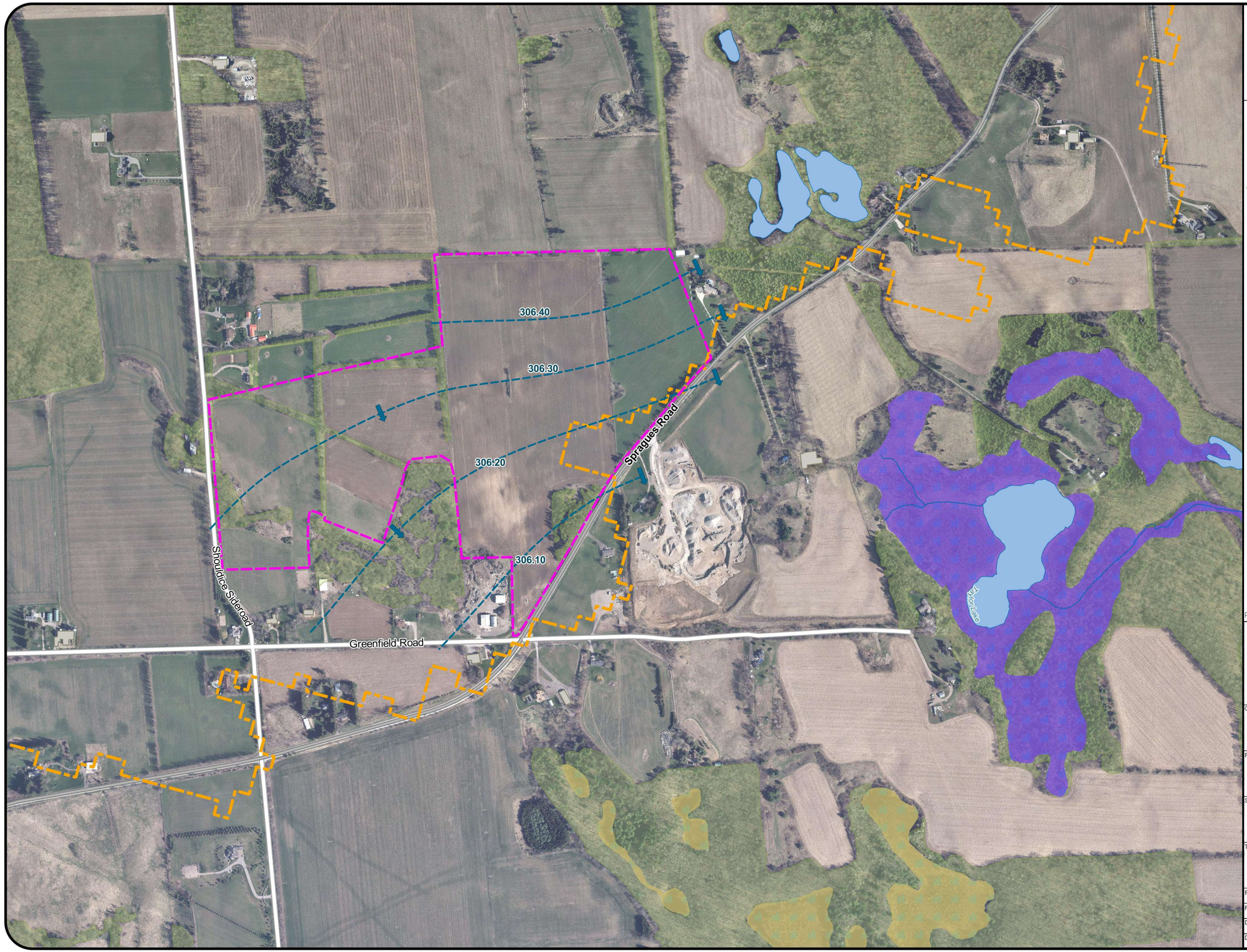
Title: **Sampled Private Wells**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	12
Date	February 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.15

June 30, 2022 - 11:55 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries

- License Boundary
- Cedar Creek Catchment Boundary (approximate)
- Groundwater Contours Nov. 16, 2021 (mAMSL)

Wetlands

- Provincally Significant Wetland
- Galt Ridge Sudden Bog
- Taylors Lake Wetland

Data Sources:
Ministry of Natural Resources and Forestry. (2021). ONTARIO FLOW ASSESSMENT TOOL
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0 70 140 210 280 350 m

Scale (11x17):1:7500

Project CRS: NAD83 / UTM zone 17N

MTE
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Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

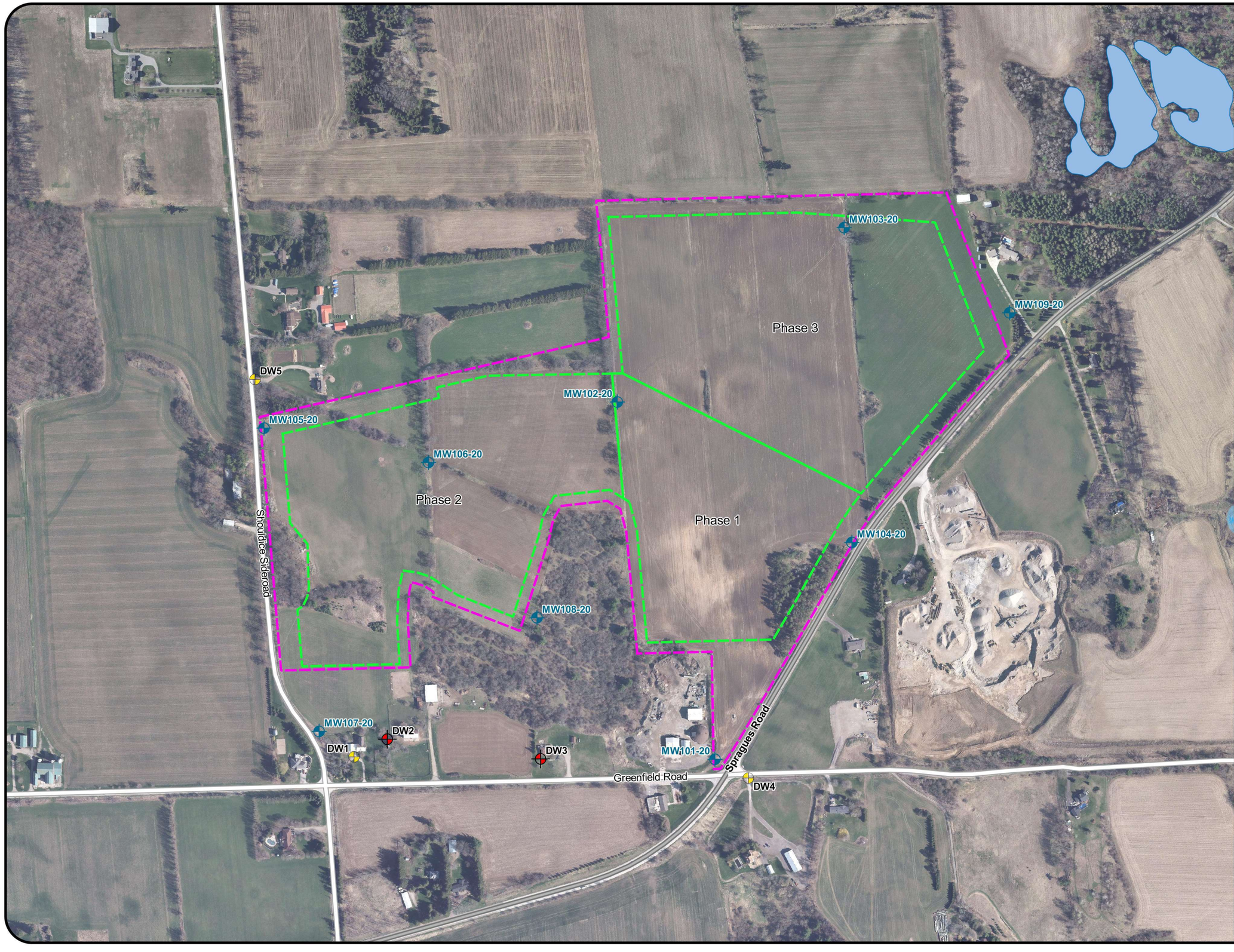
Title: **Wetland Impact Assessment**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	13
Date	June 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.13

June 28, 2022 - 13:53 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries
- License Boundary
- Extraction Boundary

Monitoring Locations
- Monitoring Well

Private Wells with no associated MECP Well Record
- Private Well (No response to Survey)

Surface Water
- Waterbody

Data Sources:
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0 40 80 120 160 200 m

Scale (11x17): 1:5000

Project CRS: NAD83 / UTM zone 17N

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Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

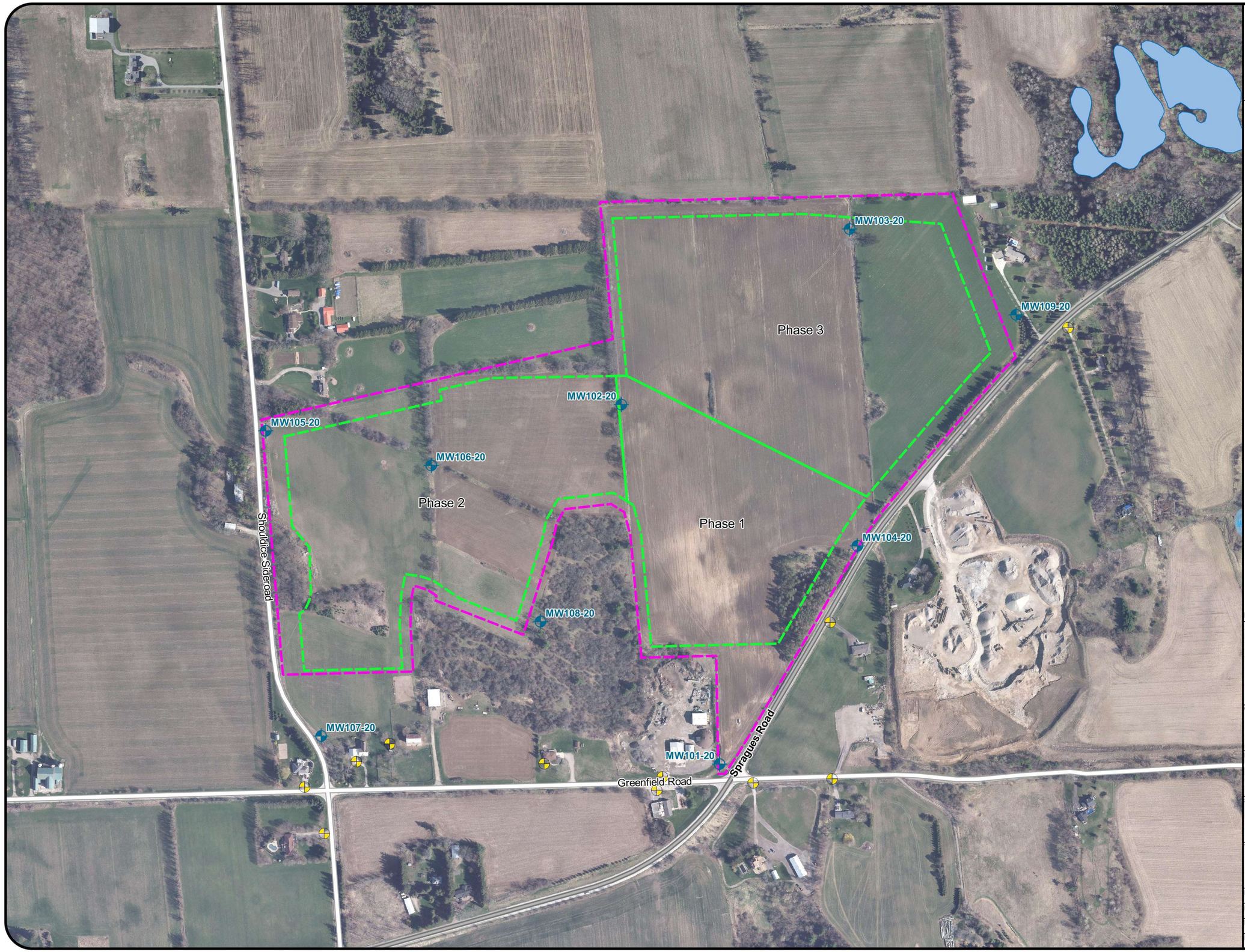
Title: **Private Wells with no associated MECP Well Record**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	14
Date	June 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

AR2.14

June 28, 2022 - 13:54 - Plotted By: FCummings



N
NORTH

N
PROJECT NORTH

Legend

Boundaries
- License Boundary
- Extraction Boundary

Monitoring Locations
- Monitoring Well
- Private Well (Approximate Location)

Surface Water
- Waterbody

Data Sources:
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0 40 80 120 160 200 m

Scale (11x17): 1:5000

Project CRS: NAD83 / UTM zone 17N

MTE
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Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

Title: **Proposed Private Well Monitoring Program**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	15
Date	June 2022		

Tables

Table 1: MECP Well Records within the Study Area

MECP Well Record ID	Date Completed	Final Status	Primary Use	Easting (m)	Northing (m)	Depth (mbgs)	Static Water Level (mbgs)	Casing Depth (mbgs)	Water Found Depth (mbgs)	Screen top (mbgs)	Screen bottom (mbgs)
6505812	4/22/1986	Water Supply	Domestic	552646.1	4796506	56.4	29.3	45.72	45.72	46.02	50.60
6504259	7/13/1974			553266.1	4797021	16.1	6.7	14.94	NA	13.72	16.15
6505014	11/15/1979			552134.1	4796003	41.1	30.5	41.15	30.48	NA	NA
6503063	7/9/1969			552654.1	4796263	39.9	29.6	39.93	39.93	NA	NA
6506190	7/29/1987			551917.1	4796052	37.2	29	37.19	37.19	NA	NA
6500513	3/15/1963			552664.1	4796548	39.6	31.1	38.10	38.10	38.10	39.62
6500514	10/24/1967			551924.1	4796143	47.2	30.5	47.24	47.24	NA	NA
6502922	7/30/1968			552654.1	4796498	40.8	26.2	39.93	38.10	39.93	40.84
6505465	5/9/1983			551484.1	4797013	36.9	21	36.88	36.88	NA	NA
6503519	10/26/1971			551764.1	4796723	36.6	25	36.58	36.58	NA	NA
6503563	1/24/1972			551739.1	4796473	44.2	35	42.98	44.20	42.98	44.20
6500509	5/4/1961			552914.1	4796953	21.9	16.1	21.03	19.51	21.03	21.95
6504345	9/16/1975			552786.1	4796121	56.1	20.7	53.95	38.40	52.73	55.17
6504066	1/8/1974			553034.1	4797313	23.2	18.6	23.16	23.16	NA	NA
6502992	10/18/1968			551724.1	4796823	38.7	27.4	38.71	38.71	NA	NA
6508038	8/9/1996			553011.1	4796351	27.1	13.7	27.13	25.91	25.60	26.52
7274606	6/21/2016			552485	4796273	57	25.1	54.25	57.00	NA	NA
6510326	10/4/2005			551922	4796146	47.60	32.1	NA	NA	NA	NA
7152443*	5/12/2010			552049	4795718	36.6	27.7	36.58	36.58	NA	NA
6500512	9/15/1960			552564.1	4796863	74.7	17.7	64.01	67.70	NA	NA
6500425	2/27/1965		Livestock	551714.1	4795803	78.3	13.7	78.33	78.03	NA	NA
6500511	10/31/1967			552974.1	4796823	19.2	27.1	19.20	19.20	NA	NA
6505804	3/19/1986		Irrigation	551817.1	4796806	45.1	29.3	45.11	45.11	NA	NA
6508235	5/30/1998		Municipal	552440.3	4796195	36	12.3	35.05	35.97	35.05	35.97
6510438	11/25/2005		Commerical	552947	4796377	23.2	27.7	22.50	22.25	22.25	23.16
6510436	12/2/2005	Observation Wells	Commerical	552724	4796793	23.8	19.2	20.72	0.00	22.25	23.77
6510435	11/6/2005			553213	4797022	24.4	15.4	18.89	0.00	14.56	21.03
6509881	10/27/2004	Abandoned	NA	552443	4796197	NA	NA	NA	NA	NA	NA

Notes:

7152443 primary use is assumed to be domestic.

Table 2: Groundwater Levels mbTOC

Date	MW101-20	MW102-20	MW103-20	MW104-20	MW105-20	MW106-20	MW107-20	MW108-20	MW109-20
6/2/2020	25.95	21.84	19.24	23.39	Not Installed				
6/9/2020	-	21.86	19.27	23.38					
11/5/2020	26.5	22.4	19.8	23.92	23.86	26.84	26.3	26.58	19.26
4/22/2021	26.79	22.7	20.07	24.18	24.2	27.16	26.63	26.89	19.5
9/16/2021	27	22.91	20.32	24.38	24.4	27.36	26.82	27.09	19.7
11/16/2021	26.88	22.77	20.14	24.26	24.28	27.24	26.7	26.98	19.53

Note:

mbTOC = meters below top of casing

- = Not Measured

Table 3: Groundwater Elevations mAMSL

Date	MW101-20	MW102-20	MW103-20	MW104-20	MW105-20	MW106-20	MW107-20	MW108-20	MW109-20
6/2/2020	306.98	307.23	307.37	306.98	Not Installed				
6/9/2020	-	307.21	307.34	306.99					
11/5/2020	306.44	306.68	306.81	306.46	306.78	306.71	306.64	306.61	306.54
4/22/2021	306.14	306.37	306.54	306.19	306.44	306.39	306.32	306.29	306.31
9/16/2021	305.93	306.16	306.29	305.99	306.24	306.19	306.13	306.09	306.11
11/16/2021	306.06	306.3	306.47	306.11	306.36	306.31	306.25	306.2	306.28

Note:

mAMSL = meters above mean sea level

- = Not Measured

Table 4: Summary of Hydraulic Conductivities

Well ID	Hydrauluic Conductivity (m/s)
MW101-20	4.54E-03
MW102-20	2.10E-04
MW103-20	1.76E-03
MW104-20	2.81E-03
MW105-20	2.85E-04
MW106-20	1.70E-03
MW107-20	3.33E-04
MW108-20	9.91E-04
MW109-20	6.10E-05
GEOMEAN	7.10E-04

Table 5.1: Water Quality Results - On-Site Monitoring Wells

Parameter	Units	Reporting Detection Limit	ODWS	MW101-20 4/22/2021	MW102-20 4/22/2021	MW103-20 4/22/2021	MW104-20 4/22/2021	MW105-20 4/22/2021	MW106-20 4/22/2021	MW107-20 4/22/2021	MW108-20 4/22/2021	MW109-20 4/22/2021
Colour	CU	2	5	**6.8**	**36.4**	<2	<2	**38.1**	**37.1**	**56.6**	**31.9**	**53.6**
Electrical Conductivity	umhos/cm	3/1	-	873	578	598	595	842	594	1060	558	576
Hardness	mg/L	0.5	80/100	**388**	**333**	**336**	**325**	**354**	**360**	**394**	**337**	**318**
Total Dissolved Solids	mg/L	20	500	**518**	369	343	346	**502**	351	**648**	361	389
Turbidity	NTU	0.1	5	**57.4**	**200**	**20.2**	4.03	**238**	**866**	**843**	**211**	**>4000**
pH	pH units	0.1	6.5/8.5	7.67	7.76	7.8	7.81	7.77	7.61	7.72	7.69	7.73
Alkalinity	mg/L	10/1	30/500	281	270	296	265	284	385	299	304	400
Ammonia	mg/L	0.01	-	<0.01	<0.01	0.039	<0.01	<0.01	0.033	0.012	<0.01	0.019
Chloride	mg/L	0.5/2.5	250	99.6	9.6	10.2	16.7	94.4	5.02	156	6.38	12.4
Fluoride	mg/L	0.02/0.1	1.5	0.067	0.077	0.044	0.061	0.065	0.065	0.064	0.068	0.066
Nitrate	mg/L	0.02/0.1	10	6.79	4.65	5.41	9.1	7.76	5.04	8.37	6.28	3.62
Nitrite	mg/L	0.01/0.05	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.016
Orthophosphate	mg/L	0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Sulfate	mg/L	0.3/1.5	500	20.9	32.7	10.9	11.9	9.82	12	17.1	10.4	31.4
Antimony	mg/L	0.0001	0.006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	0.00011	0.00018	0.00012	<0.0001	0.00016	0.00015	0.00014	0.00013	0.00011
Selenium	mg/L	5E-05	0.05	0.000228	0.000144	0.00024	0.0003	0.000239	0.000207	0.000238	0.000196	0.000208
Aluminum	mg/L	0.005	0.1	0.0089	0.0718	<0.005	<0.005	0.0061	0.0233	<0.005	0.0138	0.0059
Barium	mg/L	0.0001	1	0.136	0.235	0.0749	0.0615	0.19	0.104	0.209	0.093	0.0866
Beryllium	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	5E-05	-	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05
Boron	mg/L	0.01	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	5E-06	0.005	9.6E-06	7.3E-06	<5E-06	<5E-06	<5E-06	<5E-06	<5E-06	9.5E-06	<5E-06
Calcium	mg/L	0.05	-	98.4	80.3	78.9	75.5	90.5	87.8	103	83.9	78.6
Chromium	mg/L	0.0005	0.05	<0.0005	0.00052	0.00065	<0.0005	0.00059	<0.0005	0.00053	<0.0005	<0.0005
Cobalt	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.0002	1	0.00071	0.00037	0.0003	0.00042	0.00084	0.00032	<0.0002	0.00106	0.00084
Iron	mg/L	0.01	0.3	<0.01	0.063	<0.01	<0.01	0.011	0.031	<0.01	0.014	<0.01
Lead	mg/L	5E-05	0.01	9.3E-05	0.00173	<5E-05	<5E-05	6.5E-05	0.000157	<5E-05	8.1E-05	<5E-05
Magnesium	mg/L	0.005	-	34.7	32.1	33.9	33.2	31.1	34.3	33.2	31	29.6
Manganese	mg/L	0.0005	0.05	0.00139	0.0078	<0.0005	<0.0005	0.00395	0.00529	0.0103	0.00882	0.00797
Molybdenum	mg/L	5E-05	-	0.00022	0.000415	0.000218	0.000165	0.000429	0.000317	0.00043	0.000417	0.000699
Nickel	mg/L	0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.00059	<0.0005	0.00054
Phosphorus	mg/L	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium	mg/L	0.05	-	1.26	1.23	0.896	0.927	1.48	1.03	1.79	1.22	1.11
Silicon	mg/L	0.05	-	5.57	6.59	6.18	4.71	6.63	6.4	6.69	6.05	5.66
Silver	mg/L	5E-05	-	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05
Sodium	mg/L	0.05	20/200	**37.1**	2.69	3.51	2.91	**39**	2.06	**72.4**	1.8	5.26
Strontium	mg/L	0.001	-	0.135	0.103	0.0884	0.074	0.122	0.101	0.183	0.1	0.103
Thallium	mg/L	1E-05	-	<1E-05	<1E-05	<1E-05	<1E-05	1.3E-05	<1E-05	<1E-05	<1E-05	<1E-05
Tin	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00016	0.00024	<0.0001	<0.0001	<0.0001
Titanium	mg/L	0.0003/0.0004	-	<0.0003	0.00246	<0.0003	<0.0003	<0.0003	0.00086	<0.0003	0.00037	<0.0003
Tungsten	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	1E-05	0.02	0.000403	0.000578	0.000355	0.000285	0.00053	0.000508	0.000551	0.000479	0.000411
Vanadium	mg/L	0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	0.001	5	0.0046	0.0055	0.0023	0.0025	0.0083	0.002	0.0015	0.0027	0.0014
Zirconium	mg/L	0.0003	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
F1 (C6-C10)	ug/L	25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25
F1 (C6-C10) - BTEX	ug/L	25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25
F2 (C10-C16 Hydrocarbons)	ug/L	100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (C16-C34 Hydrocarbons)	ug/L	250	-	<250	<250	<250	<250	<250	<250	<250	<250	<250
F4 (C34-C50 Hydrocarbons)	ug/L	250	-	<250	<250	<250	<250	<250	<250	<250	<250	<250
Total Hydrocarbons (C6-C50)	ug/L	370	-	<370	<370	<370	<370	<370	<370	<370	<370	<370
Benzene	ug/L	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	0.5	140/2.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	0.5	60/24	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.54
Total Xylenes	ug/L	0.5	90/300	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p+m-Xylene	ug/L	0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

*Reporting Detection Limit (RDL) may have been altered based on the RDL at the time of analyis.

Values exceeding the ODWS are b**olded.**

Metals were field filtered.

Table 5.1: Water Quality Results - On-Site Monitoring

Parameter	Units	Reporting Detection Limit	ODWS	MW101-20 9/16/2021	MW102-20 9/16/2021	MW103-20 9/16/2021	MW104-20 9/16/2021	MW105-20 9/16/2021	MW106-20 9/16/2021	MW107-20 9/16/2021	MW108-20 9/16/2021	MW109-20 9/16/2021
Colour	CU	2	5	<2	**18**	<2	<2	3.4	**27.9**	3.2	**20.4**	**37.5**
Electrical Conductivity	umhos/cm	3/1	-	942	593	636	613	848	610	1150	568	593
Hardness	mg/L	0.5	80/100	**345**	**309**	**332**	**318**	**347**	**348**	**377**	**327**	**307**
Total Dissolved Solids	mg/L	20	500	492	356	335	352	**520**	343	**659**	329	318
Turbidity	NTU	0.1	5	1.43	**159**	0.63	2.47	**41.5**	**571**	**16.3**	**550**	**>4000**
pH	pH units	0.1	6.5/8.5	7.92	7.89	7.94	8	7.93	7.86	7.89	7.91	7.95
Alkalinity	mg/L	10/1	30/500	284	271	307	251	286	339	268	290	271
Ammonia	mg/L	0.01	-	0.011	<0.01	0.029	<0.01	<0.01	<0.01	<0.01	<0.01	0.018
Chloride	mg/L	0.5/2.5	250	98.8	8.59	8.9	16.9	100	4.27	182	7.42	12.7
Fluoride	mg/L	0.02/0.1	1.5	0.068	0.074	0.054	0.064	0.058	0.058	<0.1	0.065	0.054
Nitrate	mg/L	0.02/0.1	10	6.32	4.46	4.89	8.8	7.75	4.54	7.82	5.17	3.76
Nitrite	mg/L	0.01/0.05	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01
Orthophosphate	mg/L	0.003	-	<0.003	<0.003	<0.003	<0.003	0.0036	<0.003	<0.003	<0.003	<0.003
Sulfate	mg/L	0.3/1.5	500	21.3	31.2	9.5	11.4	10.2	11.7	15.4	9.58	28.7
Antimony	mg/L	0.0001	0.006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	0.00012	0.00015	0.00015	<0.0001	0.00016	0.00012	0.00014	0.00015	0.00012
Selenium	mg/L	5E-05	0.05	0.000232	0.000264	0.000217	0.000343	0.000241	0.000213	0.000248	0.000181	0.000244
Aluminum	mg/L	0.005	0.1	<0.005	0.0107	<0.005	<0.005	<0.005	0.0103	<0.005	0.019	<0.005
Barium	mg/L	0.0001	1	0.129	0.22	0.0773	0.0617	0.207	0.106	0.214	0.0842	0.088
Beryllium	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	5E-05	-	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05
Boron	mg/L	0.01	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	5E-06	0.005	7.3E-06	6.2E-06	<5E-06	<5E-06	<5E-06	<5E-06	<5E-06	<5E-06	<5E-06
Calcium	mg/L	0.05	-	87.1	74.5	77.7	74.5	87.6	83	99.6	80	75.4
Chromium	mg/L	0.0005	0.05	<0.0005	<0.0005	0.00064	<0.0005	0.00051	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.0002	1	0.0004	0.0003	0.00031	0.00087	0.00093	0.00026	0.00153	0.00028	0.00071
Iron	mg/L	0.01	0.3	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	<0.01	0.017	0.014
Lead	mg/L	5E-05	0.01	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	5.9E-05	<5E-05	9.4E-05	<5E-05
Magnesium	mg/L	0.005	-	30.9	30	33.6	32	31.2	34.2	31.1	30.9	28.8
Manganese	mg/L	0.0005	0.05	<0.0005	0.00131	<0.0005	<0.0005	0.00068	0.00122	0.00159	0.00245	0.00056
Molybdenum	mg/L	5E-05	-	0.000228	0.000434	0.000173	0.000174	0.000321	0.000232	0.000268	0.000271	0.000223
Nickel	mg/L	0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus	mg/L	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium	mg/L	0.05	-	1.31	1.17	0.87	0.909	1.48	0.869	1.7	1.14	1.04
Silicon	mg/L	0.05	-	5.72	6.32	6.47	4.84	6.88	6.58	6.75	6.39	5.73
Silver	mg/L	5E-05	-	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05	<5E-05
Sodium	mg/L	0.05	20/200	**57.5**	2.66	3.28	2.85	**44.8**	1.93	**85.5**	1.81	5.81
Strontium	mg/L	0.001	-	0.12	0.0963	0.0857	0.0696	0.124	0.0916	0.16	0.0962	0.0922
Thallium	mg/L	1E-05	-	<1E-05	<1E-05	<1E-05	<1E-05	1.3E-05	<1E-05	<1E-05	<1E-05	<1E-05
Tin	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	0.0003/0.0004	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00044	<0.0003	<0.0004	<0.0003
Tungsten	mg/L	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	1E-05	0.02	0.000433	0.000597	0.000399	0.000298	0.000582	0.000532	0.000528	0.000474	0.000423
Vanadium	mg/L	0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	0.001	5	0.0038	0.0011	0.0023	0.0028	0.002	0.0018	0.0012	0.0018	0.0016
Zirconium	mg/L	0.0003	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
F1 (C6-C10)	ug/L	25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25
F1 (C6-C10) - BTEX	ug/L	25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25
F2 (C10-C16 Hydrocarbons)	ug/L	100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (C16-C34 Hydrocarbons)	ug/L	250	-	<250	<250	<250	<250	<250	<250	<250	<250	<250
F4 (C34-C50 Hydrocarbons)	ug/L	250	-	<250	<250	<250	<250	<250	<250	<250	<250	<250
Total Hydrocarbons (C6-C50)	ug/L	370	-	<370	<370	<370	<370	<370	<370	<370	<370	<370
Benzene	ug/L	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	0.5	140/2.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	0.5	60/24	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	ug/L	0.5	90/300	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p+m-Xylene	ug/L	0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

*Reporting Detection Limit (RDL) may have been altered based on the RDL at the time of analysis.

Values exceeding the ODWS are b**olded.**

Metals were field filtered.

*Reporting Detection Limit (RDL) may have been altered based on the RDL at the time of analysis.

Metals were field filtered

Table 5.2: Water Quality Results - Domestic Wells

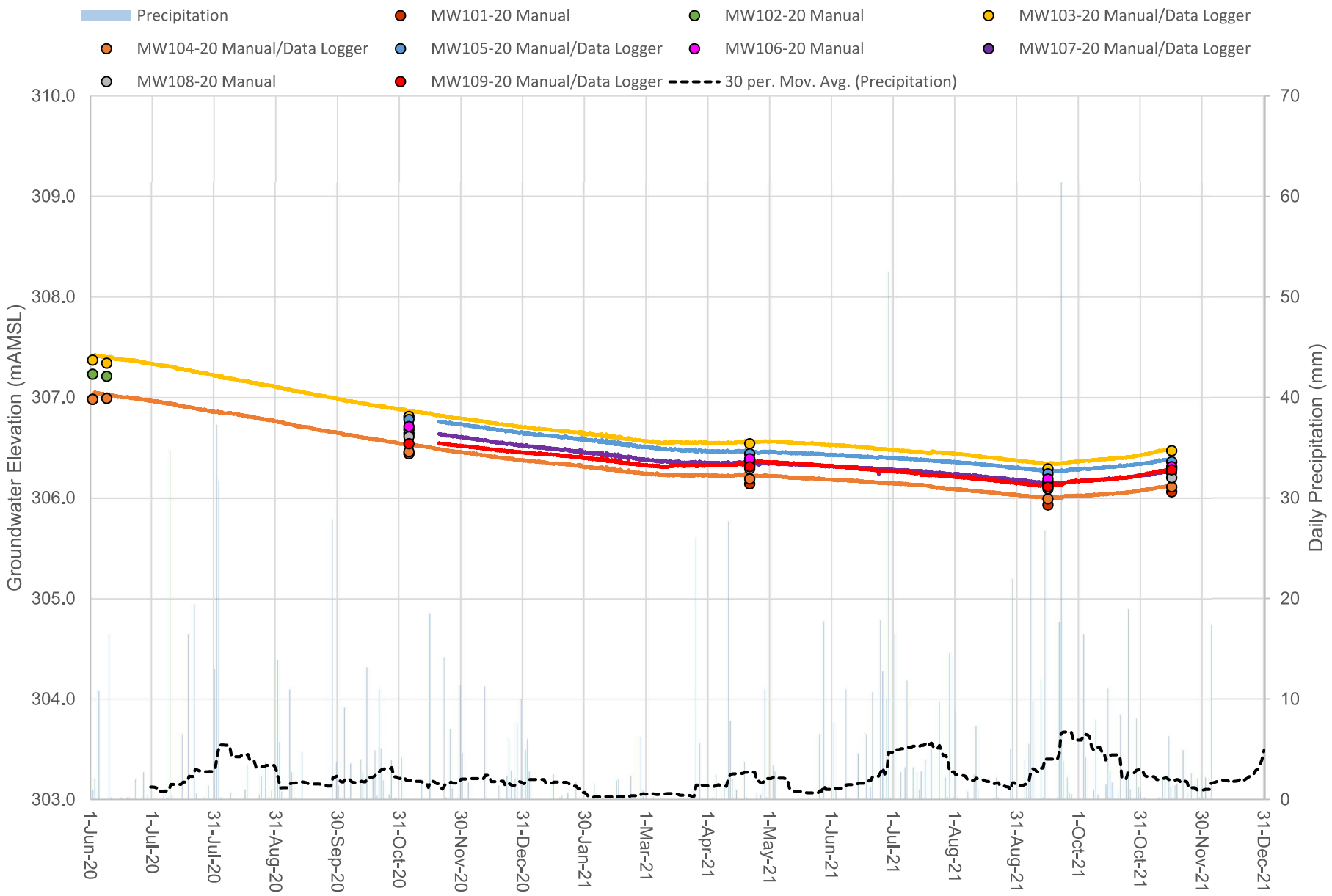
Parameter	Units	Reporting Detection	ODWS	PW1 11/16/2021	PW2 11/16/2021
Alkalinity	mg/L	1	30/500	255	227
Ammonia	mg/L	0.01	-	0.044	<0.01
Bromide	mg/L	0.1	-	<0.1	<0.1
Chloride	mg/L	0.5	250	9.86	33.2
Fluoride	mg/L	0.1	1.5	0.11	<0.1
Nitrate	mg/L	0.02	10	<0.02	7.29
Nitrite	mg/L	0.01	1	<0.01	<0.01
Orthophosphate	mg/L	0.003	-	<0.003	<0.003
Sulfate	mg/L	0.3	500	51.5	16
E. Coli	CFU/100mL	0	0	0	0
Total Coliforms	CFU/100mL	0/10	0	0	**520**
Antimony	ug/L	0.6	6	<0.6	<0.6
Arsenic	ug/L	1	10	8.3	<1
Selenium	ug/L	1	50	<1	<1
Aluminum-Total	ug/L	10	0.1	<10	<10
Barium	ug/L	10	1000	246	98
Beryllium	ug/L	0.5	-	<0.5	<0.5
Bismuth-Total	ug/L	1	-	<1	<1
Boron	ug/L	50	5000	<50	<50
Cadmium	ug/L	0.1	5	<0.1	<0.1
Calcium	mg/L	0.5	-	72.3	67.3
Cesium-Total	ug/L	0.1	-	<0.1	<0.1
Chromium	ug/L	1	50	<1	<1
Cobalt	ug/L	0.5	-	<0.5	<0.5
Copper	ug/L	1	1000	6.7	139
Iron-Total	ug/L	50	300	**3110**	122
Lead	ug/L	1	10	<1	<1
Lithium-Total	ug/L	100	-	<100	<100
Magnesium	mg/L	0.5	-	33.2	26.9
Manganese-Total	ug/L	1	50	**61.9**	1.8
Molybdenum	ug/L	0.5	-	<0.5	<0.5
Nickel	ug/L	1	-	<1	<1
Phosphorus-Total	mg/L	0.05	-	<0.05	<0.05
Potassium-Total	mg/L	1	-	<1	<1
Rubidium-Total	ug/L	2	-	<2	<2
Silicon-Total	ug/L	1000	-	7200	6100
Silver	ug/L	0.05	-	<0.05	<0.05
Sodium	mg/L	0.5	20/200	3.81	14
Strontium-Total	ug/L	1	-	110	85.2
Sulfur-Total	ug/L	500	-	17000	5120
Tellurium-Total	ug/L	2	-	<2	<2
Thallium	ug/L	0.06	-	<0.06	<0.06
Thorium-Total	ug/L	1	-	<1	<1
Tin-Total	ug/L	1	-	<1	<1
Titanium-Total	ug/L	2	-	<2	<2
Tungsten-Total	ug/L	6	-	<6	<6
Uranium	ug/L	2	20	<2	<2
Vanadium	ug/L	0.5	-	<0.5	<0.5
Zinc	ug/L	3	5000	11.1	11.1
Zirconium-Total	ug/L	0.8	-	<0.8	<0.8
Colour	CU	2	5	**13.1**	<2
Electrical Conductivity	umhos/cm	3	-	605	609
Hardness	mg/L	-	80/100	317	279
Total Dissolved Solids	mg/L	20	500	338	333
Turbidity	NTU	0.1	5	**44.6**	1.66
pH	pH units	0.1	6.5/8.5	8.2	8.28

*Reporting Detection Limit (RDL) may have been altered based on the RDL at the time of analyis.

Values exceeding the ODWS are b**olded.**

Hydrographs

Hydrograph 1: Monitoring Well Groundwater Elevations



Appendix A

Maximum Predicted Water Table Report Terms of Reference

MTE Consultants
520 Bingemans Centre Drive, Kitchener, Ontario N2B 3X9

November 17, 2021

MTE File No.: C46639-100

Mr. Chris Isley
Cambridge Aggregates Inc.
1182 Alps Road
Cambridge, ON N1R 5S5

Dear Mr. Isley:

RE: Terms of Reference – Maximum Predicted Water Table Report
Proposed Edworthy West Pit
Class A Pit Above Water
Part of Lot 17, Concession 9, Township of North Dumfries

MTE Consultants Inc. (MTE) is pleased to present the following Terms of Reference (TOR) for a Maximum Predicted Water Table Report to support an application for an aggregate license for a Class A, Pit Above Water on the above noted property, hereby referred to as the "Site".

In addition to the 2020 Reporting Standards issued by the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF), MTE also reviewed the Regional Municipality of Waterloo (RMOW) Guidelines for Hydrogeological Assessments for Proposed Mineral Aggregate Resource Extraction.

Work related to the Maximum Predicted Water Table Report began in 2020. As such, portions of the field program described herein have already been completed but the data compilation and assessment portions are still in progress. The following TOR documents what has been done and what has yet to be completed.

Scope of Work

A Maximum Predicted Water Table Report is required to:

- Identify the maximum predicted water table elevation across the Site.

In accordance with the RMOW Guidelines the Maximum predicted Water Table Report will also assess the potential impacts to:

- Water wells;
- Springs;
- Groundwater aquifers;
- Water discharge areas; and
- Determine the significance of the impacts and feasibility of mitigation.

The following describes the tasks included in the Maximum Predicted Water Table Report.

1. Background Review

The Maximum Predicted Water Table Report began with a review of the following documents:

- Permits in place for existing major water users including nearby Aggregate Sites;
- Topography, physiographic, geological and hydrogeological mapping on file with NDMNRF;
- Private well records on file with the Ministry of the Environment, Conservation and Parks (MECP);
- Relevant Government Regulations and Acts;
- The Provincial Policy Statement;
- Source Water Protection Plan (SWPP) and vulnerability mapping;
- The Region of Waterloo's Official Plan; and
- The Township of North Dumfries Official Plan.

2. Field Work

Monitoring Wells

Between April and November 2020, nine monitoring wells were installed at the locations shown on **Figure 1** (attached) to a depth of approximately 26-29 m. MTE was on-Site during the drilling program to log drill cuttings and document well installation details. As per the *Wells Regulation*, monitoring wells were constructed by a MECP licensed well technician. The construction of the monitoring wells allowed for the collection of groundwater levels and the determination of the properties of the groundwater system.

Private Wells

To augment the information collected from MECP well records, MTE conducted a private well survey of domestic wells within one kilometer of the Site in December 2020. In total 46 private well inventories were delivered with nine being returned to MTE.

Well Development and Well Tests

Monitoring wells were developed to remove fines from the well screen and the sand pack. This process ensured that representative water levels and hydraulic parameters were obtained from each monitoring well.

A single well hydraulic response test (K-test) was completed on each monitoring well to determine the hydraulic properties of the aquifer immediately surrounding each well screen. Data collected was used to establish background groundwater flow conditions.

Groundwater Levels

To understand the seasonal fluctuation of the water table under the Site, MTE installed pressure transducers (data loggers) into Five monitoring wells:

- MW101, MW103, MW104, MW105 & MW107.

Data loggers are computerized instruments that measure water levels automatically. Water levels recorded by the data loggers were used to assess seasonal changes to groundwater levels. Data obtained using the data loggers were compensated for barometric pressure using a barometric pressure logger.

In addition to water levels read by data loggers, MTE visited the site four times to measure water levels manually. These measurements were used to calibrate the data logger readings.

To compare groundwater levels across the Site, each monitoring well was surveyed in meters above mean sea level (mAMSL).

As per the ARA reporting standards, the maximum predicted water table will be determined by monitoring groundwater levels for a minimum of one year to account for seasonal variations and influences due to precipitation. Section 2.33 of the Region of Waterloo 2015 Draft Aggregate Assessment Guidelines indicates that two years of monitoring data is required so that seasonal fluctuations of the water table can be determined. Monitoring of groundwater levels is ongoing so that two years of groundwater levels will be obtained before the proposed pit is licensed.

Groundwater Samples

Per the RMOW Guidelines groundwater samples were collected from on-Site monitoring wells in early spring (April 18, 2021) and late summer (September 16, 2021). and analyzed for general chemistry and hydrocarbons. Groundwater sample results will be compared to the Ontario Drinking Water Standards. This information will be used to establish background water quality.

3. Data Compilation and Assessment

As previously mentioned, the field work and data collection for the Maximum Predicted Water Table Report began in 2020 and the data compilation and assessment portion of the investigation is ongoing. The following describes how the field data collected will be used to characterize the groundwater conditions on-Site and complete the impact assessment of the proposed pit on existing groundwater users.

Water Table Mapping

Using the groundwater levels measured from monitoring wells, MTE will determine the horizontal groundwater gradient and groundwater flow direction and present the results on a map. This information will be used to interpolate a water table elevation under the proposed pit to ensure there is adequate separation distance (a minimum of 1.5 m) from the pit floor to the spring high water table.

Geological Cross-sections

MTE will construct two geological cross-sections through the Site to show:

1) Geology;
2) The proposed pit floor;
3) The water table surface; and
4) Existing water supply wells.

The geological cross-section will be constructed using MECP well records and the information collected through the drilling program and private well survey. Geological cross-sections will show where residential water supply wells obtain water with respect to the pit floor, which will be important for assessing potential impacts from the proposed extraction on existing groundwater users.

Source Water Protection

MTE understands that the closest Municipal Well Field is approximately 2.8 km from the Site. MTE will review the Source Water Protection Plan (SWPP) policy implications for the Site and identify:

- Wellhead Protection Areas (WHPAs);
- Groundwater vulnerability scores;
- Significant drinking water threats; and
- Significant groundwater recharge areas.

After reviewing the SWPP, MTE will assess the Site's vulnerability and its potential to effect WHPAs.

Wetlands

MTE will complete a drainage assessment using topography maps to delineate surface water catchment areas for wetlands in the study area. The drainage assessment will be used to determine if the proposed pit will affect average annual flows to wetlands. The drainage assessment will also compare drainage patterns across the Site pre and post extraction. This assessment will identify changes to drainage patterns as a result of the proposed pit and identify where mitigation may be required. This assessment will ensure that the design for the proposed pit will not block existing drainage patterns nor cause negative impacts to adjacent properties.

4. Reporting

All data, hydrographs, maps, calculations, and geological cross-sections will be compiled into the report that meets provincial requirements for a Maximum Predicted Water Table Report as set out in the *Aggregate Resources Act* as well as municipal requirements as set out in the Region and Township Official Plans.

The report will present the data collected, assess the potential for adverse effects to groundwater and surface water resources and make recommendations on pit operations so it can operate without causing adverse impacts to existing water resources.

This report will be submitted in support of an:

- ARA license application;
- Zoning By-Law Amendment; and
- Township Official Plan Amendment.

Topics to be covered in the Maximum Predicted Water Table Report include (but not limited to):

- Background Information;
- Geological setting and description;
- Hydrogeological setting and description;
- Impact assessment of the pit on existing surface water and groundwater resources;
- Discussion of mitigation measures including trigger mechanisms;
- Recommendations for a monitoring plan; and
- Technical support data in the form of tables, graphs, and figures.

Closing

We trust this work plan for a Maximum Predicted Water Table Report meets the requirements set out by the reviewing agencies. Please feel free to contact the undersigned if you have any questions.

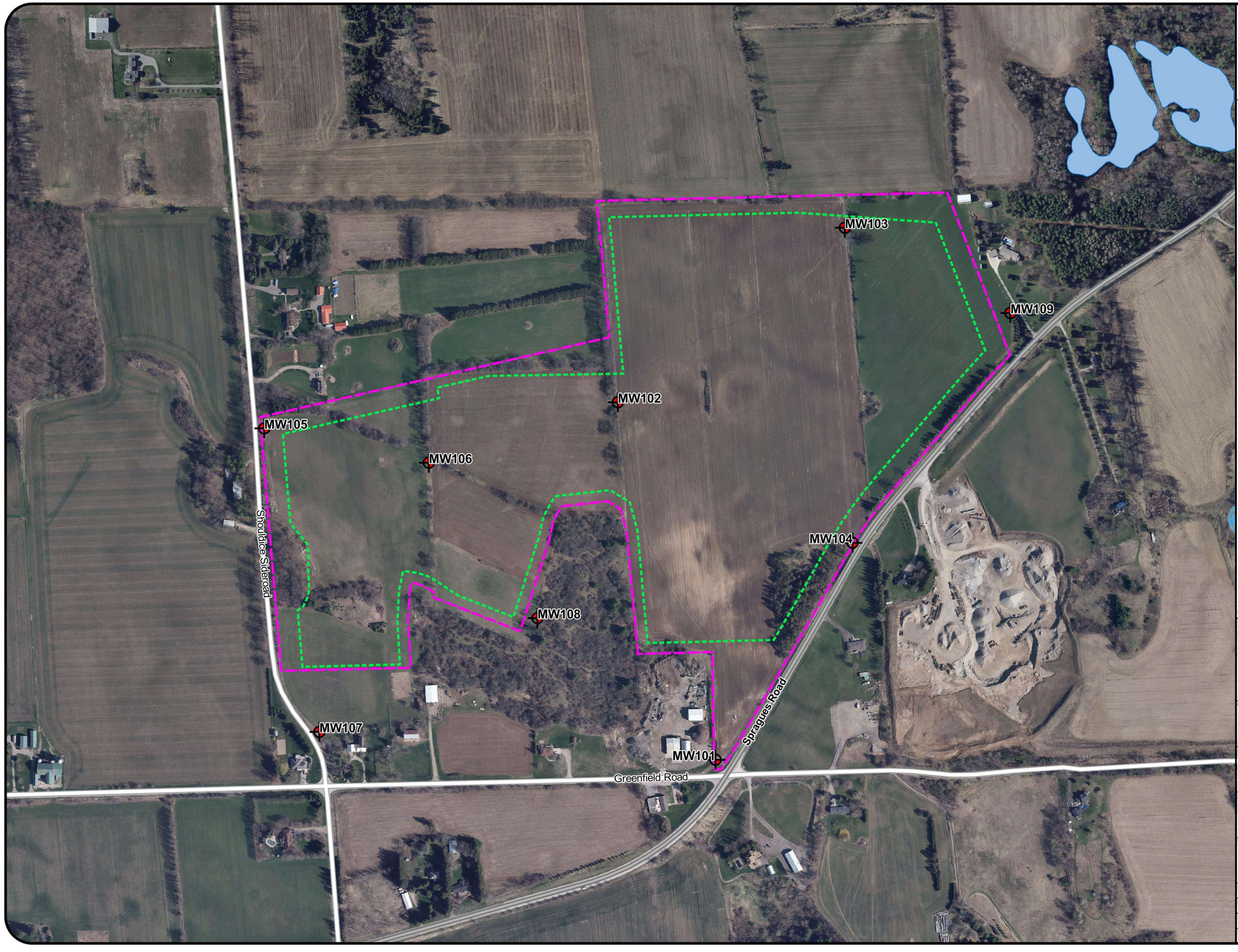
Yours truly,

MTE Consultants Inc.

Fraser Cummings, M.Sc., P.Geo.
Manager Environmental Practices
519-743-6500 ext. 1248
fcummings@mte85.com

Jay Flanagan, B.E.S., B.Ed.
Manager Aggregate Resources
519-743-6500 ext. 1289
jflanagan@mte85.com

TFC: smk
Attach.
M:\46639\100\02 - Correspondence\Correspondence\46639-100_2021-11-17_ltr rpt_Hydro-G Study_Edworthy West Pit_Maximum Predicted Water Table Report_Terms of Reference.docx



N
NORTH

N
PROJECT NORTH

Legend

Boundaries

- License Boundary
- Extraction Boundary

Monitoring Locations

- Monitoring Well

Surface Water

- Waterbody (GRCA)
- Watercourse (GRCA)

Data Sources:

Contains information licensed under the Open Government License Ontario.

Contains Information made available under Grand River Conservation Authority's Open Data Licence v2.0.

Contains information provided by the Regional Municipality of Waterloo under license

0 40 80 120 160 200 m

Scale (11x17): 1:5000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed Edworthy West Pit

Site: Township of North Dumfries

Title: **Site Map**

Reviewed By	JBF		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	1
Date	November 2021		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz
AR2.2
November 17, 2021 - 16:37 - Plotted By: FCummings

Jay B. Flanagan

From: Matthew Colley <MColley@regionofwaterloo.ca>
Sent: Wednesday, January 26, 2022 12:05 PM
To: 'Caitlin Port'
Cc: Geoff Moroz; Jane Gurney; Isley, Chris (Cambridge, ON) CAN; Hurley, Kevin R (Cambridge) CAN; Neal DeRuyter; Jay B. Flanagan; Fraser Cummings
Subject: RE: Report TORs - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Caitlin,

Yes please ensure that the comments below are considered/included in the Final Report submitted with the app. With regards to the groundwater data I would recommend that rationale is provided for what is submitted with your formal hydrogeology report, in terms of the groundwater data if you choose to provide the one year of data. Given this property lies partially within a Wellhead Protection Area there are potential risks to municipal water supply that must be considered.

Regional Staff, or a third party peer reviewer will provide comments on that submitted study and if there is not sufficient data then a re-submission/further updates may be required prior to signing off on the study.

In terms of more specific questions I would defer to Geoff.

Thank you.

Matthew Colley, MCIP, RPP
Principal Planner
Planning, Development and Legislative Services
Regional Municipality of Waterloo
T: 519-575-4757 ext. 3210
C : 519-577-6241
F: 519-575-4449
Mcolley@regionofwaterloo.ca

From: Caitlin Port <cport@mhbcplan.com>
Sent: January 25, 2022 3:00 PM
To: Matthew Colley <MColley@regionofwaterloo.ca>
Cc: Geoff Moroz <GMoroz@regionofwaterloo.ca>; Jane Gurney <JGurney@regionofwaterloo.ca>; Isley, Chris (Cambridge, ON) CAN <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>; Neal DeRuyter <nderuyter@mhbcplan.com>; Jay B. Flanagan <JFlanagan@mte85.com>; Fraser Cummings <FCummings@mte85.com>
Subject: RE: Report TORs - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi all – Thanks for the feedback

For the HydroG Report Comments #2-4 below, did you want us to provide a response or make sure that this info is considered/included in the Final Report that is submitted with the Application?

With regard to the two years of groundwater data required for submission, I wanted to clarify the requirements as outlined in the ROW Hydrogeological Assessment Guidelines which state:

- Section 2.3.3 (page 5) – "*Water levels from wells and surface water will be measured on a quarterly basis for a minimum of one year*"
- Section 2.4.2 (Page 7) - A Stage 2 Assessment is triggered if impacts are identified or if extracting below water table occurs (see Table 2c). Given this criteria, a Stage 2 is not required for the site.
- Section 3.0 - Stage Two: Detailed Hydrogeological Assessment (Page 8) – "*if after one year of the two year required monitoring period the data suggests that there will not be any adverse effects an application can be submitted prior to the full two years of monitoring is completed… the two year monitoring requirements have to be completed and submitted as an addendum to the original application for review prior to initiating operations.* "
- Table 2b states that a minimum of one-year of data is required and two years is preferable.

For this application, we will have the two-years of groundwater monitoring data for all installed wells as of November 2022, for four of the nine wells we will have the two-years of data in the late Spring of 2022. This is well before extraction will occur on this site as it takes a number of years to work through the approval process and monitoring at the site will be on-going. We have worked on other recent above-water-table pit applications in the ROW where the Region has accepted the one-year of monitoring data for application submission.

Let me know if we need to set-up a call to further discuss.

Regards,
Caitlin

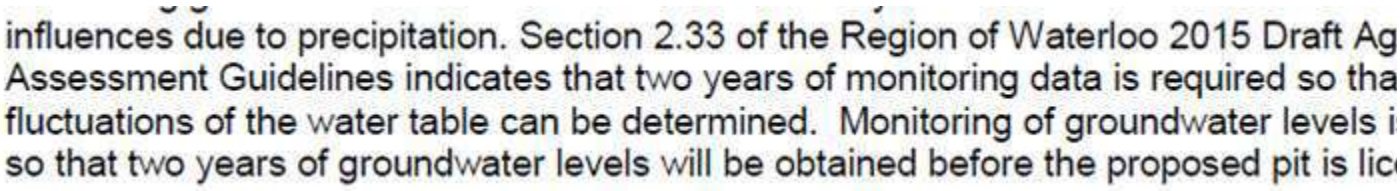
From: Matthew Colley <MColley@regionofwaterloo.ca>
Sent: January 21, 2022 8:31 AM
To: Jane Gurney <JGurney@regionofwaterloo.ca>; Caitlin Port <cport@mhbcplan.com>
Cc: Geoff Moroz <GMoroz@regionofwaterloo.ca>
Subject: RE: Report TORs - Cambridge Aggregates Edworthy West Pit, North Dumfries

Thank you Jane.

Caitlin I also just received these comments from Geoff Moroz regarding the Hydro-g. I have cc'ed him here and happy to discuss further, particularly with regards to the first point I would assume.

Hi Matthew, please note that with a limited submission of information these are considered preliminary information gaps. Additional work may be required to address information gaps and concerns once a full report is submitted. Here are preliminary comments:

1) **This sentence was in the TOR:**


influences due to precipitation. Section 2.33 of the Region of Waterloo 2015 Draft Ag
Assessment Guidelines indicates that two years of monitoring data is required so tha
fluctuations of the water table can be determined. Monitoring of groundwater levels i
so that two years of groundwater levels will be obtained before the proposed pit is lic

The proponent should complete two years of groundwater monitoring prior to submission, not just prior to licensing.

2) **There should be more monitoring points across the pit floor. The Region may require a multi-level monitoring well to be installed to evaluate potential impacts to deeper supply aquifers.**

3) **Data-loggers should be installed in all monitoring wells used as part of this assessment. There are no data-loggers in wells within the proposed extraction area, so there appears to be limited groundwater elevation data beneath the proposed pit floor.**

4) **The proponent should include an assessment of potential impacts to future groundwater elevations due to climate change.**

I would also note that all studies should continue to address/evaluate the cumulative impact policy of the Regional Official Plan (9.C.4) and should also be discussed in the submitted Planning Report.

Thank you.

Matthew Colley, MCIP, RPP
Principal Planner
Planning, Development and Legislative Services
Regional Municipality of Waterloo
T: 519-575-4757 ext. 3210
C : 519-577-6241
F: 519-575-4449
Mcolley@regionofwaterloo.ca

From: Jane Gurney <JGurney@regionofwaterloo.ca>
Sent: January 21, 2022 7:33 AM
To: 'Caitlin Port' <cport@mhbcplan.com>
Cc: Matthew Colley <MColley@regionofwaterloo.ca>; Chris Isley <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>
Subject: RE: Report TORs - Cambridge Aggregates Edworthy West Pit, North Dumfries

Caitlin,
My apologies for the delay and lack of communication on the EIS Terms of Reference (TOR) that was provided by Goodban Ecological Consulting Inc. (November 25, 2021). As advised through the pre-submission, we will be taking this file to the Ecological and Environmental Advisory Committee (EEAC), and I have now confirmed that there will be an EEAC meeting this month. I am including TOR to the agenda for January 31 (5:30 virtual meeting) and I will send the TOR recommendation report to you next week. If you would like to have someone in attendance at the meeting for any questions that may come up, you are more than welcome to do so. I realize the notice is short, however, so if you aren't able to have anyone in attendance I do not anticipate any issues or delays as a result given the site is fairly straight forward from a Regional environmental perspective.
Please let me know if you have any questions or concerns, and I will be in touch with the EEAC meeting information next week.
Thank you for your patience!
Jane

Jane E. Gurney, RPP, MCIP, AICP
Principal Planner
Community Planning
Region of Waterloo
Mobile: 519-589-6921
Office: 519-575-4500 Ext. 3454
JGurney@regionofwaterloo.ca

From: Caitlin Port <cport@mhbcplan.com>
Sent: January 20, 2022 3:33 PM
To: Geoff Moroz <GMoroz@regionofwaterloo.ca>; Jane Gurney <JGurney@regionofwaterloo.ca>; Matthew Colley <MColley@regionofwaterloo.ca>
Cc: Shahid Mughal <smughal@northdumfries.ca>; Chris Isley <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>
Subject: Report TORs - Cambridge Aggregates Edworthy West Pit, North Dumfries

Matthew, Jane, and Geoff,

Can you let me know if you have any comments on the HydroG and EIS Terms of References that were provided to the Region in November?

We are full speed ahead on completing reports and I want to make sure that the Region's comments are incorporated into the final versions of the Reports that are submitted.

Thank-you,
Caitlin

From: Matthew Colley <MColley@regionofwaterloo.ca>
Sent: January 4, 2022 10:03 AM
To: Caitlin Port <cport@mhbcplan.com>; Geoff Moroz <GMoroz@regionofwaterloo.ca>; Jane Gurney <JGurney@regionofwaterloo.ca>
Cc: Shahid Mughal <smughal@northdumfries.ca>; Chris Isley <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>; Neal DeRuyter <nderuyter@mhbcplan.com>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Caitlin,

Yes the Terms of Reference for the Hydro-G has been sent to Geoff Moroz and the EIS Terms of Reference has been provided to Jane Gurney who would facilitate this review through EEAC. I have included Jane on this email as she can work with you to set up a site visit and determine the timing for this to go to EEAC.

Aercoustic Engineering is on the Region's list of approved noise consultants.

Lastly, I would note that the Region's fee by-law has been updated in 2022. The Regional fee for the review of this app, to be provided at submission of ZBL, is now $25,000.00.

Thank you.

Matthew Colley, MCIP, RPP
Principal Planner
Planning, Development and Legislative Services
Regional Municipality of Waterloo
T: 519-575-4757 ext. 3210
C : 519-577-6241
F: 519-575-4449
Mcolley@regionofwaterloo.ca

From: Caitlin Port <cport@mhbcplan.com>
Sent: January 3, 2022 10:04 AM
To: Matthew Colley <MColley@regionofwaterloo.ca>
Cc: Shahid Mughal <smughal@northdumfries.ca>; Chris Isley <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>; Neal DeRuyter <nderuyter@mhbcplan.com>
Subject: FW: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Matthew,

Happy New Year.

I wanted to touch-base on a few items outlined in the Region's pre-consultation comments:

- Has the Hydrogeology Terms of Reference that I provided in November (see attached) been circulated to Geoff Moroz at the Region?
- The Region's pre-consultation comments indicate that the Noise Consultant preparing the noise study must be pre-approved by the Region of Waterloo. The Noise Consultant retained to complete the noise study for this project is Aercoustic Engineering. I can provide copies of CVs if needed.
- Has EEAC been provided a copy of the EIS TOR we provided? We would be happy to accommodate a site visit for EEAC members… probably in the Spring would be best.

Let me know if it would be easier to set-up a call to discuss the above.

Thanks,
Caitlin

From: Shahid Mughal <smughal@northdumfries.ca>
Sent: December 24, 2021 7:05 AM
To: Caitlin Port <cport@mhbcplan.com>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Good morning, Caitlin.

Please find attached the comments received from the following agencies:

- Region of Waterloo
- Enbridge
- Energy Plus
- Waterloo Catholic District School Board
- GRCA

I hope to receive some outstanding comments from the internal department after Christmas break.
As soon as I receive all outstanding comments, I will send you the summary of comments, including submission requirements, fee, etc.

Wishing you a happy holidays and a wonderful New Year!

Thanks,

Best regards,

Shahid Mughal, MCIP, RPP
Township Planner

The Corporation of the Township of North Dumfries
North Dumfries Community Complex
2958 Greenfield Road, P.O. Box 1060
Ayr, Ontario N0B 1E0

Office: 519-632-8800 ext. 132
Fax: 519-632-8700
Cell: 519-242-0301
smughal@northdumfries.ca

From: Caitlin Port cport@mhbcplan.com
Sent: December 23, 2021 11:14 AM
To: Shahid Mughal smughal@northdumfries.ca
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Shahid,

Besides the GRCA, did you receive anymore comments this week?

Thanks,
Caitlin

From: Shahid Mughal <smughal@northdumfries.ca>
Sent: December 7, 2021 2:51 PM
To: Caitlin Port <cport@mhbcplan.com>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Caitlin,

I hope you are well.
Just to provide an update regarding the pre-consultation application for Edworthy West Pit.
The submission package has been circulated to all external agencies and the internal department for comments.
The comments deadline is December 21, 2021. I will send you the comments as soon as I receive them from the agencies/department.

We will certainly schedule a virtual meeting if you need clarification on any comments or require additional information from agencies/departments.

Thanks,

Best regards,

Shahid Mughal, MCIP, RPP
Township Planner

The Corporation of the Township of North Dumfries
North Dumfries Community Complex
2958 Greenfield Road, P.O. Box 1060
Ayr, Ontario N0B 1E0

Office: 519-632-8800 ext. 132
Fax: 519-632-8700
Cell: 519-242-0301
smughal@northdumfries.ca

From: Caitlin Port <cport@mhbcplan.com>
Sent: November 29, 2021 11:19 AM
To: Shahid Mughal <smughal@northdumfries.ca>
Cc: Matthew Colley <MColley@regionofwaterloo.ca>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Shahid – With the arrangements made for the fees to be paid, can we schedule the pre-con meeting now?

Please find attached to TOR for the Water Report (Hydrogeology) and the Natural Environment Report (Environmental Impact Study).

Thanks,
Caitlin

From: Shahid Mughal <smughal@northdumfries.ca>
Sent: November 22, 2021 7:18 PM
To: Caitlin Port <cport@mhbcplan.com>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hi Caitlin,

Sorry for the delayed response as I was on vacation and back in the Office last week.
I am working on your file now. I received the submission package with the pre-consultation application form signed by the property Owner.
Could you please confirm if the pre-consultation application fee of $450 has been paid to the Township. Sorry I am missing anything.

Please find attached earlier email, including E-transfer payment form/direction on how to make the e-transfer payment if that is preference over cheque.

The Region would require a pre-submission application fee of $300.
The Region's pre-sub fee can be submitted via e-transfer if that is easier for you.
Peggy Walter can assist you if you would like to pay the fee via e-transfer. Peggy Walter can be reached at:
pwalter@regionofwaterloo.ca

Please feel free to contact me should you have any questions.

Thanks,

Best regards,

Shahid Mughal, MCIP, RPP
Township Planner

The Corporation of the Township of North Dumfries
North Dumfries Community Complex

2958 Greenfield Road, P.O. Box 1060
Ayr, Ontario N0B 1E0

Office: 519-632-8800 ext. 132
Fax: 519-632-8700
Cell: 519-242-0301
smughal@northdumfries.ca

From: Caitlin Port <cport@mhbcplan.com>
Sent: November 4, 2021 3:51 PM
To: Shahid Mughal <smughal@northdumfries.ca>
Cc: Matthew Colley <MColley@regionofwaterloo.ca>; Andrew Mcneely <amcneely@northdumfries.ca>; Isley, Chris (Cambridge, ON) CAN <chris@iugroup.ca>; Hurley, Kevin R (Cambridge) CAN <Kevin.Hurley@LehighHanson.com>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Hello Shahid and Andrew –

Please find attached the completed and commissioned Pre-Consultation Application form with Landowner Authorizations.

I have reattached my original Sept 7th Coverletter; however, I have included an updated Concept Plan.

The original has been sent in the mail.

Thanks,
Caitlin

From: Shahid Mughal <smughal@northdumfries.ca>
Sent: October 26, 2021 10:55 AM
To: Caitlin Port <cport@mhbcplan.com>
Cc: Matthew Colley <MColley@regionofwaterloo.ca>
Subject: RE: Pre-Consultation Meeting Request - Cambridge Aggregates Edworthy West Pit, North Dumfries

Good morning, Caitlin.

My apologies, Staff will be able to process the pre-consultation application once the complete application form is submitted to Township.
The Application form needs to be signed by the Property Owners and witnessed and signed by a Commissioner of Oaths.

I will be away from the Office from tomorrow, October 27th, returning on November 15th, 2021.
if you submit the complete application form during my absence, please also Cc to Mr. McNeely.

Thank you,

Best regards,

Shahid Mughal, MCIP, RPP
Township Planner

The Corporation of the Township of North Dumfries
North Dumfries Community Complex
2958 Greenfield Road, P.O. Box 1060

Ayr, Ontario N0B 1E0

Office: 519-632-8800 ext. 132
Fax: 519-632-8700
Cell: 519-242-0301
smughal@northdumfries.ca

Appendix B

Borehole Logs

ID Number: MW101-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 4/24/2020

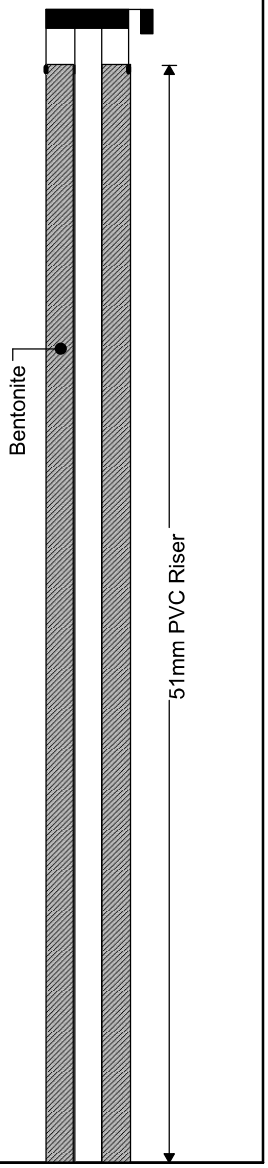
Drilling Contractor: Les Forages L.B.M. Inc

Drill Rig: DB-430

Drill Method: Air Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	332.0						
0 / 0		**SAND AND GRAVEL** Brown sand and Gravel, coarse, damp	0.0						
2 / 0									
4 / 2									
6 / 2									
8 / 4									
10 / 4									
12 / 4									
14 / 6									
16 / 6									
18 / 6									
20 / 6									
22 / 8									
24 / 8									
26 / 8									
28 / 8									
30 / 10									
32 / 10									
34 / 10									
36 / 10									
38 / 12									
40 / 12									
42 / 12									
44 / 12									
46 / 14									
48 / 14									
50 / 14									
52 / 16									
54 / 16									
56 / 16									



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW101-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 4/24/2020

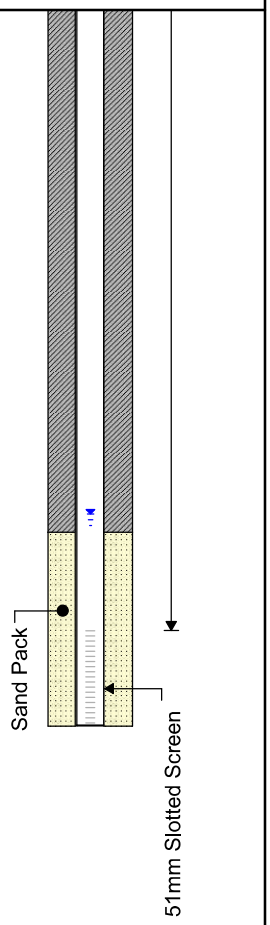
Drilling Contractor: Les Forages L.B.M. Inc

Drill Rig: DB-430

Drill Method: Air Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 66 20 68 70 72 22 74 76 78 24 80 82 84 86 26 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		**SAND AND GRAVEL** Brown sand and Gravel, coarse, damp							
			308.9 23.2						
		SAND Grey brown sand, medium to coarse							
			303.4 28.7						
		Drilling Terminated							



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW102-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 4/27/2020

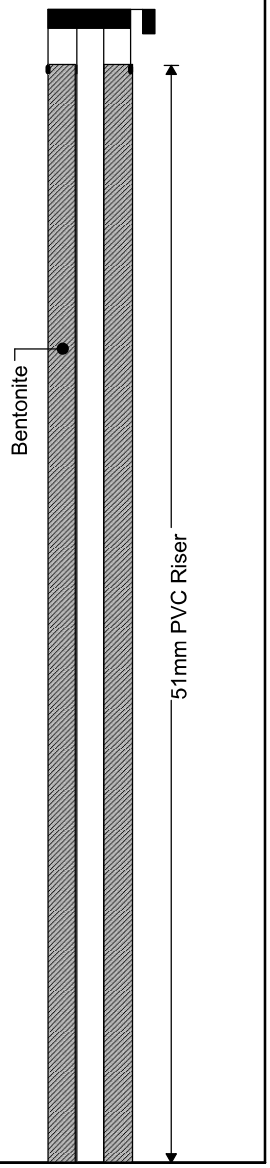
Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air rotary

Protective Cover: Monument Casing

Depth Scale (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	SPT N-Value (Blows/305mm)	Moisture Content (%)	Well Completion Details
		Ground Surface	328.2						
0 – 2 ft / 0 m		**SILTY SAND** Brown, Sand, damp, coarse	0.0						
2 – 16 ft / 0 – 4 m									
			323.0						
16 – 20 ft / 4 – 6 m		**GRAVEL** Grey/brown Gravel, coarse.	5.2						
20 – 56 ft / 6 – 16 m									



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW102-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 4/27/2020

Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 66 20 68 70 72 22 74			305.3						
76 78 24 80 82 84		**SAND** Red/brown sand, wet, fine to coarse, trace gravel	22.9						
26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 34 112 114 116		Drilling Terminated	302.3 25.9						Sand Pack; 51mm Slotted Screen

Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW103-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge aggregates

Site Location: North Dumfries

Date Completed: 4/28/2020

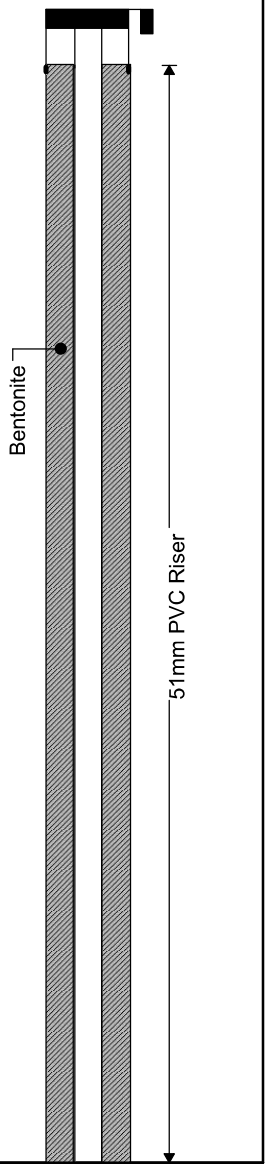
Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	Well Completion Details
ft / m		Ground Surface	325.7						
0 / 0		**SAND AND GRAVEL** Brown sand and gravel, damp, coarse, some silt near top of unit	0.0						
2 / 0									
4 / 2									
6 / 2									
8 / 2									
10 / 4									
12 / 4									
14 / 4									
16 / 6									
18 / 6									
20 / 6									
22 / 6									
24 / 8									
26 / 8									
28 / 8									
30 / 8									
32 / 10									
34 / 10									
36 / 10									
38 / 10									
40 / 12									
42 / 12									
44 / 12									
46 / 14									
48 / 14									
50 / 14									
52 / 16									
54 / 16									
56 / 16									



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW103-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge aggregates

Site Location: North Dumfries

Date Completed: 4/28/2020

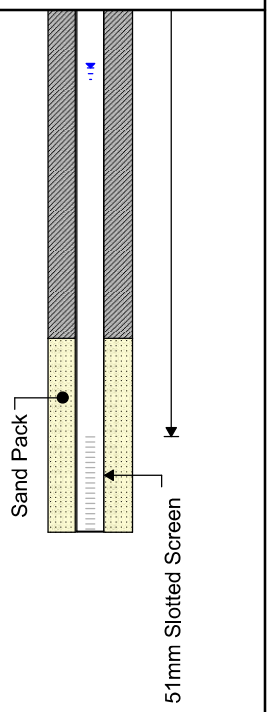
Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 66 20 68 70 72 22 74 76 78 24 80 82 84 26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		**SAND AND GRAVEL** Brown sand and gravel, damp, coarse, some silt near top of unit	304.4						
		SILTY SAND AND GRAVEL Red/brown, silty sand fine to coarse sand, wet	21.3 / 301.9						
		SAND Red brown sand, some gravel, fine to coarse sand, wet	23.8 / 300.1						
		Drilling Terminated	25.6						



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW104-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 5/6/2020

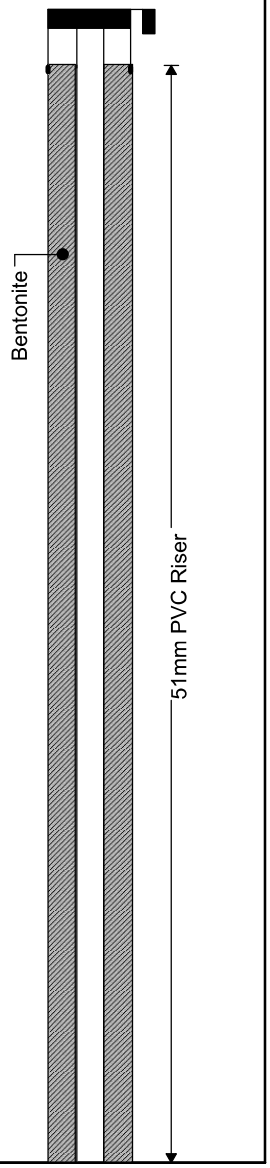
Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	329.5 / 0.0						
		TOPSOIL Grey/ brown sand and gravel, coarse, some red/brown sand near lower contact							
		SAND AND GRAVEL Grey/ brown sand and gravel, coarse, some red/brown sand near lowercontact							



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW104-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 5/6/2020

Drilling Contractor: Les Forages LBM

Drill Rig: DB-430

Drill Method: Air rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 66 20 68 70 72 22 74 76 78 24 80 82 84 26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		**SAND** Grey/brown sand, medium to coarse, wet. Trace gravel	311.5 18.0						Sand Pack; 51mm Slotted Screen
		Drilling Terminated	300.9 28.7						

Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW105-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge aggregates

Site Location: North Dumfries

Date Completed: 11/15/2020

Drilling Contractor: LBM Forages

Drill Rig: DR-24HD

Drill Method: Dual Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	329.9						
0 / 0		**TOPSOIL** Brown Silty topsoil	0.0						
6 / 2			327.7						
		GRAVEL Grey Gravel, Coarse	2.1						
16 / 4			324.7						
		SILTY SAND Brown, Silty Sand, medium- fine	5.2						
20 / 6			323.2						
		SAND Red/Brown, Sand, coarse	6.7						
26 / 8									
32 / 10									
40 / 12									
46 / 14									
48			314.9						
50 / 16		**SAND AND GRAVEL** Brown/grey gravel, coarse	14.9						

Concrete

Bentonite

51 mm PVC Riser

Field Technician: JKS

Drafted by: JKS

Reviewed by:

MTE

ID Number: MW105-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge aggregates

Site Location: North Dumfries

Date Completed: 11/15/2020

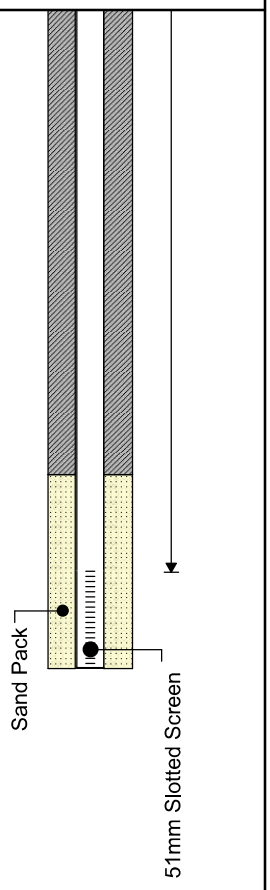
Drilling Contractor: LBM Forages

Drill Rig: DR-24HD

Drill Method: Dual Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 20 66 68 70 72 22 74 76 78 24 80 82 84 26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		**GRAVEL** Brown/grey gravel, coarse	310.4 19.5						
		SAND AND GRAVEL Grey/brown sand and gravel, medium coarse sand, coarse gravel	304.9 25.0						
		Drilling Terminated	300.6 29.3						



Field Technician: JKS

Drafted by: JKS

Reviewed by:

MTE

ID Number: MW106-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 10/31/2020

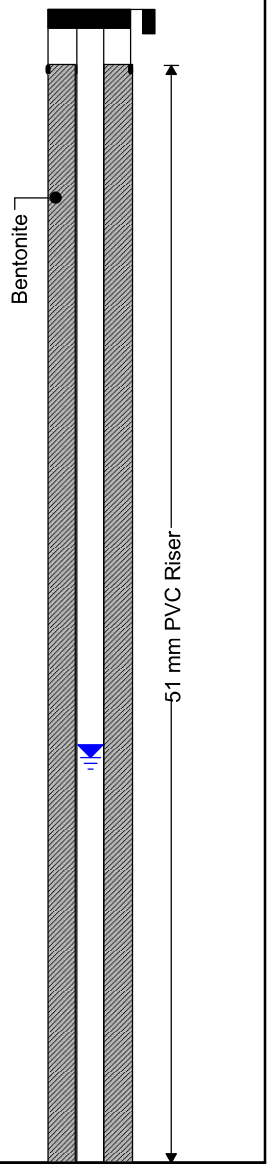
Drilling Contractor: LBM Forages

Drill Rig: DR-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	332.8						
0 / 0		**TOPSOIL** Brown topsoil, fine and silty	0.0						
6 / 2			330.9						
		GRAVEL Grey/brown gravel, coarse	1.8						
			319.1						
46 / 14		**SAND** Brown sand, coarse	13.7						
48			317.8						
		GRAVEL Grey gravel, medium to coarse	14.9						
56 / 16			315.1						



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW106-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 10/31/2020

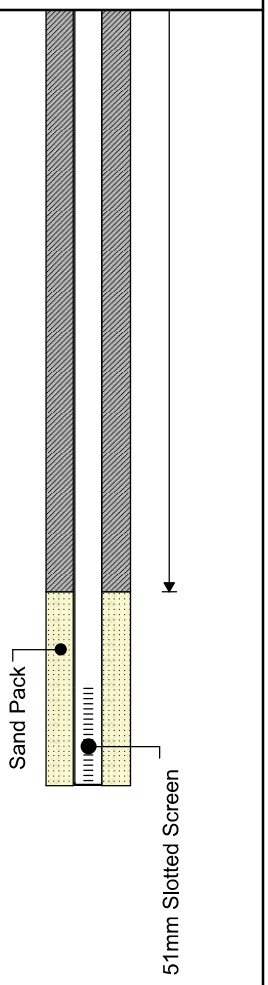
Drilling Contractor: LBM Forages

Drill Rig: DR-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 64 66 20 68 70 72 22 74 76 78 24 80 82 84 26 86 88 90 28 92 94 96 30 98 100 102 104 32 106 108 110 112 34 114 116		**SAND** Brown sand, coarse, trace stones	315.1 17.7						
		SAND AND GRAVEL Grey/brown sand and gravel, coarse	305.3 27.4						
		Drilling Terminated	302.0 30.8						



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW107-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 10/28/2020

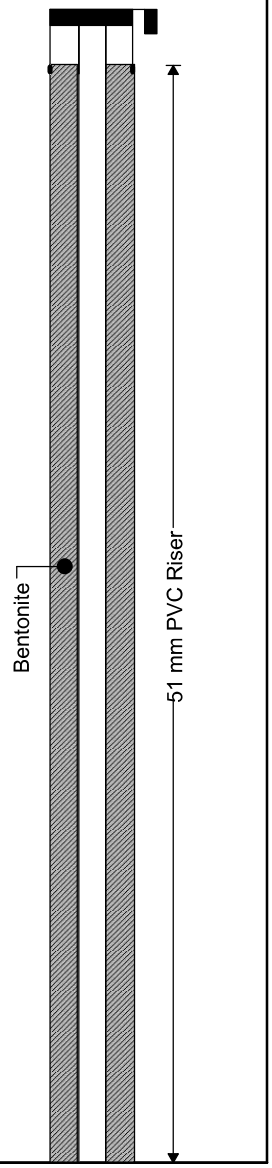
Drilling Contractor: LBM forages

Drill Rig: DR-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	332.1						
0 / 0		**TOPSOIL** Silty topsoil, some clay and stones, brown, fine grained	0.0						
18 / 6		**SAND AND GRAVEL** Grey brown, gravel and sand, coarse	326.6 / 5.5						



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW107-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 10/28/2020

Drilling Contractor: LBM forages

Drill Rig: DR-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62 20 64 66 68 70 72 22 74 76 78 24 80 82 84 26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		**SAND** Brown Sand, coarse-medium	313.2 18.9						Sand Pack; 51mm Slotted Screen
		Drilling Terminated	301.3 30.8						

Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW108-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 10/29/2020

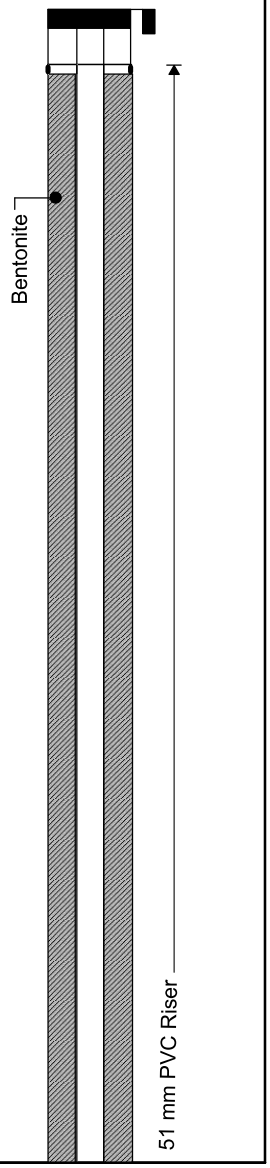
Drilling Contractor: LBM Forages

Drill Rig: DH-24HD

Drill Method: Dual Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
ft / m		Ground Surface	101.3						
0 / 0		**TOPSOIL** Brown topsoil, fine silty	0.0						
2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 20 / 22 / 24 / 26 / 2 / 4 / 6 / 8									
26 / 8		**GRAVEL** Grey Gravel, coarse, trace sand	93.1 8.2						
28 / 30 / 32 / 34 / 36 / 38 / 40 / 42 / 44 / 46 / 48 / 50 / 52 / 54 / 56 / 10 / 12 / 14 / 16									



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW108-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggergates

Site Location: North Dumfries

Date Completed: 10/29/2020

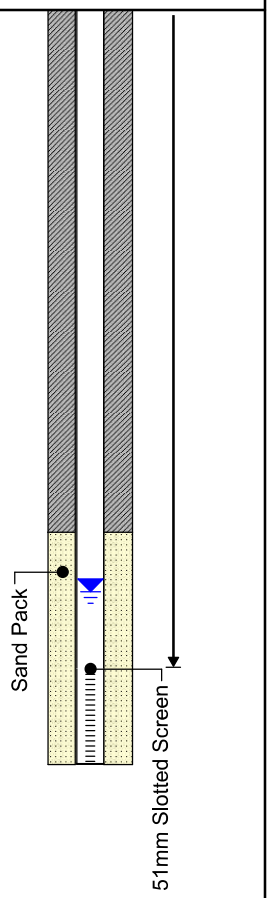
Drilling Contractor: LBM Forages

Drill Rig: DH-24HD

Drill Method: Dual Rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 / 18 20 22 24 26 28 30 32 34		**SILTY CLAY AND GRAVEL** Grey coarse gravel, mixed with medium to coarse grey brown sand	80.9 / 20.4						
		SAND Brown reddish sand, medium to coarse	76.9 / 24.4						
		Drilling Terminated	70.8 / 30.5						



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW109-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 11/2/2020

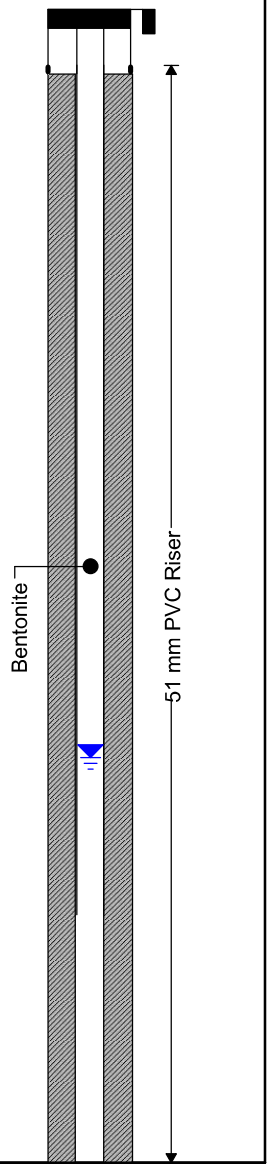
Drilling Contractor: LBM forages

Drill Rig: DH-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	SPT N-Value (Blows/305mm)	Moisture Content (%)	Well Completion Details
ft / m		Ground Surface	325.0						
0 / 0		**TOPSOIL** silty topsoil, brown top soil	0.0 / 324.1						
2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 20 / 22 / 24 / 26 / 28 / 30 / 32 / 34 / 36 / 38 / 40 / 42 / 44 / 46 / 48 / 50 / 52 / 54 / 56 ft; 0 / 2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 m		**SAND AND GRAVEL** grey coarse sand with coarse sand	0.9						
		CLAY TILL brown, fine till with trace stones	315.9 / 9.1						
		SAND AND GRAVEL grey coarse with coarse sand	312.8						
		CLAY TILL brown, fine till with trace stones	12.2 / 311.9						
		SAND AND GRAVEL grey coarse with coarse sand	13.1						
		CLAY TILL brown, fine till with trace stones							
		SAND AND GRAVEL grey coarse with coarse sand							



Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

ID Number: MW109-20

Project Name: West Edworthy Pit

Project No: 46639-100

Client: Cambridge Aggregates

Site Location: North Dumfries

Date Completed: 11/2/2020

Drilling Contractor: LBM forages

Drill Rig: DH-24HD

Drill Method: Dual rotary

Protective Cover: Monument Casing

Subsurface Profile			Sample				SPT	Moisture	Well Completion Details
Depth Scale	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	N-Value • Blows/305mm • 20 40 60 80	Moisture Content • % • 10 20 30	
58 18 60 62			306.1						
64 20 66		**CLAY TILL** brown, fine till with trace stones	18.9 304.6						
68 70 72 22 74		**SAND AND GRAVEL** grey coarse with coarse sand	20.4 302.1						
76 78 24 80 82 84 26 86 88 90 92 28 94 96 98 30 100 102 104 32 106 108 110 112 34 114 116		Drilling Terminated	22.9						Sand Pack; 51mm Slotted Screen

Field Technician: JKS

Drafted by: JKS

Reviewed by: TFC

MTE

EW 21-01 552596 4796667

SCALE (m)	MUD SAND GRAVEL (clay, silt, vf, f, m, c, vc, pebb, cobb, boul)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 1,22 mBGS Topsoil, organic rich zone , diamicton at base
		1 to 3	1,22 to 2,44, 3,96 to 5,49, 5,49 to 6,71	>2,5		1,22 to 6,40 mBGS Sand and gravel, +30% stone, ALCS 4 to 7 cm, LC 14 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling
		ns	ns	na		6,40 to 6,71 mBGS Silt, reddish tinge
		4	7,01 to 8,53	<2,6		6,71 to 8,84 mBGS Sand, Pebbles - colour change to darker brown/red with fine to coarse gravel, ALCS 0,5 to 3 cm, medium to medium fine grained sand, silt layers
		5 to 7	8,84 to 10,06, 13,11 to 14,63, 14,63 to 16,15	>2,5		8,84 to 16,46 mBGS Sand and gravel, in sets, +30% stone, ALCS 4 to 8 cm, LC 18 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling, sets 10 to 35 cm thick, reddish tinge and matrix appears to be silty although it may be from drilling dust
		8	16,46 to 17,68			16,46 to 17,68 mBGS Sand, fine to coarse gravel (up to 19 mm), sand medium, medium fine to medium coarse grained
		9	17,68 to 18,90			17,68 to 18,90 mBGS Sand and gravel, +30% stone, ALCS 4 to 8 cm, LC 20 cm, sets 0,3 to 0,7 m thick appears coarser grained sand than sample 8
		10, 11 & 12	19,51 to20,73, 22,25 to 23,77, 23,77 to 25,30	2,5 to 4,5		18,90 to 27,43 mBGS Sand, sets of medium, medium coarse to medium fine grained sand, sets 10 to 40 cm thick, likely fine gravel at base of sets (tabular xbeds I think)
						water table at 23,93 mBGS
						EOH 27,43 mBGS

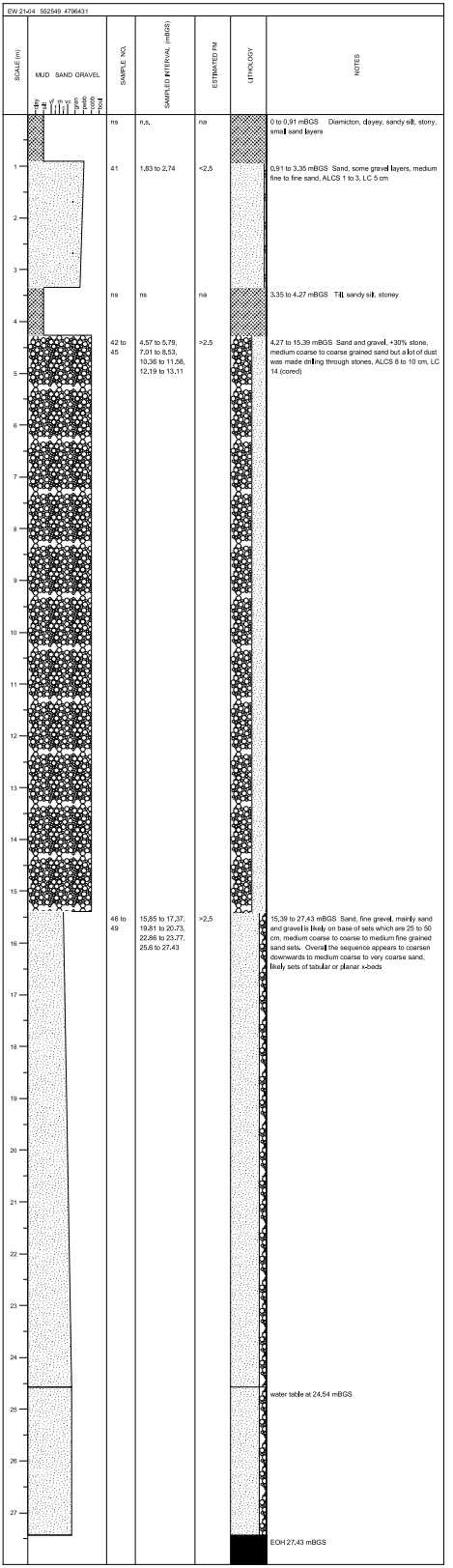
EW 21-02 552433 4796587

SCALE (m)	MUD SAND GRAVEL (Silt, Sand, V f, f, m, c, Pebb, Cobb, Bould)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED FM	LITHOLOGY	NOTES
0		13	2 to 2.3	na		0 to 2,74 mBGS Topsoil, clamton, clayish to silty, stony, with small sand layers
3		14, 15 & 16	3,05 to 3,96, 7,62 to 8,49, 7,32 to 8,53	>2,6		2,74 to 9,14 mBGS Sand and gravel, +30% stone, ALCS 5 to 10 cm, LC 12 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling, in sets, sets 30 to 50 cm thick, appears silty although it may be from drilling dust
9		17, 18	8,84 to 10.06, 10.36 to 11.28			9,14 to 11,58 m BGS Sand, medium fine to very fine grained, FM likely less than 2.2, there is fine gravel but would be on base of sets
12		19	11.58 to12.50	>2.4		11.58 to 12.80 mBGS Sand and gravel, +30% stone, ALCS 5 to 10 cm, LC 12 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling, in sets, sets 30 to 50 cm thick, appears to be silty although it may be from drilling dust
13		20	13.11 to 14.63	<2.2		12.80 to 14.94 mBGS Sand, some gravel, medium to very fine grained sand, fine gravel at base of unit, FM likely less than 2.2
15		21	15.24 to 16.15	>2.4		14.94 to 16.15 mBGS Sand and gravel, fine to coarse gravel, ALCS 1 to 3 cm, silty fine to medium silty sand to medium coarse grained sand, layered
16		22	16.46 to 17.37			16.15 to 17.37 mBGS Sand, medium to medium fine grained, fine gravel base, tabular x-beds
18		23	17.68 to 19.81	>2.5		17.37 to 20.12 mBGS Sand and gravel, ALCS 4 to 6 cm, LC 8 cm lots of dust produced, medium to medium coarse to medium fine grained sand
20		24	20.42 to 22.25	>2.5		20.12 to 28.35 mBGS Sand, medium fine to very coarse grained sand, fine gravel, sets with stony bases
22						water table at 22.56 mBGS
28						28.35 to 29.26 mBGS **Till**, sandy silt, stony
29						EOH 28.35 mBGS

EW 21-03 552385 4799448

SCALE (m)	MUD SAND GRAVEL (cl, si, vf, f, m, c, vc, gran, pebb, cobb, boul)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 4.57 mBGS Diamicton, silty clay to sandy silt, wet, stony with small sand layers
5		27 to 32	5.49 to 7.01, 7.01 to 8.53, 9.75 to 11.28, 12.80 to 14.33, 16.15 to 17.37 & 19.20 to 20.12	>2.5		4.57 to 21.34 mBGS Sand and gravel, +30% stone, ALCS 4 to 8 cm, LC 15 cm, layered, medium to medium coarse to very coarse grained sand, dust (silt) produced by drilling, in sets, sets 30 to 50 cm thick, appears to be silty although it may be from drilling dust
21		n.s.	n.s.			21.34 to 21.95 mBGS Sand, some stone, >15% stone, medium to medium coarse sand
22		ns	ns	na		21.95 to 22.25 mBGS Silt
23		33, 34	22.25 to 23.77, 23.77 to 25.91	<2.6		22.25 to 24.99 mBGS Sand gravel, dirty medium to medium coarse sand, diamicton layers, ALCS 3 to 6, LC 12 cm, Water Table at 22.25 mBGS
25		ns	ns	na		24.99 to 25.30 mBGS Diamicton, sandy silt, stoney
		40	25.91 to 27.43	>3		25.30 to 27.43 mBGS Sand, medium coarse to very coarse sand fine gravel
27						EOH 27.43 mBGS

EW 21-04 552549 4796431



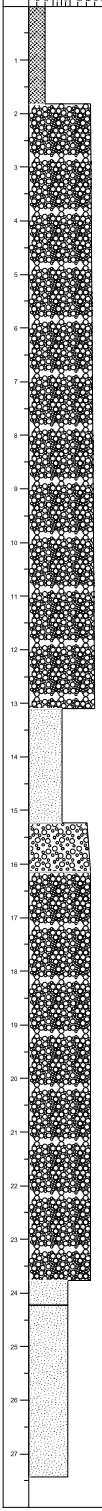
EW 21-05 552320 4796680

SCALE (m)	MUD SAND GRAVEL (cl si sa gr cb)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED Pd	LITHOLOGY	NOTES
0		ns	n.s.	na		0 to 2.74 mBGS Diamicton, clay silt to sandy silt, stony
3		50 to 55	2.74 to 4.27, 4.57 to 5.49, 5.79 to 8.84, 10.36 to 11.89, 11.89 to 14.94, 14.94 to 17.98	>2.5		2.74 to 18.90 mBGS Sand and gravel, +30% stone, ALCS 4 to 8 cm, LC 14 cm, layered, medium to medium coarse to very coarse grained sand, dust (silt) produced by drilling, sets 30 to 50 cm thick, appears to be silty although it may be from drilling dust sand and gravel, +30% stone, there are open work (graded gravel, no matrix) beds
19		56 to 60	19.51 to 20.73, 21.03 to 22.56, 22.56 to 24.08, 24.38 to 25.60, 25.91 to 27.13	>2.5		18.90 to 27.43 mBGS Sand, medium coarse to very coarse grained sand, fine to coarse gravel (<19 mm). Grades downward to sand, medium coarse to medium grained sand, fine to coarse gravel (on bases). ALCS 2 to 4 cm, LC 6 cm
22						water table at 21.64 mBGS
27						EOH 27.43 mBGS

EW 21-06 552215 4796994

SCALE (m)	MUD SAND GRAVEL (cl, si, vf, f, m, c, vc, gran, pebb, cobb, bould)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED Pd	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 2.29 mBGS Diamicton, clay sit to sandy silt, stony
2		61 to 63	3.05 to 4.27, 4.88 to 5.79, 7.32 to 8.38	>2.5		2.29 to 10.36 mBGS Sand and gravel, +30% stone, ALCS 2 to 5 cm, LC 10 cm, layered in sets, like tabular x-beds, medium to medium coarse to very coarse grained sand, dust (silt) produced by drilling, in sets, sets 30 to 50 cm thick, appears to be silty although it may from drilling dust
10		64	10.35 to 11.89	1.8 to 2.5		10.36 to 11.89 mBGS Sand, medium coarse grained sand, ALCS 1 to 3 cm, LC 5 cm
12		65 to 69	12.19 to 13.41, 13.41 to 14.94, 16.46 to 17.68, 18.29 to 19.51, 21.34 t 22.40	>2.5		11.89 to 24.08 mBGS Sand and gravel, distinct fining upward sets with possible open work fine to coarse gravel base and medium, medium coarse to medium fine grained sand caps. Sets 25 to 45 cm thick
24						Water Table at 23.47 mBGS
		70	25.45 to 26.83	>2		24.08 to 27.43 mBGS Sand some stone, medium coarse to medium fine sand, ALCS 2 to 5 cm, LC 6 cm
27						EOH 27.43 mBGS

EW 21-07 552369 4796863



SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
ns	n.s.	na		0 to 1,83 mBGS Diamicton, clay sit to sandy silt, stony
71 to 73	3,05 to 4,27, 7,62 to 8,53, 9,14 to10,36	>2,5		1,83 to 13,11 mBGS Sand and gravel, +30% stone, ALCS 4 to 8 cm, LC 14 cm, dusty from drilling, medium coarse to medium grained sand
74	13,72 to 14,94	1,8 to 2,5		13,11 to15,24 mBGS Sand, medium coarse to coarse grained sand, pebbles
		>2,5		15,24 to 16,15 mBGS Sand and gravel, In fining upward sets, ALCS 2 to 4 cm, LC 10 cm, medium coarse to coarse grained sand
75 to 77	16,76 to 17,68, 19,51 to 20,73, 21,03 to 23,47	>2,5		16,15 to 23,77 mBGS sand and gravel, +30% stone, ALCS 4 to 7 cm LC 14 cm, in sets, there is a lot of drilling dust
78	23,47 to 24,99			23,77 to 27,43 mBGS Sand, pebbles, medium coarse grained sand, fine gravel
				Water table at 24,23 m BGS
				EOH 27,43 mBGS

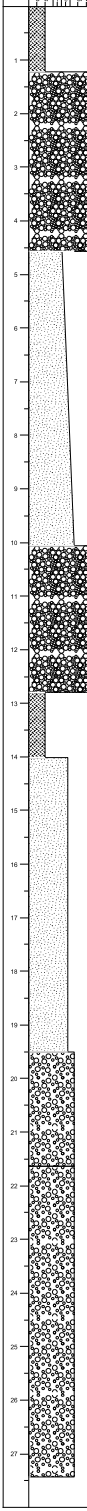
EW 21-08 552552 4796913

SCALE (m)	MUD SAND GRAVEL (cl si sa gr cb)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 0.76 mBGS Diamicton, clay sit to sandy silt, stony
1		79 to 83	1.83 to 2.74, 4.27 to 5.49, 7.62 to 8.53, 9.14 to 10.06, 13.72 to 14.63	>2.5		0.76 to 16.15 mBGS Sand and gravel, +30% stone, ALCS 3 to 5 cm, LC 12 cm, medium to medium coarse grained sand, layered, dust created from drilling
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16		84 to 88	16.46 to 17.68, 19.29 to 19.51, 20.12 to 20.73, 21.34 to 22.25, 24.38 to 25.60	<2.3		16.15 to 27.43 mBGS Sand, medium fine to fine grained
17						
18						
19						
20						
21						
22						
23						
24						Water Table at 23.77
25						
26						
27						EOH 27.43 mBGS

EW 21-09 552526 4796983

SCALE (m)	MUD SAND GRAVEL (CLAY, SILT, VF, F, M, C, V C, GRAN, PEBB, COBB)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
0		89 to 91	0,91 to 1,52, 4,57 to 5,49, 7,62 to 8,53	>2,5		0 to 10,06 mBGS Sand and gravel, +30% stone, in sets, ALCS 6 to 8 cm, LC 15 cm, medium to medium coarse grained sand, dust from drilling
10		92, 93	10,67 to 11,58, 13,72 to 14,63	>2,5		10,06 to 16,52 mBGS Sand, some stone, medium to medium coarse grained sand, <15% stone, ALCS 1 to 2 cm
16		94	16,76 to 17,68	>2,5		16,51 to 18,59 mBGS Sand and gravel, in sets, +30% stone, ALCS 4 to 8, LC 15 cm, lots of dust from drilling
19		95, 96	20,12 to 20,73, 21,03 to 22,25	>2,5		18,59 to 23,77 mBGS Sand, some gravel, ALCS 1 to 3 cm, open work gravel sets present, mainly medium to medium coarse grained sand
23						Water table at 23,16 mBGS
24		ns	ns			23,77 to 27,43 mBGS Sand, silty fine sand
27						EOH 27,43 mBGS

EW 21-10 552707.4796808



SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
ns	n.s.	na		0 to 122 mBGS Diamicton, clay sit to sandy silt, stony
ns	ns	>2.5		1,22 to 4,57 mBGS Sand and gravel, +30% stone, ALCS 4 to 7 cm, LC 12 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling
97, 98	4.88to 5.49, 7.32 to 8.84	>2.2		4,57 to10,06 mBGS Sand, some stone, medium coarse to coarse grained sand, to find sand, in sets, ALCS 1 to 3 cm, +15% stone
99	10,67 to11.58	>2.5		10,06 to 12,80 mBGS Sand, gravel, ALCS 4 to 8 cm, LC 10 cm, medium coarse to coarse grained sand, silty
ns	ns			12,80 to 14,02 mBGS Diamicton, red, silty, to clayey silt, stones
100, 101	14,02 to 14,63, 14,94 to 16,46	>2.5		14,02 to 19,51 mBGS Sand, some pebbles, medium coarse to coarse grained sand, fine gravel, ALCS 1 to 4 cm, LC 6 cm
102 to 105	19,51 to 21,03, 21,03 to 22,56, 24,08 to 25,60, 25,60 to 27,13			19,51 to 27,43 mBGS Sand and gravel, +25% stone, ALCS 2 to 4, LC 7 cm, medium coarse to coarse grained sand
				Water Table at 21.64 mBGS
				EOH 27,43 mBGS

EW 21-11 552739 4797010

SCALE (m)	MUD SAND GRAVEL (cl si sa gr cbl bldr)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 122 mBGS Topsoil, organics silty sand
1		106, 107	1.22 to 2.44, 3.35 to 4.27	>2.5		0.61 to 5.18 mBGS Sand and gravel, +30% stone, graded open work present, stones in open work 0.5 to 13 cm, are overlain by sand and sand and gravel. ALCS 3 to 6 cm, LC 12 cm
2						
3						
4						
5						
		108	5.79 to 6.40	>2.2		5.18 to 6.40 mBGS Sand, stones; medium coarse to medium grained sand and fine gravel to coarse gravel
6						
		ns	ns			6.40 to 11.28 mBGS Rhythmites, thin beds of clay, silt and fine sand
7						
8						
9						
10						
11						
		ns	ns			11.28 to 11.89 mBGS Sand, fine silty
		ns	ns			11.89 to 14.94 mBGS Rhythmites, beds of fine sand, silt and clay
12						
13						
14						
15						
		109, 110	16.46 to 17.98, 19.51 to 21.03	>2.4		14.94 to 21.03 mBGS Sand, stone, <15% stone, ALCS 2 to 4 cm, LC 12, medium to medium coarse grained sand
16						
17						
18						
19						
20						
21						
		111	24.38 to 25.91	<2		21.03 to 24.69 mBGS Sand, medium fine to medium coarse grained
						Water Table at 21.64 mBGS
22						
23						
24						
25		ns	ns	>2.5		24.69 to 27.43 mBGS Sand, medium coarse to very coarse sand
26						
27						
						EOH 27.43 mBGS

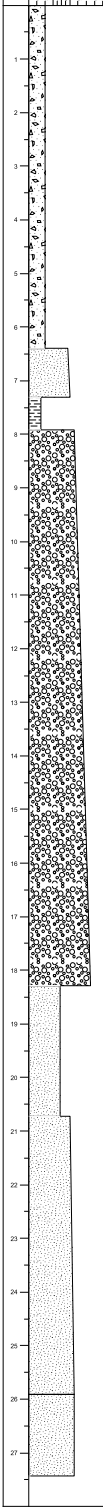
EW 21-12 551842 4796627

SCALE (m)	MUD SAND GRAVEL (cl si sa gr cbl bldr)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED Pd	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 1,07 mBGS Diamicton, fine silty sand to sandy silt, stony
1		112 to 114	1,52 to 2,74, 4,88 to 5,79, 7,62 to 8,53	>2,5		1,07 to 9,75 mBGS Sand and gravel, +30% stone, ALCS 4 to 6 cm, LC 12 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling, in sets, sets 30 to 50 cm thick, appears to be silty although it may be from drilling dust
2						
3						
4						
5						
6						
7						
8						
9						
10		115 to 117	10,67 to 11,58, 11,89 to 14,94, 15,24 to 16,15	>2,2		9,75 to 18,29 mBGS Sand, stones, in sets 25 to 40 cm thick, stony base with ALCS 2 to 4 cm with medium to fine grained sand caps, overlying sand thicker than underlying stony zone, overall the unit fines downward to medium fine sand
11						
12						
13						
14						
15						
16						
17						
18						
19		118 to 120	20,73 to 21,95, 23,77 to 25,60	>2,2		18,29 to 27,43 mBGS Sand, some stones. Coarse and fine beds, 10 to 15 cm fine gravel medium sand overlain by fine sand, medium coarse to coarse grained sand and fine to coarse gravel, still in sets ALCS 1 to 3 cm, LC 10 cm
20						
21						
22						
23						Water Table at 23,47 mBGS
24						
25						
26						
27						EOH 27,43 mBGS

EW 21-13 552739 4797010

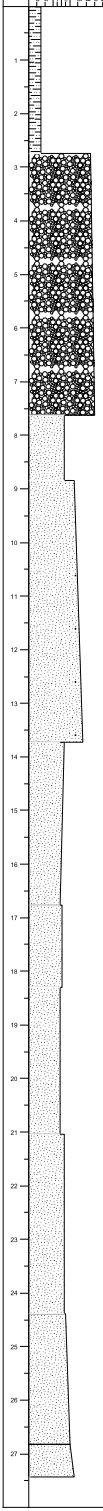
SCALE (m)	MUD SAND GRAVEL (cl si sa gr cbl bldr)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED Pd	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 1.07 mBGS Diamicton, silty sand to silt, stony
1		121, 122	1.52 to 2.74, 4.57 to 5.79	>2.5		1.07 to 5.48 mBGS Sand and gravel, +30% stone, ALCS 4 to 8 cm, LC 14 cm (Cored) layered, medium to medium coarse grained sand, dust (silt) produced by drilling, sets 30 to 50 cm thick, appears to be silty although it may be from drilling dust
2						
3						
4						
5						
6		123, 124	6.71 to 8.23, 8.84 to 10.36	>2.2		5.48 to 11.89 mBGS Sand, medium, medium coarse to very coarse grained, some stones, ALCS 0.5 to 1.5 cm,<15% stone
7						
8						
9						
10						
11						
12		ns	ns	<1.5		11.89 to 12.81 mBGS Sand, fine silty sand
13		125, 126, 127	11.89 to 12.80, 16.76 to 17.98, 17.98 to 19.20	>2.2		12.81 to 19.20 mBGS Sand, medium to medium coarse to very coarse grained, fine gravel
14						
15						
16						
17						
18						
19		128	19.51 to 21.03	<2		19.20 to 21.03 mBGS Sand, medium to medium fine grained
20						
21		ns	ns			21.03 to 21.34 mBGS Silt
		129	21.95 to 23.47	<2.2		21.34 to 24.08 mBGS Sand,medium, medium fine grained, reddish tinge
22						
23						
24		130	23.47 to 24.99			24.08 to 24.99 mBGS Sand, stones, medium coarse to very coarse grained, ALCS 1 to 4 cm, LC 7 cm
25		131	25.30 to 27.43			24.99 to 27.43 mBGS Sand, medium fine to very fine grained
26						
						Water Table at 26.67 mBGS
27						EOH 27.43 mBGS

EW 21-14 551860 4796488



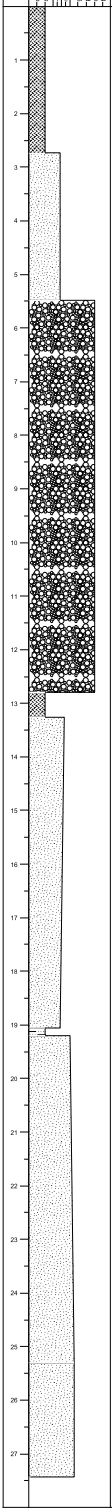
SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
ns	n.s.	na		0 to 6.40 mBGS Diamicton, sand and gravel, silty sand interbeds
ns	ns	>2.5		6.40 to 7.31 mBGS Sand, medium coarse to very coarse sand
ns	ns			7.31 to 7.92 mBGS Rhythmites, layers of fine sand, silt and clay
132, 133	9.14 to 10.36, 14.02 to 15.85			7.92 to 18.29 mBGS Sand and gravel, sets of medium fine to medium sand over gravel, ALCS 1 to 4 cm, LC 10 cm, sets 10 to 60 cm +30% stone, sets of tabular x-beds or scours
134	19.51 to 20.73			18.29 to 20.73 mBGS Sand, medium to fine grained
135, 136	21.64 to 23.47, 23.47 to 25.91	>2.5		20.73 to 27.43 mBGS Sand, medium to medium coarse grained, some fine gravel
				Water Table at 25.91 mBGS
				EOH 27.43 mBGS

EW 21-15 552057 4796445



SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
ns	n.s.	na		0 to 2.74 mBGS Topsoil of beds of fine sand and silty clay to clayey silt
137	4.57 to 5.79	>2.5		2.74 to 7.62 mBGS Sand and gravel, ALCS 5 to 8 cm, LC 19 cm, medium coarse to medium grained sand but lots of dust from drilling
138	7.32 to 8.84	1.8 to 2.5		7.62 to 8.84 mBGS Sand,medium to medium coarse grained sand, bimodal - fine and coarse nothing in middle
139, 140	10.36 to 11.89, 11.89 to 13.41	>2.5		8.84 to 13.72 mBGS Sand, medium fine to medium grained to medium coarse, sets of thinly tabular xbed, some stones, lots of dust created from drilling
141	13.72 to 14.94	<2.6		13.72 to 16.76 mBGS Sand, medium fine, medium to medium coarse grained, in sets
142	16.76 to 17.98			16.76 to 18.29 mBGS Sand, pebbles, bimodal matrix supported beds present, medium fine to fine grained sand and fine gravel
143	19.51 to 21.03	<2		18.29 to 21.03 mBGS Sand, medium fine grained
144	21.95 to 24.08	>2.2		21.03 to 24 38 mBGS Sand, medium to medium coarse to very coarse grained, <15% stone, ALCS <1.5 cm
145	24.38 to 25.60	>2.5		24.38 to 27.43 mBGS Sand, medium coarse to very coarse grained, fine gravel, ALCS <1.5 cm, LC 4 cm,
				Water Table at 26.82 mBGS
				EOH 27.43 mBGS

EW 21-16 552048 4796436



SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
ns	n.s.	na		0 to 2.74 mBGS Diamicton, silty sand to silt to clayey silt
146	4.27 to 5.79	<2.5		2.74 to 5.49 mBGS Sand, medium fine grained
147, 148, 150	6.71 to 8.23, 10.67 to 11.58, 12.34 to 12.80	> 2.3		5.49 to 12.80 mBGS Sand and gravel, +30% stone, ALCS 6 to 10 cm, LC 25 cm (cored), medium to medium coarse grained sand, lots of dust produced from drilling
ns	ns			12.80 to 13.26 mBGS Diamicton, sandy silt, damp
149, 150	14.33 to 15.85, 12.34 to 12.80	<2		12.80 to 17.07 mBGS Sand, medium fine grained, bimodal
ns	ns			19.05 to 19.20 mBGS Diamicton, sandy silt
152 & 153	22.56 to 24.08, 24.08 to 25.30	>2.2		19.20 to 27.43 mBGS Sand, medium coarse to medium fine grained sets, fine gravel to coarse gravel, layers, ALCS 1 to 4 cm, LC 6 cm
				Water Table at 25.30 mBGS
				EOH 27.43 mBGS

EW 21-17 551689 4796338

SCALE (m)	MUD SAND GRAVEL (cly, si, vf, f, m, vc, gran, pebb, cobb, bould)	SAMPLE NO.	SAMPLED INTERVAL (mBGS)	ESTIMATED PM	LITHOLOGY	NOTES
		ns	n.s.	na		0 to 1,83 mBGS Diamicton, silty sand to silt to clayey silt
		154	1.83 to 3.96	<2		1.83 to 3.96 mBGS Sand, some stone; mix of medium coarse sand, fine to coarse gravel, ALCS 3 to 6 cm, LC 10, some matrix supported bimodal material, medium coarse to fine sand (bimodal stuff)
		155, 156	3.96 to 5.79, 5.79 to 7.32	> 2.3		3.96 to 8.53 mBGS Sand and gravel, +30% stone, ALCS 8 to 12 cm, LC 25 cm. Medium coarse to very coarse sand but a lot of dust made from drilling, in 20 to 60 cm sets
		157, 158	7.32 to 8.23, 10.06 to 11.89	>2		8.53 to 11.26 mBGS Sand and gravel, +15% stone, ALCS 1 to 4 cm, LC 10 cm Medium coarse to very coarse grained sand but a lot of dust made from drilling, in 20 to 60 cm sets, there is also bimodal, medium fine and fine gravel, matrix supported
		ns	ns			11.26 to 11.89 mBGS Clay
		159	13.41 to 14.33	>2.2		11.89 to 14.33 mBGS Sand and gravel, +30% stone, ALCS 6 to 10 cm, LC 12 cm (Cored), coarse grained sand , lot of dust created from drilling
		160 to 162	16.46 to 17.98, 18.90 to 20.12, 22.56 to 24.08	>2		14.33 to 24.99 mBGS Sand, medium, medium fine to medium coarse grained fine gravel (pebbles), the pebbles were at base of what looks like tabular x-beds
		ns	ns			24.38 to 24.99 mBGS Diamicton, sandy silt
		163	24.99 to 27.13	>2.4		24.99 to 27.43 mBGS Sand, medium medium tocoarse grained to very coarse grained, fine gravel, likely pebble bases. Water table at 24.99 mBGS
						EOH 27.43 mBGS

Appendix C

Private Well Survey

Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1396 Road Greenfield

Address Cambridge Ont

Phone Number [redacted] email [redacted]

Property Owner: ☑ Yes ☐ No If No, Property Owner's Name

Previous Property Owners ?

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☑ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well ☑ Don't Know

Depth to Water ☑ Don't Know

Pump Depth ☑ Don't Know

Pump Type Submersible ☐ Don't Know

Water Source: ☐ Bedrock ☑ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller ☒ Don't Know

Date Installed ☒ Don't Know

I have the MOE Water Well Record ☐ Yes ☒ No ☐ Don't Know

MOE Water Well Record Number ☒ Don't Know

Type of Water Use: ☑ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other

Water Treatment: ☑ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide ☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment Iron Blaster. ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☑ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☑ No

Any problems with water quality in the past? ☑ Yes ☐ No

If yes, what type ? ☐ Sulphur smell ☑ Iron taste ☐ Brown water ☐ Bacteria

Other High Iron content, stains sinks & Toilets Not suitable for drinking.

Location of Septic Bed See diagram

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

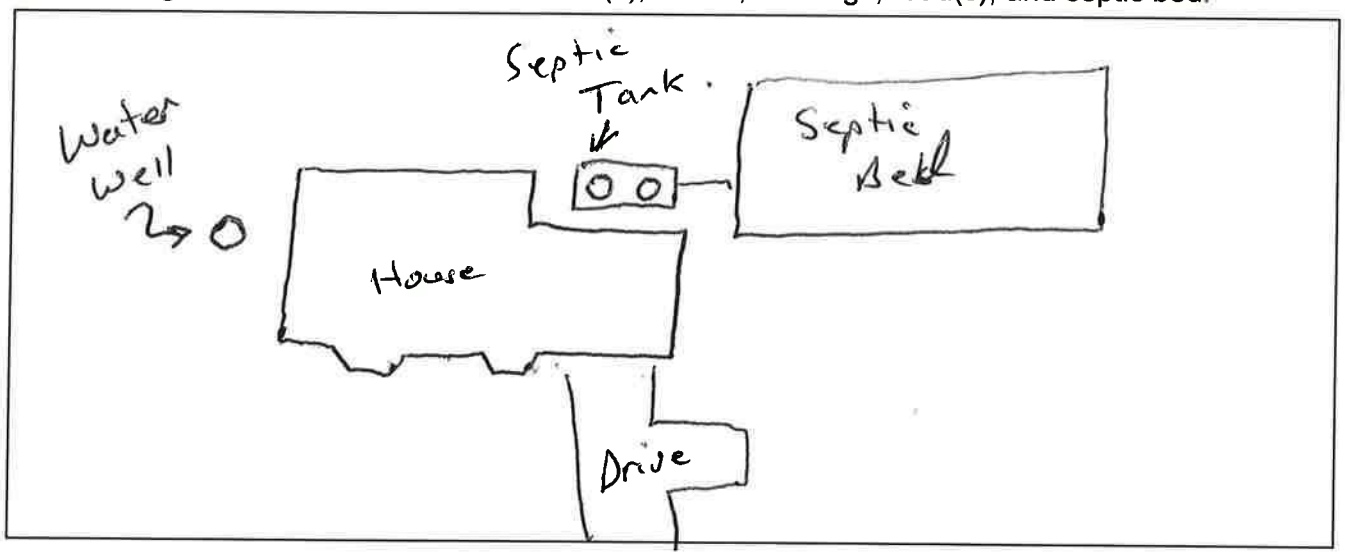
Other _____

Is the well easily accessible? ☑ Yes ☐ No

If Yes, may we measure the water level in this well? ☑ Yes ☐ No

Describe Well Location West side of house, 7' from house wall.

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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www.wellaware.ca

Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1650 Road Shouldice

Address 1650 Shouldice Side Road

CAMBRIDGE N1R5S5

Phone Number [redacted] email [redacted]

Property Owner: ☒ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners [redacted]

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☒ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☒ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well approx 180 foot ☐ Don't Know

Depth to Water _____ ☒ Don't Know

Pump Depth _____ ☒ Don't Know

Pump Type Jet I think ☐ Don't Know

Water Source: ☒ Bedrock ☐ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller _____ ☒ Don't Know

Date Installed 1987 or 1988 ☐ Don't Know

I have the MOE Water Well Record ☐ Yes ☒ No ☐ Don't Know

MOE Water Well Record Number _____ ☐ Don't Know

Type of Water Use: ☒ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☒ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment None ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☒ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☒ No

Any problems with water quality in the past? ☐ Yes ☒ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed Front Yard

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

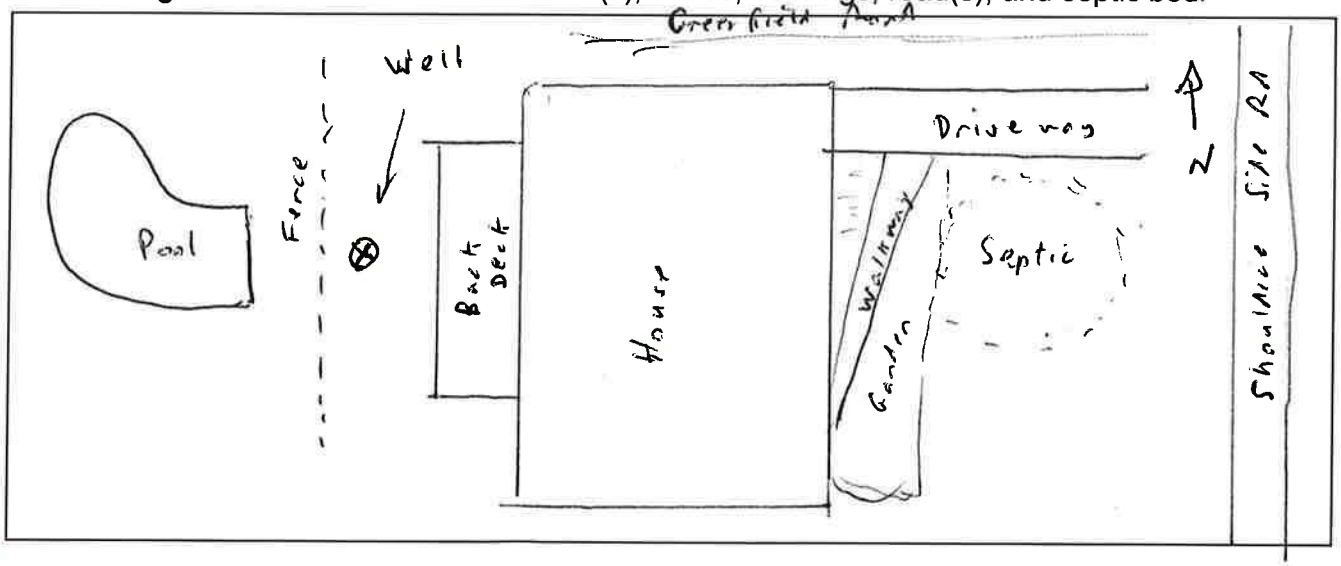
Other None

Is the well easily accessible? ☒ Yes ☐ No

If Yes, may we measure the water level in this well? ☒ Yes ☐ No

Describe Well Location Back Yard between pool and deck

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1103 Road Greenfield

Address 1103 Greenfield Road RR4 Cambridge N1R5S5

Phone Number [redacted] email [redacted]

Property Owner: [X] Yes [ ] No If No, Property Owner's Name _____

Previous Property Owners [redacted]

Number of Wells on property one [ ] Don't Know

Type of Well: [X] Drilled [ ] Dug [ ] Sand Point [ ] Other _____ [ ] Don't Know

Diameter of Well: [ ] 2 inches [X] 4 inches [ ] 6 inches [ ] 8 inches [ ] 3 feet [ ] Don't Know

Depth of Well 180' [ ] Don't Know

Depth to Water _____ [X] Don't Know

Pump Depth _____ [X] Don't Know

Pump Type Grunfos 4" Stainless steel submersible pump [ ] Don't Know

Water Source: [ ] Bedrock [X] Sand/Gravel/Overburden [ ] Don't Know

Name of Well Driller _____ [X] Don't Know

Date Installed House built 1976 [ ] Don't Know

I have the MOE Water Well Record [ ] Yes [ ] No [X] Don't Know

MOE Water Well Record Number _____ [X] Don't Know

Type of Water Use: [X] Domestic [ ] Farm [ ] Irrigation [ ] Industrial [ ] Other _____

Water Treatment: [X] Softener [ ] Sand Filter [ ] Carbon Filter [ ] Fiber Filter [ ] Aluminum Oxide

[ ] UV [ ] Reverse Osmosis [ ] Distillation [ ] Ion Exchange [ ] Ozonation

Other Water Treatment None [ ] Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☒ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☒ No

Any problems with water quality in the past? ☐ Yes ☒ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed East of house

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

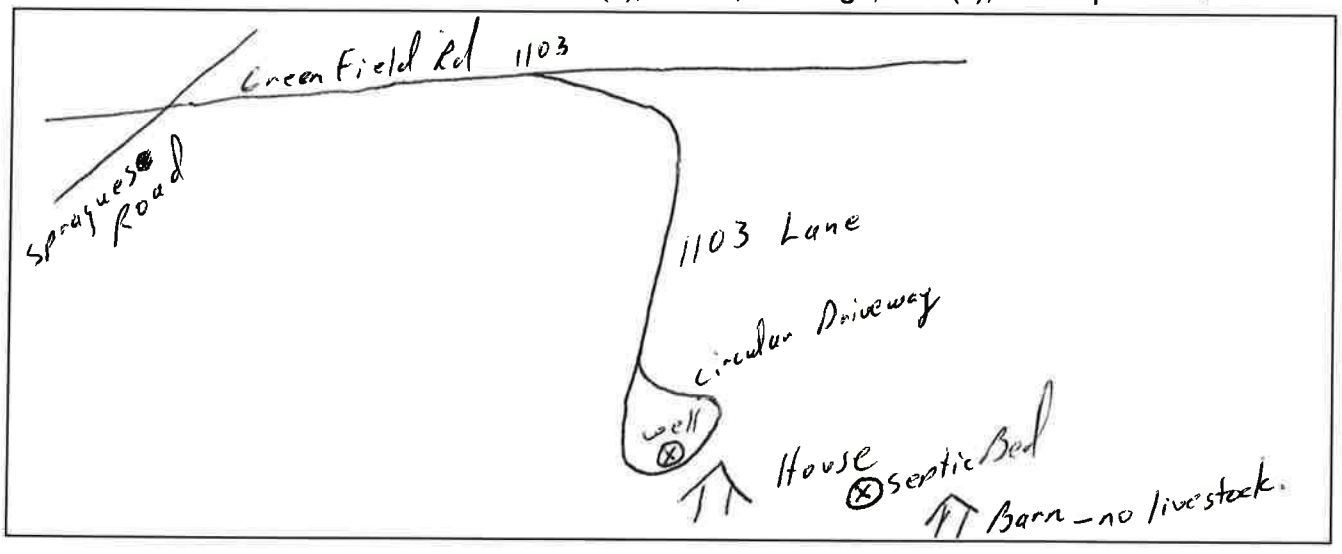
Other _____

Is the well easily accessible? ☒ Yes ☐ No

If Yes, may we measure the water level in this well? ☒ Yes ☐ No Your expense + you pay if you damage anything.

Describe Well Location West of house, in a cement vault.

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1262 Road Greenfield Rd

Address Cambridge

Phone Number [redacted] email

Property Owner: ☑ Yes ☐ No If No, Property Owner's Name

Previous Property Owners

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☑ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well 139 ☐ Don't Know

Depth to Water 97 March/08 ☐ Don't Know

Pump Depth 126 ☐ Don't Know

Pump Type Jet ☐ Don't Know

Water Source: ☐ Bedrock ☐ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller ☐ Don't Know

Date Installed ☐ Don't Know

I have the MOE Water Well Record ☐ Yes ☐ No ☐ Don't Know

MOE Water Well Record Number ☐ Don't Know

Type of Water Use: ☑ Domestic ☑ Farm ☐ Irrigation ☐ Industrial ☐ Other

Water Treatment: ☐ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment None ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☒ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☒ No

Any problems with water quality in the past? ☐ Yes ☒ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed North/west corner of house

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

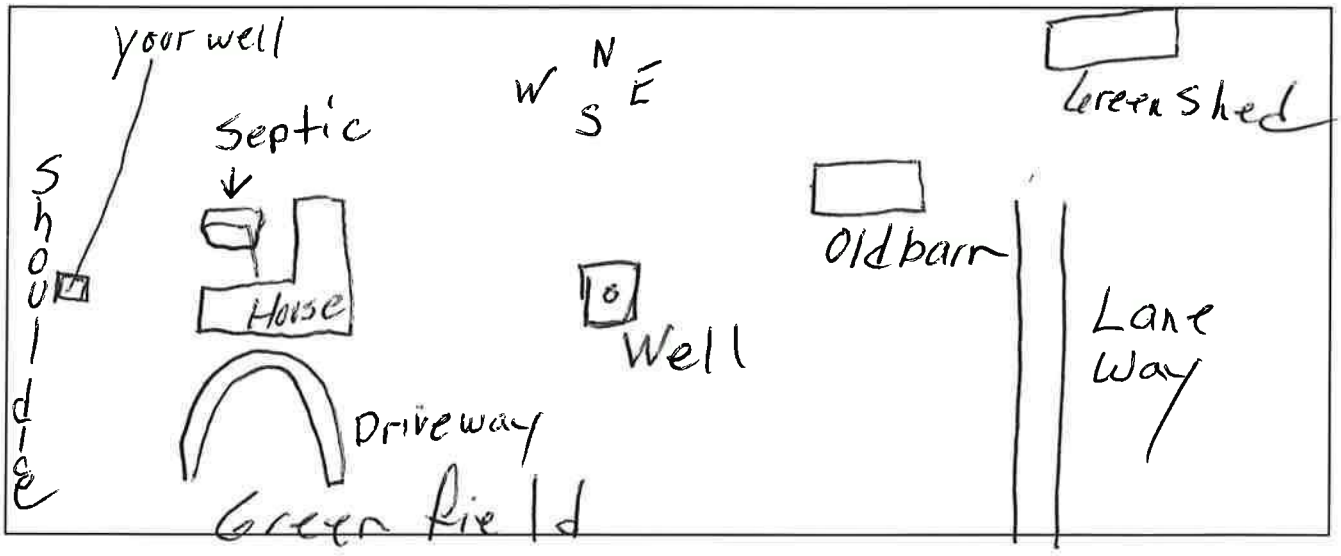
Other _____

Is the well easily accessible? ☒ Yes ☐ No

If Yes, may we measure the water level in this well? ☐ Yes ☒ No ~~Maybe~~

Describe Well Location _____

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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MTE# _____

Rec'd DEC 2 1 2020

FYI IFC INIT. _____

Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1208 Road Greenfield rd

Address 1208 greenfield rd

Phone Number [redacted] email [redacted]

Property Owner: ☒ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners _____

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☒ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☐ 6 inches ☒ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well 130' ☐ Don't Know

Depth to Water _____ ☒ Don't Know

Pump Depth 130' ☐ Don't Know

Pump Type electric ☐ Don't Know

Water Source: ☐ Bedrock ☒ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller _____ ☒ Don't Know

Date Installed 35 yrs ago ☐ Don't Know

I have the MOE Water Well Record ☐ Yes ☒ No ☐ Don't Know

MOE Water Well Record Number _____ ☐ Don't Know

Type of Water Use: ☒ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☐ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment None ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☐ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☒ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☒ No

Any problems with water quality in the past? ☐ Yes ☒ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed out back

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☒ heating oil tank

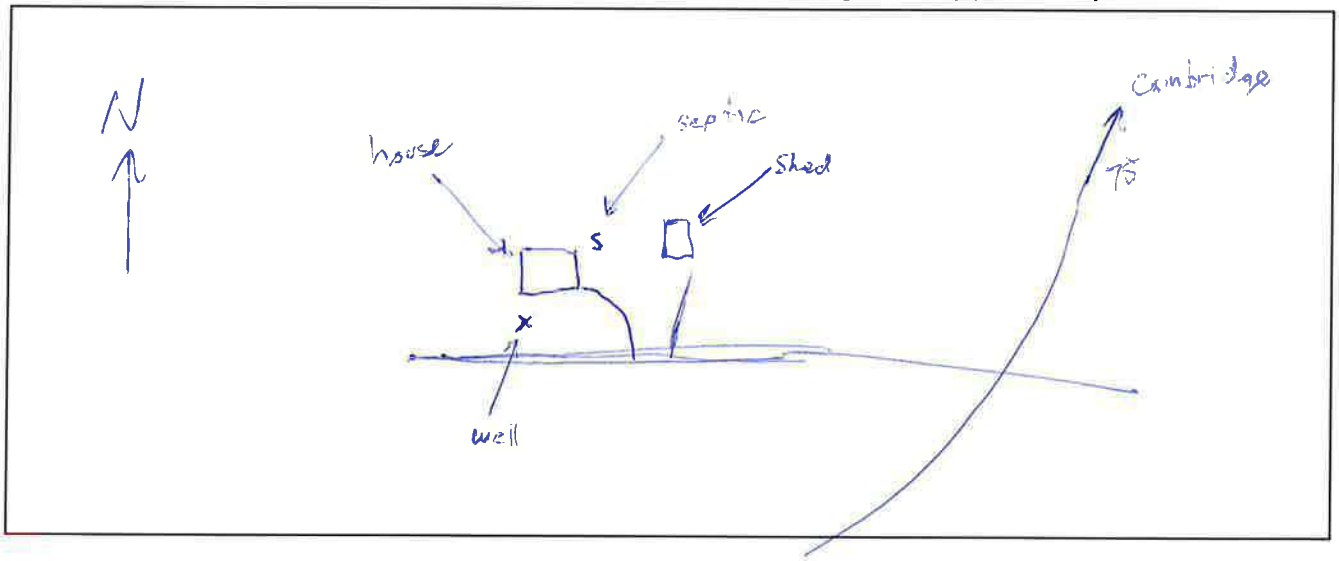
Other _____

Is the well easily accessible? ☒ Yes ☐ No

If Yes, may we measure the water level in this well? ☒ Yes ☐ No

Describe Well Location Front lawn

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1282 Road Greenfield

Address 1282 Greenfield Rd, Cambridge

Phone Number [redacted] email [redacted]

Property Owner: ☑ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners _____

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☐ 6 inches ☑ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well _____ ☑ Don't Know

Depth to Water _____ ☑ Don't Know

Pump Depth _____ ☑ Don't Know

Pump Type _____ ☑ Don't Know

Water Source: ☐ Bedrock ☑ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller _____ ☑ Don't Know

Date Installed _____ ☑ Don't Know

I have the MOE Water Well Record ☐ Yes ☐ No ☑ Don't Know

MOE Water Well Record Number A001971 ☐ Don't Know

Type of Water Use: ☑ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☑ Softener ☐ Sand Filter ☑ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment _____ ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☑ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☑ No

Any problems with water quality in the past? ☐ Yes ☑ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed Behind the home.

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

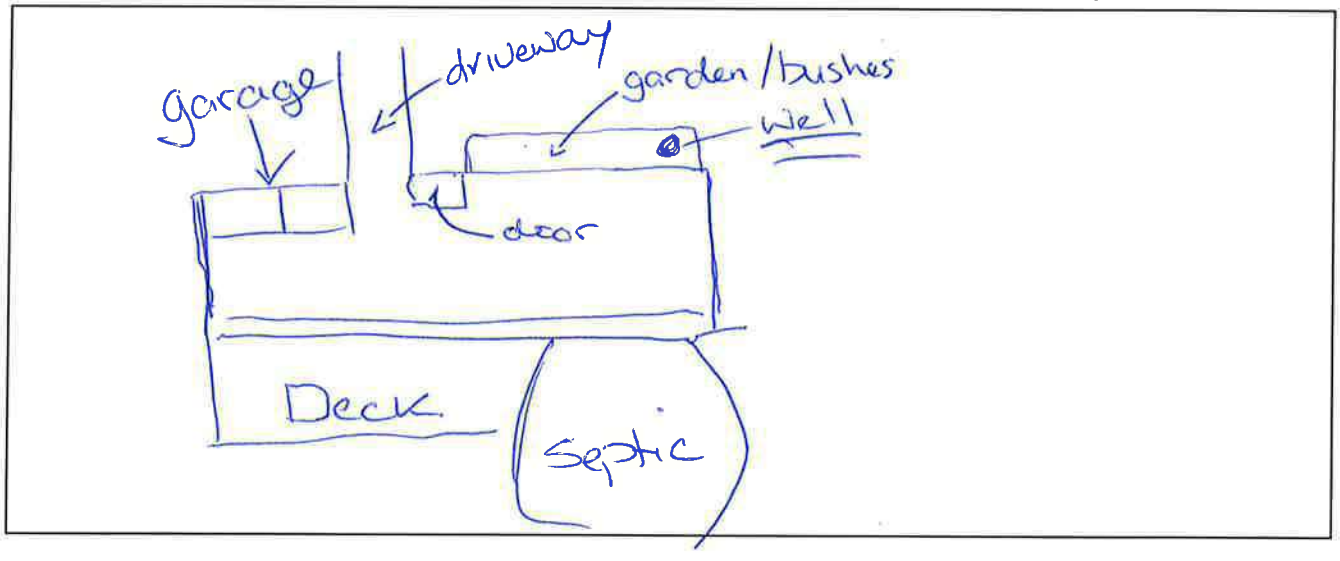
Other _____

Is the well easily accessible? ☑ Yes ☐ No

If Yes, may we measure the water level in this well? ☑ Yes ☐ No

Describe Well Location In front of the house on the West corner of the home.

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number _____ Road _____

Address 1220 Alps Rd

Phone Number [redacted] email [redacted]

Property Owner: ☑ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners [redacted]

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☑ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well 80' ☐ Don't Know

Depth to Water _____ ☑ Don't Know

Pump Depth 30'? ☐ Don't Know

Pump Type Submersible ☐ Don't Know

Water Source: ☐ Bedrock ☐ Sand/Gravel/Overburden ☑ Don't Know

Name of Well Driller _____ ☐ Don't Know

Date Installed 2006 ☐ Don't Know

I have the MOE Water Well Record ☐ Yes ☐ No ☑ Don't Know

MOE Water Well Record Number _____ ☑ Don't Know

Type of Water Use: ☑ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☑ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment _____ ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☑ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☑ No

Any problems with water quality in the past? ☑ Yes ☐ No

If yes, what type ? ☑ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed West of house

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

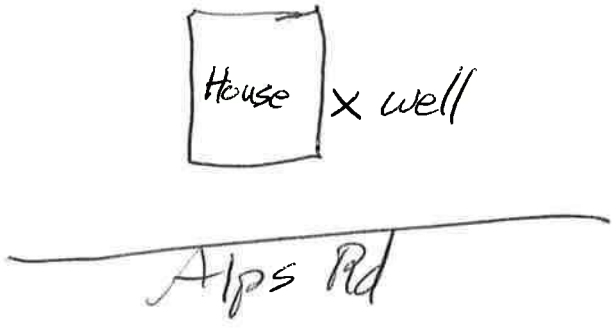
Other _____

Is the well easily accessible? ☑ Yes ☐ No

If Yes, may we measure the water level in this well? ☑ Yes ☐ No

Describe Well Location east of house

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



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Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1915 Road SHOULDICE SIDE RD

Address 1915 SHOULDICE SIDE RD, CAMBRIDGE NIR 5S5

Phone Number [redacted] email [redacted]

Property Owner: ☐ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners [redacted]

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☑ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well 75' ☐ Don't Know

Depth to Water 61' FROM GRADE ☐ Don't Know

Pump Depth 73' ☐ Don't Know

Pump Type Submersible ☐ Don't Know

Water Source: ☐ Bedrock ☑ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller _____ ☒ Don't Know

Date Installed _____ ☒ Don't Know

I have the MOE Water Well Record ☐ Yes ☐ No ☒ Don't Know

MOE Water Well Record Number _____ ☒ Don't Know

Type of Water Use: ☑ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☑ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide ☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment _____ ☒ Don't Know

MTE# _____

Rec'd FEB 03 2021

FYI FTC INIT. _____

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☑ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☑ No

Any problems with water quality in the past? ☐ Yes ☑ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed Behind House

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

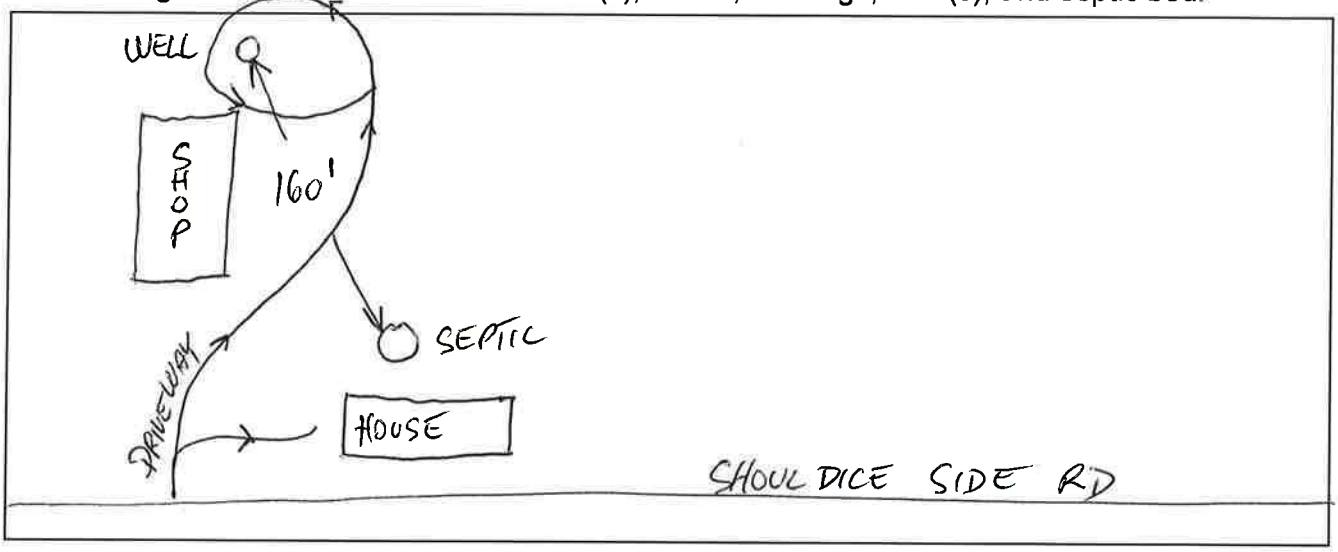
Other _____

Is the well easily accessible? ☑ Yes ☐ No

If Yes, may we measure the water level in this well? ☐ Yes ☐ No

Describe Well Location Behind Shop

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



Important!! Learn to protect your water supply. Ask us for an information package or visit:

www.gca.ca

www.wellaware.ca

Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1866 Road Shouldice Rd

Address Cambridge, ON N1R 5S5

Phone Number [redacted] email [redacted]

Property Owner: ☑ Yes ☐ No If No, Property Owner's Name _____

Previous Property Owners _____

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☑ Drilled ☐ Dug ☐ Sand Point ☐ Other _____ ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☐ 6 inches ☐ 8 inches ☐ 3 feet ☑ Don't Know

Depth of Well _____ ☑ Don't Know

Depth to Water _____ ☑ Don't Know

Pump Depth _____ ☑ Don't Know

Pump Type _____ ☑ Don't Know

Water Source: ☐ Bedrock ☐ Sand/Gravel/Overburden ☑ Don't Know

Name of Well Driller _____ ☑ Don't Know

Date Installed _____ ☑ Don't Know

I have the MOE Water Well Record ☐ Yes ☐ No ☑ Don't Know

MOE Water Well Record Number _____ ☑ Don't Know

Type of Water Use: ☑ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other _____

Water Treatment: ☑ Softener ☐ Sand Filter ☐ Carbon Filter ☐ Fiber Filter ☐ Aluminum Oxide

☐ UV ☑ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment _____ ☐ Don't Know

MTE# _____

Rec'd FEB 05 2021

FYI TFC INIT. _____

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☑ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☑ No

Any problems with water quality in the past? ☐ Yes ☑ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed see diagram

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

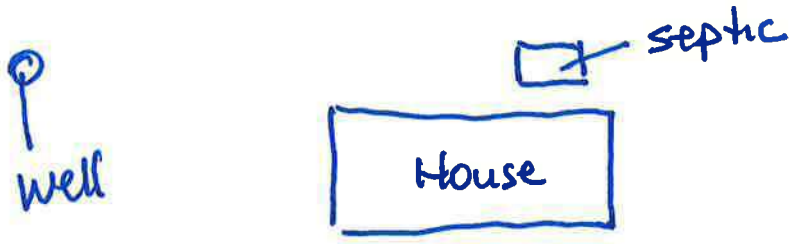
Other _____

Is the well easily accessible? ☑ Yes ☐ No

If Yes, may we measure the water level in this well? ☑ Yes ☐ No

Describe Well Location Rear yard

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:



Important!! Learn to protect your water supply. Ask us for an information package or visit:

www.gca.ca

www.wellaware.ca

Water Well Inventory – Page 1

46639-100

Resident Name [redacted]

911 Number 1354 Road sprague rd

Address Cambridge

Phone Number [redacted] mail

Property Owner: ☒ Yes ☐ No If No, Property Owner's Name

Previous Property Owners

Number of Wells on property 1 ☐ Don't Know

Type of Well: ☒ Drilled ☐ Dug ☐ Sand Point ☐ Other ☐ Don't Know

Diameter of Well: ☐ 2 inches ☐ 4 inches ☒ 6 inches ☐ 8 inches ☐ 3 feet ☐ Don't Know

Depth of Well 245 ft ☐ Don't Know

Depth to Water ☒ Don't Know

Pump Depth 80 Ft ☐ Don't Know

Pump Type submursebel ☐ Don't Know

Water Source: ☒ Bedrock ☐ Sand/Gravel/Overburden ☐ Don't Know

Name of Well Driller J L Graham Guelph ☐ Don't Know

Date Installed Sept 30 - 1960 ☐ Don't Know

I have the MOE Water Well Record ☐ Yes ☒ No ☐ Don't Know

MOE Water Well Record Number ☒ Don't Know

Type of Water Use: ☒ Domestic ☐ Farm ☐ Irrigation ☐ Industrial ☐ Other

Water Treatment: ☒ Softener ☐ Sand Filter ☐ Carbon Filter ☒ Fiber Filter ☐ Aluminum Oxide

☐ UV ☐ Reverse Osmosis ☐ Distillation ☐ Ion Exchange ☐ Ozonation

Other Water Treatment ☐ Don't Know

Water Well Inventory – Page 2

46639-100

Condition of Well Casing ☒ Good ☐ Buried ☐ Corroded ☐ Seized ☐ Broken ☐ Don't Know

Other _____

Any problems with water quantity in the past? ☐ Yes ☒ No

Any problems with water quality in the past? ☐ Yes ☒ No

If yes, what type ? ☐ Sulphur smell ☐ Iron taste ☐ Brown water ☐ Bacteria

Other _____

Location of Septic Bed more then 50 Ft

Potential Sources of Contamination: ☐ barn ☐ manure pile ☐ gas tanks ☐ heating oil tank

Other _____

Is the well easily accessible? ☒ Yes ☐ No

If Yes, may we measure the water level in this well? ☒ Yes ☐ No

Describe Well Location in the presence of the owner

Sketch a diagram to show the location of well(s), house, buildings, road(s), and septic bed:

Important!! Learn to protect your water supply. Ask us for an information package or visit:

www.gca.ca

www.wellaware.ca

Appendix D

Golder 2020 Monitoring Report

552500
553000
553500
4798500
4798000

MW3/03
MW08-1
MW5/07
MW7/07
MW6/07
Office Well
MW4/07
MW1/03
MW2/03
MW08-2
MW08-3

JOHANNA DR.
ANGELA CRES
DUCHESS DR
FRASERWOOD CRT
PEACHTREE CRES
ST ANDREWS ST
ALPS RD
SPRAGUES RD

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Expansion Pit Monitoring Well
- Existing Pit Monitoring Well
- Decommissioned Well (Sept. 2010)
- LHCAI Existing Licence Boundary
- LHCAI Expansion Licence Boundary
- Licensed Boundary (Owned by Others)
- Limit of Extraction Boundary

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2008
Data within study area provided by Cambridge Aggregates, 2008 and 2013.
Imagery - ESRI World Imagery, 2017
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

50 25 0 50 100 150
SCALE 1:5,000 METRES

PROJECT
LEHIGH HANSON/CAMBRIDGE AGGREGATES INC.
NORTH DUMFRIES PIT

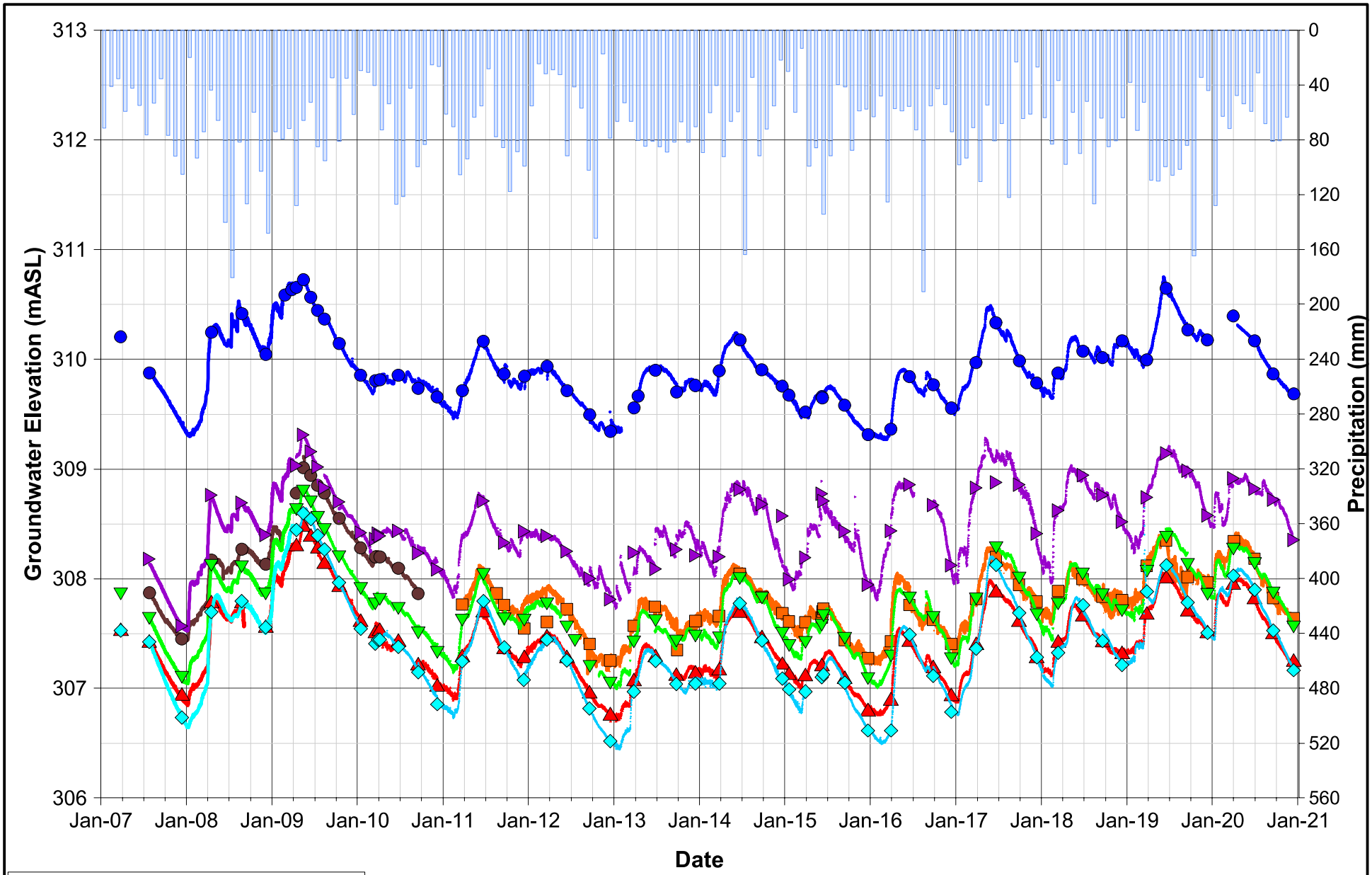
TITLE
SITE PLAN

GOLDER
Mississauga, Ontario

PROJECT NO. 19121075			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	21 Mar. 2021		
GIS	JMC	21 Mar. 2021		
CHECK	GP	21 Mar. 2021		
REVIEW	GP	21 Mar. 2021		

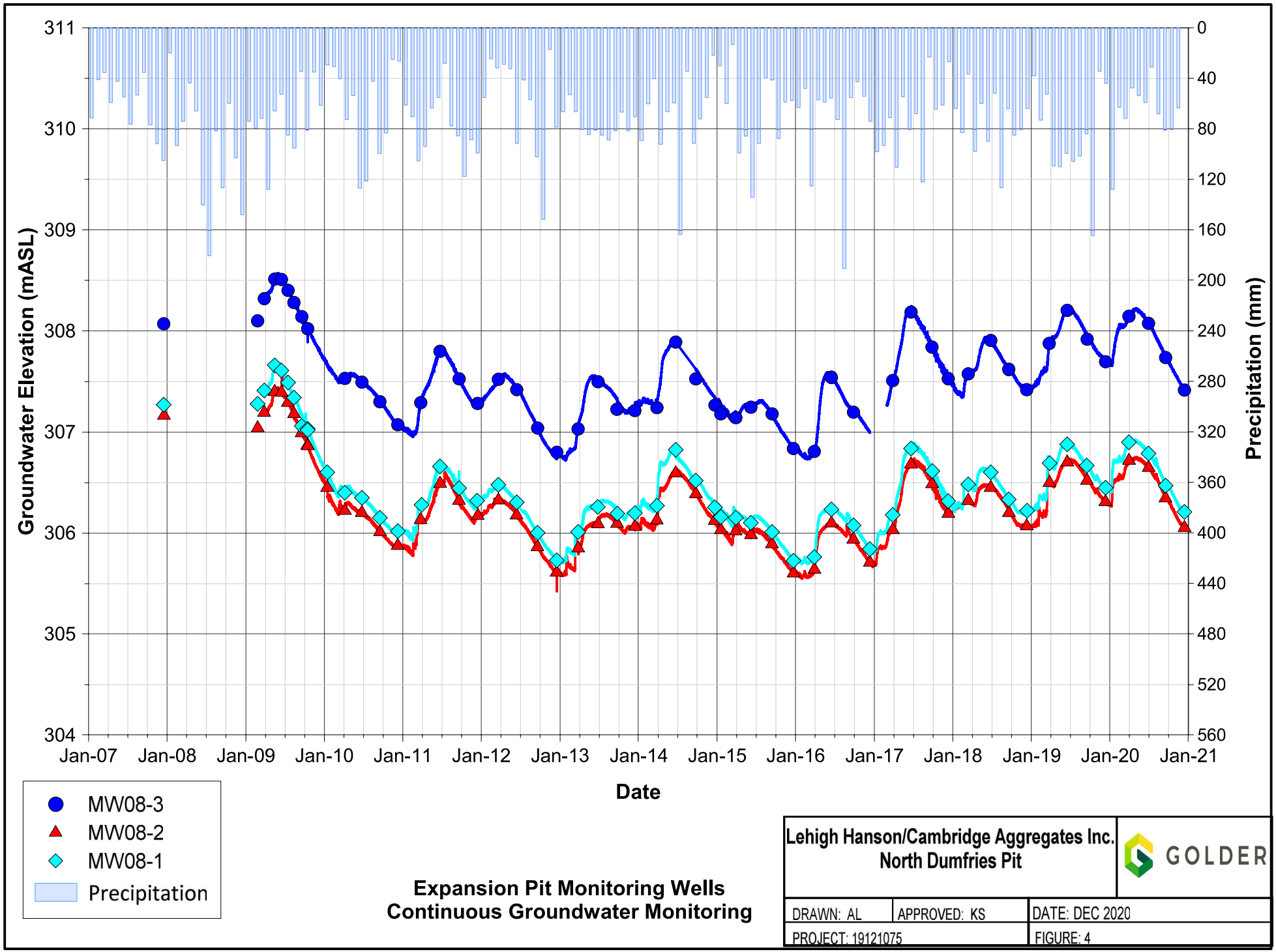
FIGURE: 2

G:\Projects\2008\08-1112-0170\GIS\MXDs\Draft\March_2013\Site_Plan.mxd



Existing Pit Monitoring Wells
Continuous Groundwater Monitoring

Lehigh Hanson/Cambridge Aggregates Inc. **North Dumfries Pit**		GOLDER
DRAWN: AL	APPROVED: KS	DATE: DEC 2020
PROJECT: 19121075		FIGURE: 3



Expansion Pit Monitoring Wells
Continuous Groundwater Monitoring

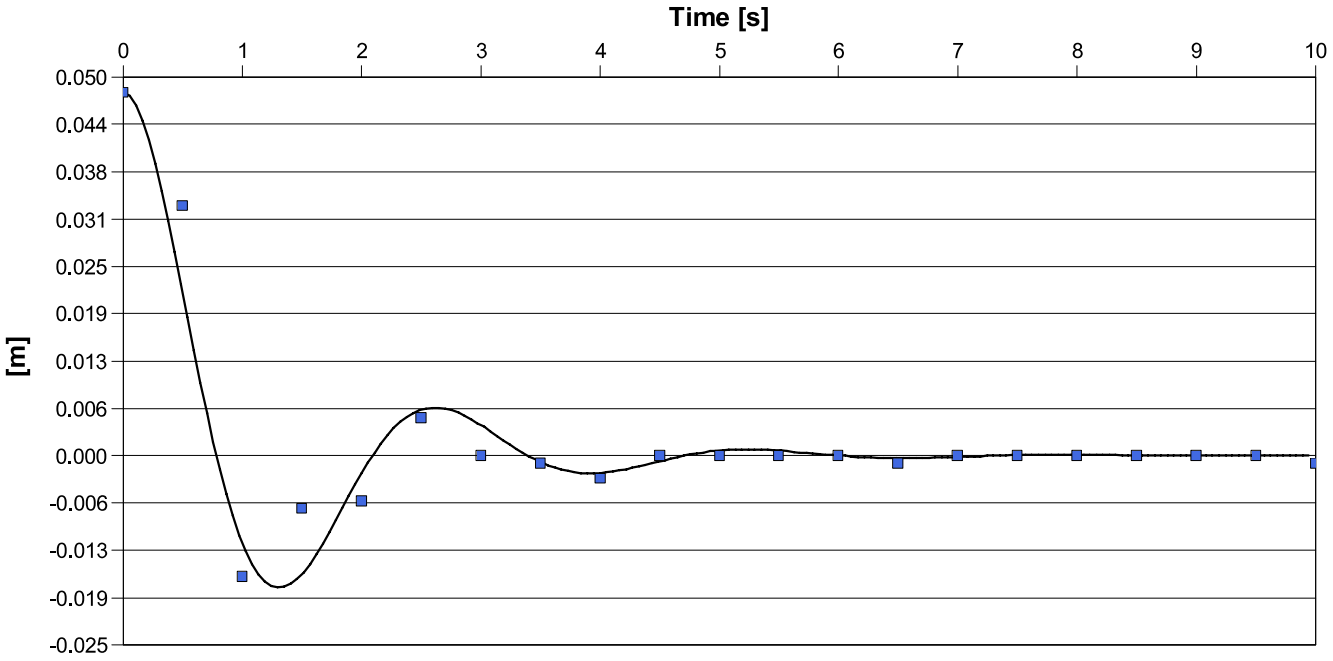
Lehigh Hanson/Cambridge Aggregates Inc. **North Dumfries Pit**		GOLDER
DRAWN: AL	APPROVED: KS	DATE: DEC 2020
PROJECT: 19121075		FIGURE: 4

Appendix E

Aquifer Test Data Sheets

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	Slug Test Analysis Report
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW101	Test Well: MW101
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Butler High-K	Analysis Date: 12/14/2021
Aquifer Thickness: 2.49 m		

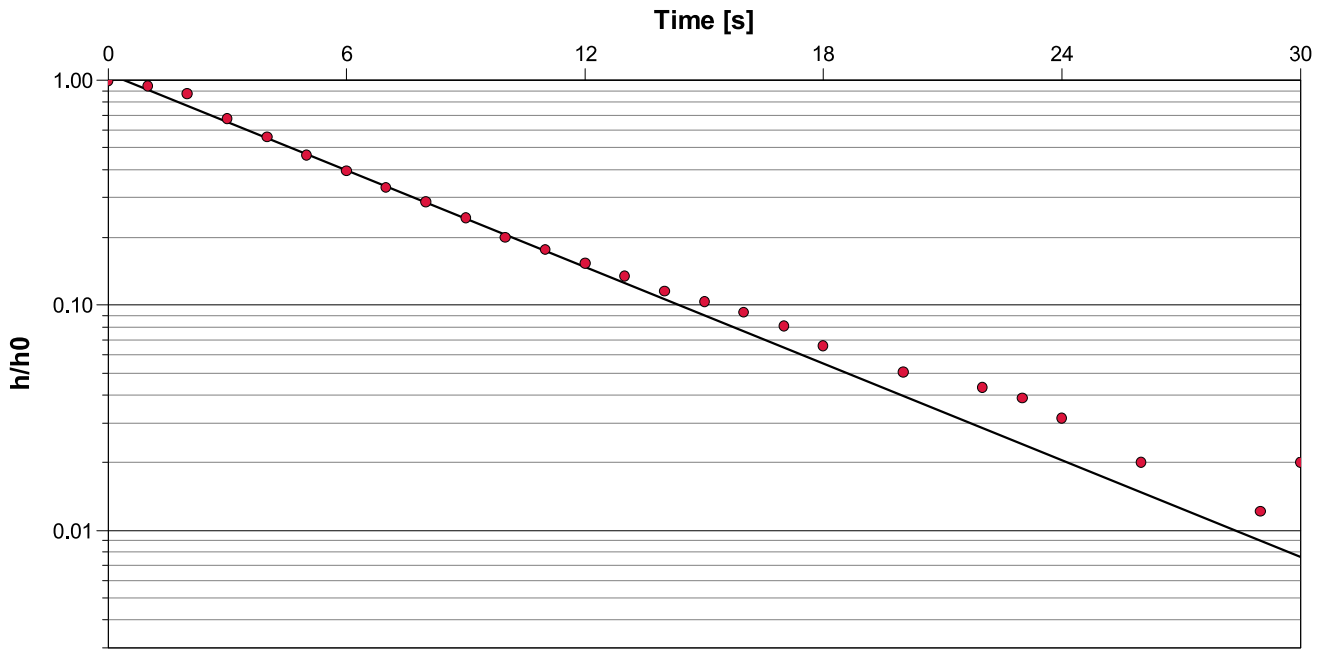


Calculation using Butler High-K

Observation Well	tD/t	Hydraulic Conductivity m/s	CD	
MW101	2.53×10^{0}	4.54×10^{-3}	6.13×10^{-1}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	**Slug Test Analysis Report**
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW102	Test Well: MW102
Test Conducted by: JKS		Test Date: 9/8/2020
Analysis Performed by: TFC	Bouwer & Rice	Analysis Date: 9/8/2020
Aquifer Thickness: 4.20 m		

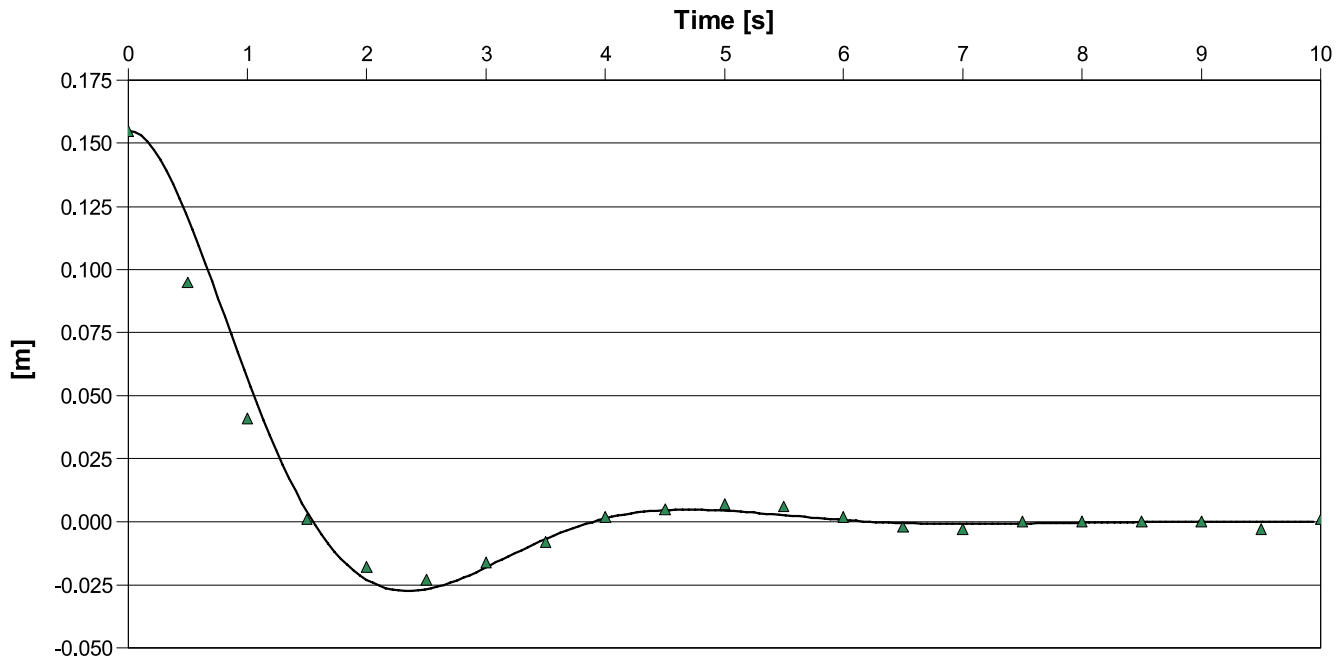


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW102	2.10×10^{-4}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	**Slug Test Analysis Report**
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW103	Test Well: MW103
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Butler High-K	Analysis Date: 12/14/2021
Aquifer Thickness: 6.30 m		

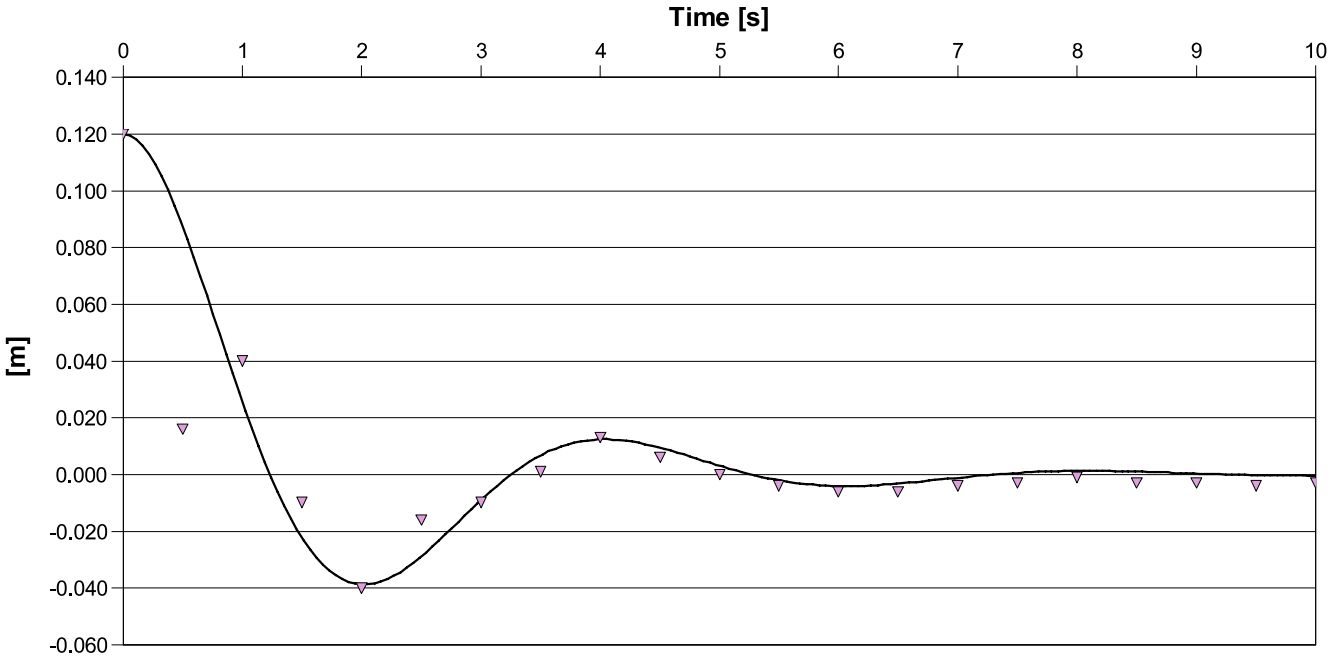


Calculation using Butler High-K

Observation Well	tD/t	Hydraulic Conductivity m/s	CD	
MW103	1.53×10^{0}	1.76×10^{-3}	9.65×10^{-1}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	Slug Test Analysis Report
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW104	Test Well: MW104
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Butler High-K	Analysis Date: 12/14/2021
Aquifer Thickness: 4.51 m		

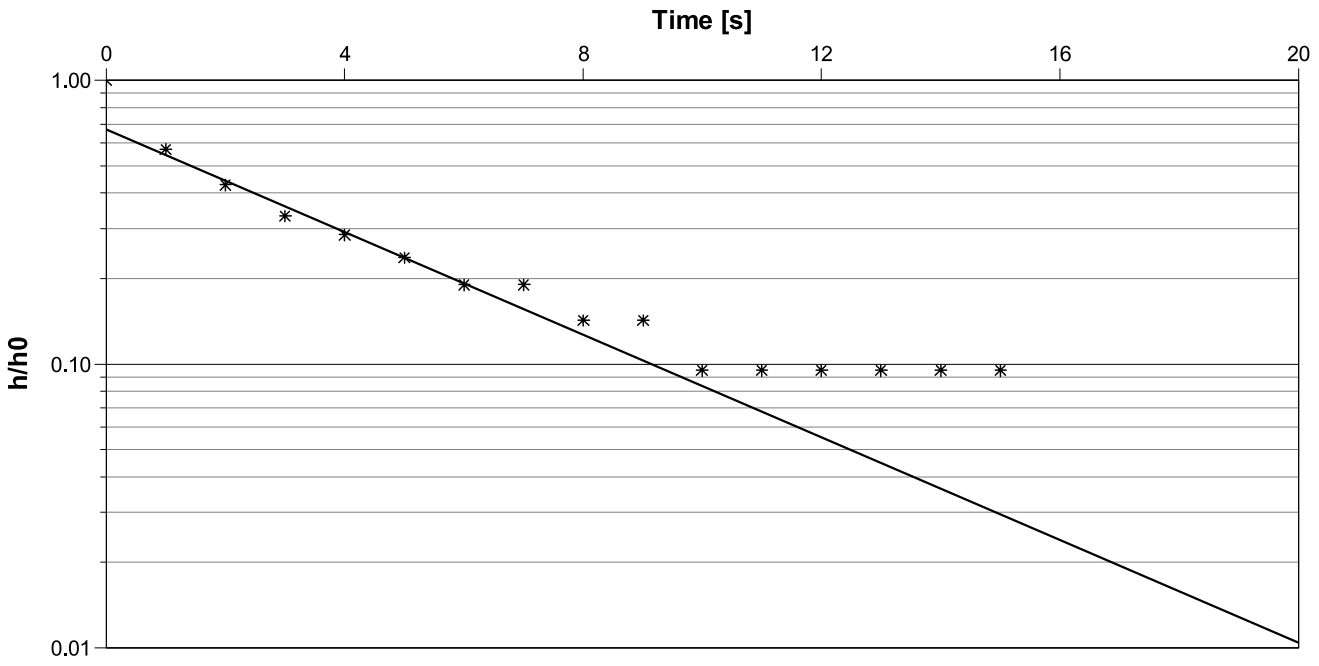


Calculation using Butler High-K

Observation Well	tD/t	Hydraulic Conductivity m/s	CD	
MW104	1.65×10^{0}	2.81×10^{-3}	6.78×10^{-1}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	Slug Test Analysis Report
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW105 - Rising 2	Test Well: MW105
Test Conducted by: JKS		Test Date: 10/6/2021
Analysis Performed by: TFC	Bouwer & Rice	Analysis Date: 10/6/2021
Aquifer Thickness: 5.62 m		

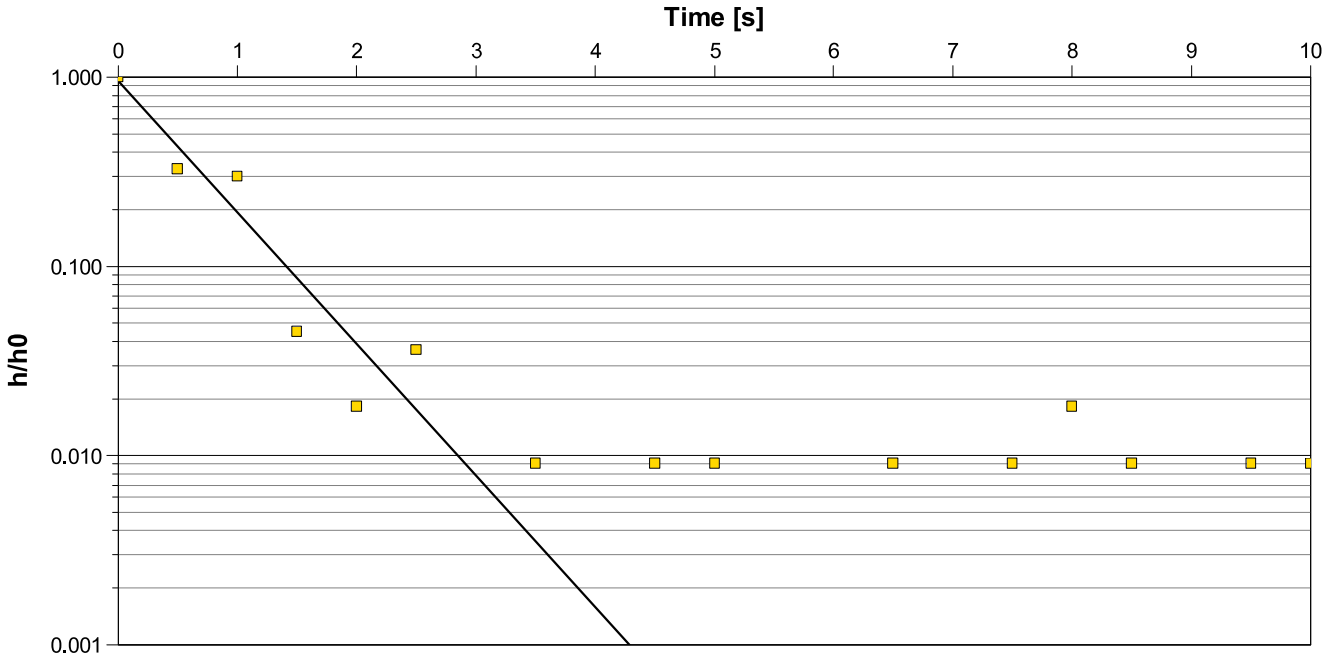


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW105	2.85×10^{-4}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	Slug Test Analysis Report
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW106	Test Well: MW106
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Bouwer & Rice	Analysis Date: 12/14/2021
Aquifer Thickness: 3.11 m		

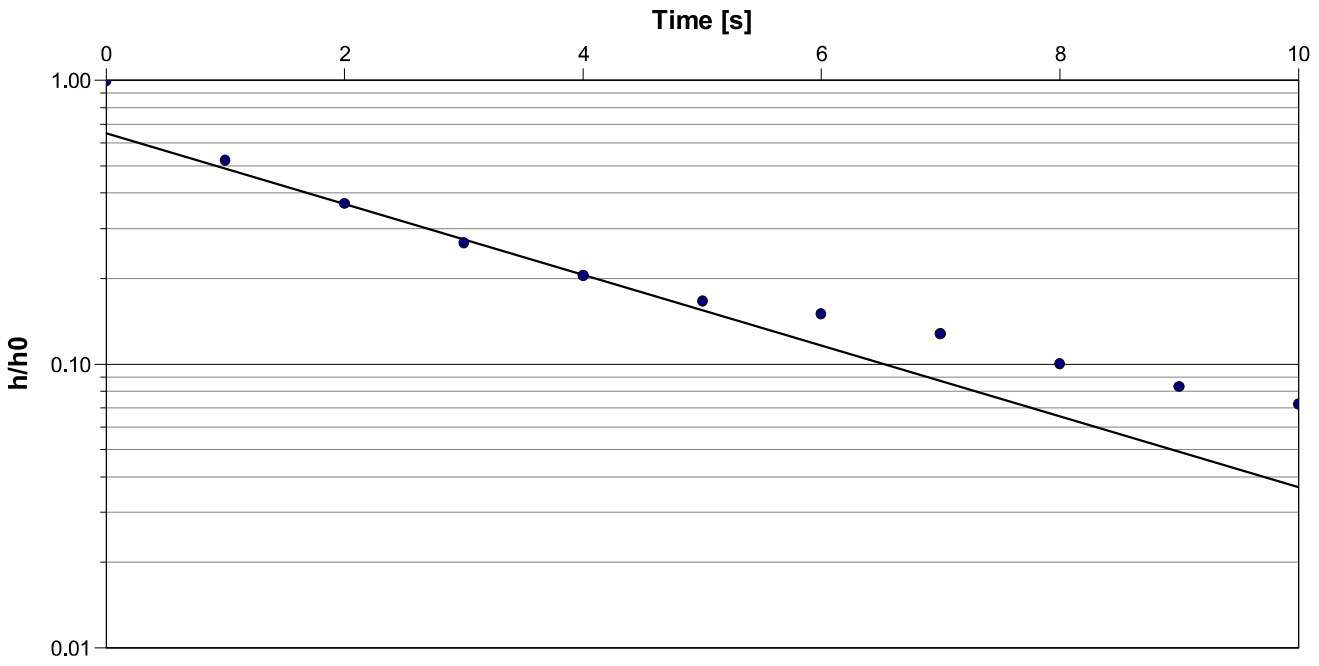


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW106	1.70×10^{-3}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	Slug Test Analysis Report
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW107 - Rising 5	Test Well: MW107
Test Conducted by: JKS		Test Date: 10/6/2021
Analysis Performed by: TFC	Bouwer & Rice	Analysis Date: 10/6/2021
Aquifer Thickness: 4.60 m		

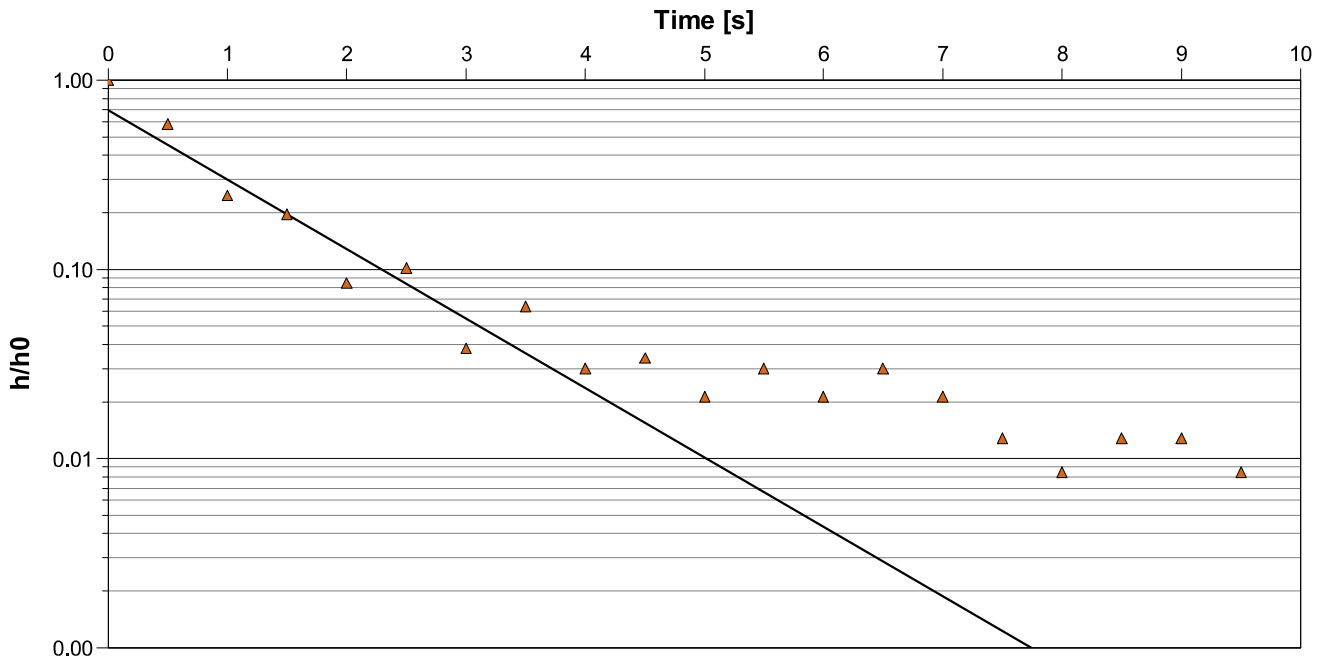


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW107	3.33×10^{-4}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	**Slug Test Analysis Report**
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW108	Test Well: MW108
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Bouwer & Rice	Analysis Date: 12/14/2021
Aquifer Thickness: 3.07 m		

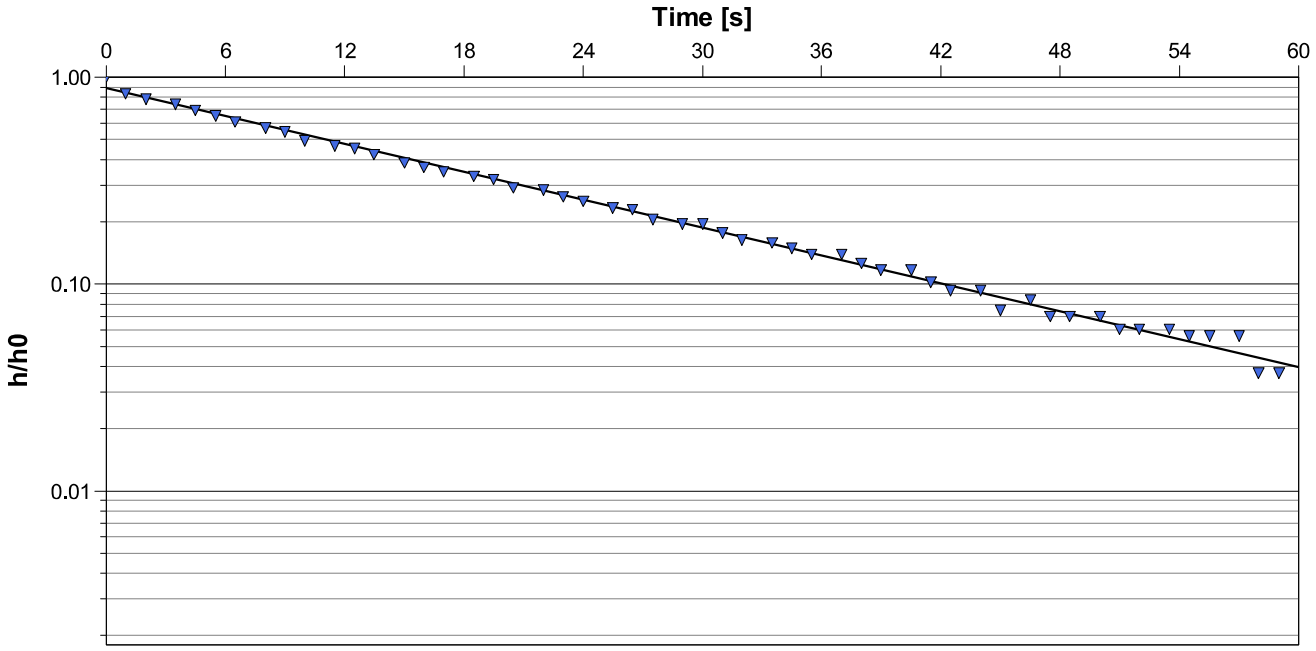


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW108	9.91×10^{-4}	

MTE Consultants 520 Bingemans Centre Drive Kitchener, Ontario N2B 3X9	**Slug Test Analysis Report**
	Project: West Edworthy Pit
	Number: 46639-100
	Client: Cambridge Aggregates

Location: Cambridge	Slug Test: MW109	Test Well: MW109
Test Conducted by: JAK		Test Date: 11/16/2021
Analysis Performed by: JAK	Bouwer & Rice	Analysis Date: 12/14/2021
Aquifer Thickness: 4.85 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW109	6.10×10^{-5}	

Appendix F

Certificates of Analysis

MTE CONSULTANTS INC. (Kitchener)
ATTN: FRASER CUMMINGS
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9

Date Received: 23- APR- 21
Report Date: 03- MAY- 21 12:20 (MT)
Version: FINAL

Client Phone: 519- 743- 6500

Certificate of Analysis

Lab Work Order #: L2579646

Project P.O. #: NOT SUBMITTED
Job Reference: 46639- 100
C of C Numbers: 20- 894223
Legal Site Desc:

Emily Hansen
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-1 MW101-20 Sampled By: TFC on 22-APR-21 @ 14:36 Matrix: WATER							
Physical Tests							
Colour, Apparent	6.8		2.0	CU		23-APR-21	R5440632
Conductivity	873		3.0	umhos/cm		26-APR-21	R5441631
Hardness (as CaCO3)	388		0.50	mg/L		27-APR-21	
pH	7.67		0.10	pH units		26-APR-21	R5441631
Total Dissolved Solids	518	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	57.4		0.10	NTU	24-APR-21	24-APR-21	R5440782
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	281		10	mg/L		26-APR-21	R5441631
Ammonia, Total (as N)	<0.010		0.010	mg/L		26-APR-21	R5441175
Chloride (Cl)	99.6		0.50	mg/L		27-APR-21	R5442659
Fluoride (F)	0.067		0.020	mg/L		27-APR-21	R5442659
Nitrate (as N)	6.79		0.020	mg/L		27-APR-21	R5442659
Nitrite (as N)	<0.010		0.010	mg/L		27-APR-21	R5442659
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	20.9		0.30	mg/L		27-APR-21	R5442659
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0089		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00011		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.136		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	0.0000096		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	98.4		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00071		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	0.000093		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	34.7		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00139		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000220		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.26		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000228		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	5.57		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	37.1		0.050	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-1 MW101-20 Sampled By: TFC on 22-APR-21 @ 14:36 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.135		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000403		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0046		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	114.2		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	101.6		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5442596
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	86.0		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	102.2		60-140	%		29-APR-21	R5442596
L2579646-2 MW102-20 Sampled By: TFC on 22-APR-21 @ 13:42 Matrix: WATER							
Physical Tests							
Colour, Apparent	36.4		2.0	CU		23-APR-21	R5440632
Conductivity	578		3.0	umhos/cm		26-APR-21	R5441615
Hardness (as CaCO3)	333		0.50	mg/L		27-APR-21	
pH	7.76		0.10	pH units		26-APR-21	R5441615
Total Dissolved Solids	369	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	200		0.10	NTU	24-APR-21	24-APR-21	R5440781
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	270		10	mg/L		26-APR-21	R5441615
Ammonia, Total (as N)	<0.010		0.010	mg/L		26-APR-21	R5441175
Chloride (Cl)	9.60		0.50	mg/L		26-APR-21	R5441976

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-2 MW102-20 Sampled By: TFC on 22-APR-21 @ 13:42 Matrix: WATER							
Anions and Nutrients							
Fluoride (F)	0.077		0.020	mg/L		26-APR-21	R5441976
Nitrate (as N)	4.65		0.020	mg/L		26-APR-21	R5441976
Nitrite (as N)	<0.010		0.010	mg/L		26-APR-21	R5441976
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	32.7		0.30	mg/L		26-APR-21	R5441976
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0718		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00018		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.235		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	0.0000073		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	80.3		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	0.00052		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00037		0.00020	mg/L	26-APR-21	27-APR-21	R5441577
Iron (Fe)-Dissolved	0.063		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	0.00173		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	32.1		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00780		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000415		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.23		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000144		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.59		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	2.69		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.103		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	0.00246		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000578		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0055		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-2 MW102-20 Sampled By: TFC on 22-APR-21 @ 13:42 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	103.1		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5442596
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	88.8		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	97.1		60-140	%		29-APR-21	R5442596
L2579646-3 MW103-20 Sampled By: TFC on 22-APR-21 @ 16:26 Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU		23-APR-21	R5440632
Conductivity	598		3.0	umhos/cm		26-APR-21	R5441631
Hardness (as CaCO3)	336		0.50	mg/L		27-APR-21	
pH	7.80		0.10	pH units		26-APR-21	R5441631
Total Dissolved Solids	343	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	20.2		0.10	NTU	24-APR-21	24-APR-21	R5440782
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	296		10	mg/L		26-APR-21	R5441631
Ammonia, Total (as N)	0.039		0.010	mg/L		26-APR-21	R5441175
Chloride (Cl)	10.2		0.50	mg/L		27-APR-21	R5442659
Fluoride (F)	0.044		0.020	mg/L		27-APR-21	R5442659
Nitrate (as N)	5.41		0.020	mg/L		27-APR-21	R5442659
Nitrite (as N)	<0.010		0.010	mg/L		27-APR-21	R5442659
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	10.9		0.30	mg/L		27-APR-21	R5442659
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00012		0.00010	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-3 MW103-20 Sampled By: TFC on 22-APR-21 @ 16:26 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	0.0749		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	78.9		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	0.00065		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00030		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	33.9		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000218		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	0.896		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000240		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.18		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	3.51		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.0884		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000355		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0023		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50		0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50		0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30		0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40		0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	103.9		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		29-APR-21	R5442596

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-3 MW103-20 Sampled By: TFC on 22-APR-21 @ 16:26 Matrix: WATER							
Hydrocarbons							
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	83.7		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	102.5		60-140	%		29-APR-21	R5442596
L2579646-4 MW104-20 Sampled By: TFC on 22-APR-21 @ 17:42 Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU		23-APR-21	R5440632
Conductivity	595		3.0	umhos/cm		26-APR-21	R5441631
Hardness (as CaCO3)	325		0.50	mg/L		27-APR-21	
pH	7.81		0.10	pH units		26-APR-21	R5441631
Total Dissolved Solids	346	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	4.03		0.10	NTU	24-APR-21	24-APR-21	R5440782
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	265		10	mg/L		26-APR-21	R5441631
Ammonia, Total (as N)	<0.010		0.010	mg/L		26-APR-21	R5441175
Chloride (Cl)	16.7		0.50	mg/L		27-APR-21	R5442659
Fluoride (F)	0.061		0.020	mg/L		27-APR-21	R5442659
Nitrate (as N)	9.10		0.020	mg/L		27-APR-21	R5442659
Nitrite (as N)	<0.010		0.010	mg/L		27-APR-21	R5442659
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	11.9		0.30	mg/L		27-APR-21	R5442659
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.0615		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	75.5		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00042		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-4 MW104-20 Sampled By: TFC on 22-APR-21 @ 17:42 Matrix: WATER							
Dissolved Metals							
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	33.2		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000165		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	0.927		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000300		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	4.71		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	2.91		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.0740		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000285		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0025		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50		0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50		0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30		0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40		0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	101.8		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	99.8		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		29-APR-21	R5442596
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	84.6		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	102.4		60-140	%		29-APR-21	R5442596
L2579646-5 MW105-20 Sampled By: TFC on 22-APR-21 @ 10:00 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-5 MW105-20 Sampled By: TFC on 22-APR-21 @ 10:00 Matrix: WATER							
Physical Tests							
Colour, Apparent	38.1		2.0	CU		23-APR-21	R5440632
Conductivity	842		3.0	umhos/cm		24-APR-21	R5441402
Hardness (as CaCO3)	354		0.50	mg/L		27-APR-21	
pH	7.77		0.10	pH units		24-APR-21	R5441402
Total Dissolved Solids	502	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	238		0.10	NTU	24-APR-21	24-APR-21	R5440781
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	284		10	mg/L		24-APR-21	R5441402
Ammonia, Total (as N)	<0.010		0.010	mg/L		01-MAY-21	R5445318
Chloride (Cl)	94.4		0.50	mg/L		26-APR-21	R5441976
Fluoride (F)	0.065		0.020	mg/L		26-APR-21	R5441976
Nitrate (as N)	7.76		0.020	mg/L		26-APR-21	R5441976
Nitrite (as N)	<0.010		0.010	mg/L		26-APR-21	R5441976
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	9.82		0.30	mg/L		26-APR-21	R5441976
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0061		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00016		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.190		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	90.5		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	0.00059		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00084		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	0.011		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	0.000065		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	31.1		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00395		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000429		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.48		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000239		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.63		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	39.0		0.050	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-5 MW105-20 Sampled By: TFC on 22-APR-21 @ 10:00 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.122		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	0.000013		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	0.00016		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000530		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0083		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	100.7		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5442596
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	85.9		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	82.7		60-140	%		29-APR-21	R5442596
L2579646-6 MW106-20 Sampled By: TFC on 22-APR-21 @ 12:20 Matrix: WATER							
Physical Tests							
Colour, Apparent	37.1		2.0	CU		23-APR-21	R5440632
Conductivity	594		3.0	umhos/cm		26-APR-21	R5441615
Hardness (as CaCO3)	360		0.50	mg/L		27-APR-21	
pH	7.61		0.10	pH units		26-APR-21	R5441615
Total Dissolved Solids	351	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	866		0.10	NTU	24-APR-21	24-APR-21	R5440781
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	385		10	mg/L		26-APR-21	R5441615
Ammonia, Total (as N)	0.033		0.010	mg/L		01-MAY-21	R5445318
Chloride (Cl)	5.02		0.50	mg/L		26-APR-21	R5441976

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-6 MW106-20 Sampled By: TFC on 22-APR-21 @ 12:20 Matrix: WATER							
Anions and Nutrients							
Fluoride (F)	0.065		0.020	mg/L		26-APR-21	R5441976
Nitrate (as N)	5.04		0.020	mg/L		26-APR-21	R5441976
Nitrite (as N)	<0.010		0.010	mg/L		26-APR-21	R5441976
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	12.0		0.30	mg/L		26-APR-21	R5441976
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0233		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00015		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.104		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	87.8		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00032		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	0.031		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	0.000157		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	34.3		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00529		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000317		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.03		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000207		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.40		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	2.06		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.101		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	0.00024		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	0.00086		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000508		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0020		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-6 MW106-20 Sampled By: TFC on 22-APR-21 @ 12:20 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	101.0		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5442596
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	86.8		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	74.8		60-140	%		29-APR-21	R5442596
L2579646-7 MW107-20 Sampled By: TFC on 22-APR-21 @ 11:00 Matrix: WATER							
Physical Tests							
Colour, Apparent	56.6		2.0	CU		23-APR-21	R5440632
Conductivity	1060		3.0	umhos/cm		24-APR-21	R5441406
Hardness (as CaCO3)	394		0.50	mg/L		27-APR-21	
pH	7.72		0.10	pH units		24-APR-21	R5441406
Total Dissolved Solids	648	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	843		0.10	NTU	24-APR-21	24-APR-21	R5440781
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	299		10	mg/L		24-APR-21	R5441406
Ammonia, Total (as N)	0.012		0.010	mg/L		01-MAY-21	R5445318
Chloride (Cl)	156		0.50	mg/L		26-APR-21	R5441976
Fluoride (F)	0.064		0.020	mg/L		26-APR-21	R5441976
Nitrate (as N)	8.37		0.020	mg/L		26-APR-21	R5441976
Nitrite (as N)	<0.010		0.010	mg/L		26-APR-21	R5441976
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	17.1		0.30	mg/L		26-APR-21	R5441976
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00014		0.00010	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-7 MW107-20 Sampled By: TFC on 22-APR-21 @ 11:00 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	0.209		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	103		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	0.00053		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	33.2		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.0103		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000430		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	0.00059		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.79		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000238		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.69		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	72.4		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.183		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000551		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0015		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5442596
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5442596
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5442596
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	102.3		70-130	%		29-APR-21	R5442596
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		29-APR-21	R5442596
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5442596

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-7 MW107-20 Sampled By: TFC on 22-APR-21 @ 11:00 Matrix: WATER							
Hydrocarbons							
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	27-APR-21	R5441677
F3 (C16-C34)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
F4 (C34-C50)	<250		250	ug/L	26-APR-21	27-APR-21	R5441677
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	27-APR-21	R5441677
Surrogate: 2-Bromobenzotrifluoride	88.0		60-140	%	26-APR-21	27-APR-21	R5441677
Surrogate: 3,4-Dichlorotoluene	86.9		60-140	%		29-APR-21	R5442596
L2579646-8 MW108-20 Sampled By: TFC on 22-APR-21 @ 12:55 Matrix: WATER							
Physical Tests							
Colour, Apparent	31.9		2.0	CU		23-APR-21	R5440632
Conductivity	558		3.0	umhos/cm		26-APR-21	R5441615
Hardness (as CaCO3)	337		0.50	mg/L		27-APR-21	
pH	7.69		0.10	pH units		26-APR-21	R5441615
Total Dissolved Solids	361	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	211		0.10	NTU	24-APR-21	24-APR-21	R5440781
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	304		10	mg/L		26-APR-21	R5441615
Ammonia, Total (as N)	<0.010		0.010	mg/L		01-MAY-21	R5445318
Chloride (Cl)	6.38		0.50	mg/L		26-APR-21	R5441976
Fluoride (F)	0.068		0.020	mg/L		26-APR-21	R5441976
Nitrate (as N)	6.28		0.020	mg/L		26-APR-21	R5441976
Nitrite (as N)	<0.010		0.010	mg/L		26-APR-21	R5441976
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	10.4		0.30	mg/L		26-APR-21	R5441976
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0138		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00013		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.0930		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	0.0000095		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	83.9		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00106		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	0.014		0.010	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-8 MW108-20 Sampled By: TFC on 22-APR-21 @ 12:55 Matrix: WATER							
Dissolved Metals							
Lead (Pb)-Dissolved	0.000081		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	31.0		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00882		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000417		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.22		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000196		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	6.05		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	1.80		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Strontium (Sr)-Dissolved	0.100		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	0.00037		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000479		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0027		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5443076
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5443076
Toluene	<0.50	OWP	0.50	ug/L		29-APR-21	R5443076
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5443076
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5443076
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	95.4		70-130	%		29-APR-21	R5443076
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		29-APR-21	R5443076
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5443076
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	28-APR-21	R5441667
F3 (C16-C34)	<250		250	ug/L	26-APR-21	28-APR-21	R5441667
F4 (C34-C50)	<250		250	ug/L	26-APR-21	28-APR-21	R5441667
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	28-APR-21	R5441667
Surrogate: 2-Bromobenzotrifluoride	94.3		60-140	%	26-APR-21	28-APR-21	R5441667
Surrogate: 3,4-Dichlorotoluene	84.3		60-140	%		29-APR-21	R5443076
L2579646-9 MW109-20 Sampled By: TFC on 22-APR-21 @ 15:28 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-9 MW109-20 Sampled By: TFC on 22-APR-21 @ 15:28 Matrix: WATER							
Physical Tests							
Colour, Apparent	53.6		2.0	CU		23-APR-21	R5440632
Conductivity	576		3.0	umhos/cm		26-APR-21	R5441631
Hardness (as CaCO3)	318		0.50	mg/L		27-APR-21	
pH	7.73		0.10	pH units		26-APR-21	R5441631
Total Dissolved Solids	389	DLDS	20	mg/L		26-APR-21	R5441806
Turbidity	>4000		0.10	NTU		24-APR-21	R5440782
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	400		10	mg/L		26-APR-21	R5441631
Ammonia, Total (as N)	0.019		0.010	mg/L		01-MAY-21	R5445318
Chloride (Cl)	12.4		0.50	mg/L		27-APR-21	R5442659
Fluoride (F)	0.066		0.020	mg/L		27-APR-21	R5442659
Nitrate (as N)	3.62		0.020	mg/L		27-APR-21	R5442659
Nitrite (as N)	0.016		0.010	mg/L		27-APR-21	R5442659
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		27-APR-21	R5441758
Sulfate (SO4)	31.4		0.30	mg/L		27-APR-21	R5442659
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					26-APR-21	R5441420
Aluminum (Al)-Dissolved	0.0059		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Arsenic (As)-Dissolved	0.00011		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Barium (Ba)-Dissolved	0.0866		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Boron (B)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	26-APR-21	26-APR-21	R5441577
Calcium (Ca)-Dissolved	78.6		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Copper (Cu)-Dissolved	0.00084		0.00020	mg/L	26-APR-21	26-APR-21	R5441577
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	26-APR-21	26-APR-21	R5441577
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Magnesium (Mg)-Dissolved	29.6		0.0050	mg/L	26-APR-21	26-APR-21	R5441577
Manganese (Mn)-Dissolved	0.00797		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Molybdenum (Mo)-Dissolved	0.000699		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Nickel (Ni)-Dissolved	0.00054		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Potassium (K)-Dissolved	1.11		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Selenium (Se)-Dissolved	0.000208		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Silicon (Si)-Dissolved	5.66		0.050	mg/L	26-APR-21	26-APR-21	R5441577
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	26-APR-21	26-APR-21	R5441577
Sodium (Na)-Dissolved	5.26		0.050	mg/L	26-APR-21	26-APR-21	R5441577

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2579646-9 MW109-20 Sampled By: TFC on 22-APR-21 @ 15:28 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.103		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	26-APR-21	26-APR-21	R5441577
Uranium (U)-Dissolved	0.000411		0.000010	mg/L	26-APR-21	26-APR-21	R5441577
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	26-APR-21	26-APR-21	R5441577
Zinc (Zn)-Dissolved	0.0014		0.0010	mg/L	26-APR-21	26-APR-21	R5441577
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	26-APR-21	26-APR-21	R5441577
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5443076
Ethylbenzene	<0.50	OWP	0.50	ug/L		29-APR-21	R5443076
Toluene	0.54	OWP	0.50	ug/L		29-APR-21	R5443076
o-Xylene	<0.30	OWP	0.30	ug/L		29-APR-21	R5443076
m+p-Xylenes	<0.40	OWP	0.40	ug/L		29-APR-21	R5443076
Xylenes (Total)	<0.50		0.50	ug/L		29-APR-21	
Surrogate: 4-Bromofluorobenzene	95.9		70-130	%		29-APR-21	R5443076
Surrogate: 1,4-Difluorobenzene	99.2		70-130	%		29-APR-21	R5443076
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		29-APR-21	R5443076
F1-BTEX	<25		25	ug/L		29-APR-21	
F2 (C10-C16)	<100		100	ug/L	26-APR-21	28-APR-21	R5441667
F3 (C16-C34)	<250		250	ug/L	26-APR-21	28-APR-21	R5441667
F4 (C34-C50)	<250		250	ug/L	26-APR-21	28-APR-21	R5441667
Total Hydrocarbons (C6-C50)	<370		370	ug/L		29-APR-21	
Chrom. to baseline at nC50	YES				26-APR-21	28-APR-21	R5441667
Surrogate: 2-Bromobenzotrifluoride	89.1		60-140	%	26-APR-21	28-APR-21	R5441667
Surrogate: 3,4-Dichlorotoluene	73.0		60-140	%		29-APR-21	R5443076

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Fluoride (F)	MS-B	L2579646-1, -3, -4, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2579646-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nitrate (as N)	MS-B	L2579646-2, -5, -6, -7, -8

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	APHA 2320B

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint.

BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

COLOUR-APPARENT-WT	Water	Colour	APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene,

Reference Information

Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the ìReference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil ñTier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

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

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

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

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

NO2-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PO4-DO-COL-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

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

Reference Information

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

20-894223

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

Quality Control Report

Workorder: L2579646 Report Date: 03-MAY-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	Water							
Batch R5441402								
WG3523633-4 DUP		**WG3523633-3**						
Alkalinity, Total (as CaCO3)		284	286		mg/L	0.7	20	24-APR-21
WG3523633-2 LCS								
Alkalinity, Total (as CaCO3)			103.7		%		85-115	24-APR-21
WG3523633-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	24-APR-21
Batch R5441406								
WG3523635-4 DUP		**WG3523635-3**						
Alkalinity, Total (as CaCO3)		286	287		mg/L	0.4	20	24-APR-21
WG3523635-2 LCS								
Alkalinity, Total (as CaCO3)			105.4		%		85-115	24-APR-21
WG3523635-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	24-APR-21
Batch R5441615								
WG3524080-4 DUP		**WG3524080-3**						
Alkalinity, Total (as CaCO3)		294	281		mg/L	4.4	20	26-APR-21
WG3524080-2 LCS								
Alkalinity, Total (as CaCO3)			101.8		%		85-115	26-APR-21
WG3524080-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	26-APR-21
Batch R5441631								
WG3524283-6 DUP		**WG3524283-5**						
Alkalinity, Total (as CaCO3)		281	282		mg/L	0.4	20	26-APR-21
WG3524283-2 LCS								
Alkalinity, Total (as CaCO3)			97.6		%		85-115	26-APR-21
WG3524283-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	26-APR-21
BTX-511-HS-WT	Water							
Batch R5442596								
WG3525495-4 DUP		**WG3525495-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	28-APR-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	28-APR-21
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	28-APR-21
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	28-APR-21
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	28-APR-21
WG3525495-1 LCS								
Benzene			98.9		%		70-130	28-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R5442596								
WG3525495-1 LCS								
Ethylbenzene			89.3		%		70-130	28-APR-21
m+p-Xylenes			92.6		%		70-130	28-APR-21
o-Xylene			90.5		%		70-130	28-APR-21
Toluene			87.1		%		70-130	28-APR-21
WG3525495-2 MB								
Benzene			<0.50		ug/L		0.5	28-APR-21
Ethylbenzene			<0.50		ug/L		0.5	28-APR-21
m+p-Xylenes			<0.40		ug/L		0.4	28-APR-21
o-Xylene			<0.30		ug/L		0.3	28-APR-21
Toluene			<0.50		ug/L		0.5	28-APR-21
Surrogate: 1,4-Difluorobenzene			100.2		%		70-130	28-APR-21
Surrogate: 4-Bromofluorobenzene			100.8		%		70-130	28-APR-21
WG3525495-5 MS		**WG3525495-3**						
Benzene			98.6		%		50-140	28-APR-21
Ethylbenzene			87.1		%		50-140	28-APR-21
m+p-Xylenes			90.3		%		50-140	28-APR-21
o-Xylene			88.5		%		50-140	28-APR-21
Toluene			84.7		%		50-140	28-APR-21
Batch R5443076								
WG3526021-4 DUP		**WG3526021-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-APR-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	29-APR-21
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	29-APR-21
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	29-APR-21
Toluene		0.54	0.54		ug/L	0.0	30	29-APR-21
WG3526021-1 LCS								
Benzene			103.2		%		70-130	29-APR-21
Ethylbenzene			90.7		%		70-130	29-APR-21
m+p-Xylenes			89.7		%		70-130	29-APR-21
o-Xylene			89.0		%		70-130	29-APR-21
Toluene			97.3		%		70-130	29-APR-21
WG3526021-2 MB								
Benzene			<0.50		ug/L		0.5	29-APR-21
Ethylbenzene			<0.50		ug/L		0.5	29-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R5443076								
WG3526021-2 MB								
m+p-Xylenes			<0.40		ug/L		0.4	29-APR-21
o-Xylene			<0.30		ug/L		0.3	29-APR-21
Toluene			<0.50		ug/L		0.5	29-APR-21
Surrogate: 1,4-Difluorobenzene			98.5		%		70-130	29-APR-21
Surrogate: 4-Bromofluorobenzene			96.6		%		70-130	29-APR-21
WG3526021-5 MS		**WG3526021-3**						
Benzene			104.6		%		50-140	29-APR-21
Ethylbenzene			93.7		%		50-140	29-APR-21
m+p-Xylenes			93.4		%		50-140	29-APR-21
o-Xylene			93.1		%		50-140	29-APR-21
Toluene			99.95		%		50-140	29-APR-21
CL-IC-N-WT	Water							
Batch R5441976								
WG3524393-19 DUP		**WG3524393-18**						
Chloride (Cl)		9.57	9.59		mg/L	0.1	20	26-APR-21
WG3524393-17 LCS								
Chloride (Cl)			101.0		%		90-110	26-APR-21
WG3524393-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-APR-21
WG3524393-20 MS		**WG3524393-18**						
Chloride (Cl)			101.2		%		75-125	26-APR-21
Batch R5442659								
WG3525158-10 DUP		**WG3525158-8**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	27-APR-21
WG3525158-7 LCS								
Chloride (Cl)			101.3		%		90-110	27-APR-21
WG3525158-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	27-APR-21
WG3525158-9 MS		**WG3525158-8**						
Chloride (Cl)			101.3		%		75-125	27-APR-21
COLOUR-APPARENT-WT	Water							
Batch R5440632								
WG3523436-3 DUP		**L2579629-1**						
Colour, Apparent		<2.0	<2.0	RPD-NA	CU	N/A	20	23-APR-21
WG3523436-2 LCS								
Colour, Apparent			102.7		%		85-115	23-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-APPARENT-WT	Water							
Batch R5440632								
WG3523436-1 MB								
Colour, Apparent			<2.0		CU		2	23-APR-21
EC-WT	Water							
Batch R5441402								
WG3523633-4 DUP		**WG3523633-3**						
Conductivity		2060	2080		umhos/cm	1.0	10	24-APR-21
WG3523633-2 LCS								
Conductivity			102.6		%		90-110	24-APR-21
WG3523633-1 MB								
Conductivity			<3.0		umhos/cm		3	24-APR-21
Batch R5441406								
WG3523635-4 DUP		**WG3523635-3**						
Conductivity		1550	1550		umhos/cm	0.1	10	24-APR-21
WG3523635-2 LCS								
Conductivity			100.6		%		90-110	24-APR-21
WG3523635-1 MB								
Conductivity			<3.0		umhos/cm		3	24-APR-21
Batch R5441615								
WG3524080-4 DUP		**WG3524080-3**						
Conductivity		970	980		umhos/cm	1.0	10	26-APR-21
WG3524080-2 LCS								
Conductivity			101.4		%		90-110	26-APR-21
Batch R5441631								
WG3524283-6 DUP		**WG3524283-5**						
Conductivity		873	870		umhos/cm	0.3	10	26-APR-21
WG3524283-2 LCS								
Conductivity			99.3		%		90-110	26-APR-21
WG3524283-1 MB								
Conductivity			<3.0		umhos/cm		3	26-APR-21
F-IC-N-WT	Water							
Batch R5441976								
WG3524393-19 DUP		**WG3524393-18**						
Fluoride (F)		0.077	0.077		mg/L	0.8	20	26-APR-21
WG3524393-17 LCS								
Fluoride (F)			102.0		%		90-110	26-APR-21
WG3524393-16 MB								
							0.02	

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	Water							
Batch R5441976								
WG3524393-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-APR-21
WG3524393-20 MS		**WG3524393-18**						
Fluoride (F)			99.4		%		75-125	26-APR-21
Batch R5442659								
WG3525158-10 DUP		**WG3525158-8**						
Fluoride (F)		1.08	1.08		mg/L	0.0	20	27-APR-21
WG3525158-7 LCS								
Fluoride (F)			101.8		%		90-110	27-APR-21
WG3525158-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	27-APR-21
WG3525158-9 MS		**WG3525158-8**						
Fluoride (F)			N/A	MS-B	%		-	27-APR-21
F1-HS-511-WT	Water							
Batch R5442596								
WG3525495-4 DUP		**WG3525495-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	28-APR-21
WG3525495-1 LCS								
F1 (C6-C10)			89.0		%		80-120	28-APR-21
WG3525495-2 MB								
F1 (C6-C10)			<25		ug/L		25	28-APR-21
Surrogate: 3,4-Dichlorotoluene			106.7		%		60-140	28-APR-21
WG3525495-5 MS		**WG3525495-3**						
F1 (C6-C10)			88.6		%		60-140	28-APR-21
Batch R5443076								
WG3526021-4 DUP		**WG3526021-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	29-APR-21
WG3526021-1 LCS								
F1 (C6-C10)			91.4		%		80-120	29-APR-21
WG3526021-2 MB								
F1 (C6-C10)			<25		ug/L		25	29-APR-21
Surrogate: 3,4-Dichlorotoluene			112.9		%		60-140	29-APR-21
WG3526021-5 MS		**WG3526021-3**						
F1 (C6-C10)			80.1		%		60-140	29-APR-21
F2-F4-511-WT	Water							

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	Water							
Batch	**R5441667**							
WG3524185-2	**LCS**							
F2 (C10-C16)			100.1		%		70-130	27-APR-21
F3 (C16-C34)			100.9		%		70-130	27-APR-21
F4 (C34-C50)			104.3		%		70-130	27-APR-21
WG3524185-1	**MB**							
F2 (C10-C16)			<100		ug/L		100	27-APR-21
F3 (C16-C34)			<250		ug/L		250	27-APR-21
F4 (C34-C50)			<250		ug/L		250	27-APR-21
Surrogate: 2-Bromobenzotrifluoride			91.5		%		60-140	27-APR-21
Batch	**R5441677**							
WG3523856-2	**LCS**							
F2 (C10-C16)			98.6		%		70-130	27-APR-21
F3 (C16-C34)			100.1		%		70-130	27-APR-21
F4 (C34-C50)			103.9		%		70-130	27-APR-21
WG3523856-1	**MB**							
F2 (C10-C16)			<100		ug/L		100	27-APR-21
F3 (C16-C34)			<250		ug/L		250	27-APR-21
F4 (C34-C50)			<250		ug/L		250	27-APR-21
Surrogate: 2-Bromobenzotrifluoride			88.6		%		60-140	27-APR-21
MET-D-CCMS-WT	Water							
Batch	**R5441577**							
WG3524311-4	**DUP**	**WG3524311-3**						
Aluminum (Al)-Dissolved		0.0089	0.0087		mg/L	2.7	20	26-APR-21
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-APR-21
Arsenic (As)-Dissolved		0.00011	0.00011		mg/L	5.2	20	26-APR-21
Barium (Ba)-Dissolved		0.136	0.135		mg/L	0.9	20	26-APR-21
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-APR-21
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	26-APR-21
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-APR-21
Cadmium (Cd)-Dissolved		0.0000096	0.0000089		mg/L	7.6	20	26-APR-21
Calcium (Ca)-Dissolved		98.4	98.8		mg/L	0.4	20	26-APR-21
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-APR-21
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-APR-21
Copper (Cu)-Dissolved		0.00071	0.00071		mg/L	0.6	20	26-APR-21
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5441577								
WG3524311-4 DUP		**WG3524311-3**						
Lead (Pb)-Dissolved		0.000093	0.000092		mg/L	0.4	20	26-APR-21
Magnesium (Mg)-Dissolved		34.7	34.3		mg/L	1.0	20	26-APR-21
Manganese (Mn)-Dissolved		0.00139	0.00148		mg/L	6.3	20	26-APR-21
Molybdenum (Mo)-Dissolved		0.000220	0.000222		mg/L	0.6	20	26-APR-21
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-APR-21
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	26-APR-21
Potassium (K)-Dissolved		1.26	1.28		mg/L	1.0	20	26-APR-21
Selenium (Se)-Dissolved		0.000228	0.000226		mg/L	1.2	20	26-APR-21
Silicon (Si)-Dissolved		5.57	5.58		mg/L	0.2	20	26-APR-21
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	26-APR-21
Sodium (Na)-Dissolved		37.1	36.7		mg/L	1.2	20	26-APR-21
Strontium (Sr)-Dissolved		0.135	0.134		mg/L	1.0	20	26-APR-21
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	26-APR-21
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-APR-21
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	26-APR-21
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-APR-21
Uranium (U)-Dissolved		0.000403	0.000410		mg/L	1.8	20	26-APR-21
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-APR-21
Zinc (Zn)-Dissolved		0.0046	0.0046		mg/L	1.4	20	26-APR-21
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	26-APR-21
WG3524311-2 LCS								
Aluminum (Al)-Dissolved			99.4		%		80-120	26-APR-21
Antimony (Sb)-Dissolved			100.0		%		80-120	26-APR-21
Arsenic (As)-Dissolved			95.8		%		80-120	26-APR-21
Barium (Ba)-Dissolved			98.7		%		80-120	26-APR-21
Beryllium (Be)-Dissolved			101.2		%		80-120	26-APR-21
Bismuth (Bi)-Dissolved			92.6		%		80-120	26-APR-21
Boron (B)-Dissolved			94.9		%		80-120	26-APR-21
Cadmium (Cd)-Dissolved			95.0		%		80-120	26-APR-21
Calcium (Ca)-Dissolved			100.9		%		80-120	26-APR-21
Chromium (Cr)-Dissolved			92.0		%		80-120	26-APR-21
Cobalt (Co)-Dissolved			92.3		%		80-120	26-APR-21
Copper (Cu)-Dissolved			90.9		%		80-120	26-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5441577								
WG3524311-2 LCS								
Iron (Fe)-Dissolved			91.3		%		80-120	26-APR-21
Lead (Pb)-Dissolved			94.2		%		80-120	26-APR-21
Magnesium (Mg)-Dissolved			97.3		%		80-120	26-APR-21
Manganese (Mn)-Dissolved			94.0		%		80-120	26-APR-21
Molybdenum (Mo)-Dissolved			101.3		%		80-120	26-APR-21
Nickel (Ni)-Dissolved			90.7		%		80-120	26-APR-21
Phosphorus (P)-Dissolved			94.7		%		80-120	26-APR-21
Potassium (K)-Dissolved			97.8		%		80-120	26-APR-21
Selenium (Se)-Dissolved			95.4		%		80-120	26-APR-21
Silicon (Si)-Dissolved			98.5		%		60-140	26-APR-21
Silver (Ag)-Dissolved			102.4		%		80-120	26-APR-21
Sodium (Na)-Dissolved			95.9		%		80-120	26-APR-21
Strontium (Sr)-Dissolved			106.9		%		80-120	26-APR-21
Thallium (Tl)-Dissolved			95.4		%		80-120	26-APR-21
Tin (Sn)-Dissolved			96.3		%		80-120	26-APR-21
Titanium (Ti)-Dissolved			90.2		%		80-120	26-APR-21
Tungsten (W)-Dissolved			94.9		%		80-120	26-APR-21
Uranium (U)-Dissolved			95.2		%		80-120	26-APR-21
Vanadium (V)-Dissolved			95.5		%		80-120	26-APR-21
Zinc (Zn)-Dissolved			100.2		%		80-120	26-APR-21
Zirconium (Zr)-Dissolved			100.1		%		80-120	26-APR-21
WG3524311-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	26-APR-21
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	26-APR-21
Boron (B)-Dissolved			<0.010		mg/L		0.01	26-APR-21
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	26-APR-21
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	26-APR-21
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	26-APR-21
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	26-APR-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5441577								
WG3524311-1 MB								
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	26-APR-21
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	26-APR-21
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	26-APR-21
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	26-APR-21
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	26-APR-21
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	26-APR-21
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	26-APR-21
Potassium (K)-Dissolved			<0.050		mg/L		0.05	26-APR-21
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	26-APR-21
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	26-APR-21
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	26-APR-21
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	26-APR-21
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	26-APR-21
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	26-APR-21
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	26-APR-21
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	26-APR-21
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	26-APR-21
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	26-APR-21
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	26-APR-21
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	26-APR-21
WG3524311-5 MS		**WG3524311-6**						
Aluminum (Al)-Dissolved			91.6		%		70-130	26-APR-21
Antimony (Sb)-Dissolved			101.8		%		70-130	26-APR-21
Arsenic (As)-Dissolved			100.9		%		70-130	26-APR-21
Barium (Ba)-Dissolved			N/A	MS-B	%		-	26-APR-21
Beryllium (Be)-Dissolved			98.9		%		70-130	26-APR-21
Bismuth (Bi)-Dissolved			82.4		%		70-130	26-APR-21
Boron (B)-Dissolved			91.4		%		70-130	26-APR-21
Cadmium (Cd)-Dissolved			94.9		%		70-130	26-APR-21
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	26-APR-21
Chromium (Cr)-Dissolved			91.8		%		70-130	26-APR-21
Cobalt (Co)-Dissolved			91.4		%		70-130	26-APR-21
Copper (Cu)-Dissolved			95.7		%		70-130	27-APR-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5441577								
WG3524311-5 MS		**WG3524311-6**						
Iron (Fe)-Dissolved			N/A	MS-B	%		-	26-APR-21
Lead (Pb)-Dissolved			86.1		%		70-130	26-APR-21
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	26-APR-21
Manganese (Mn)-Dissolved			96.0		%		70-130	26-APR-21
Molybdenum (Mo)-Dissolved			104.6		%		70-130	26-APR-21
Nickel (Ni)-Dissolved			88.6		%		70-130	26-APR-21
Phosphorus (P)-Dissolved			100.9		%		70-130	26-APR-21
Potassium (K)-Dissolved			103.5		%		70-130	26-APR-21
Selenium (Se)-Dissolved			103.3		%		70-130	26-APR-21
Silicon (Si)-Dissolved			N/A	MS-B	%		-	26-APR-21
Silver (Ag)-Dissolved			104.9		%		70-130	26-APR-21
Sodium (Na)-Dissolved			N/A	MS-B	%		-	26-APR-21
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	26-APR-21
Thallium (Tl)-Dissolved			91.8		%		70-130	26-APR-21
Tin (Sn)-Dissolved			96.0		%		70-130	26-APR-21
Titanium (Ti)-Dissolved			94.3		%		70-130	26-APR-21
Tungsten (W)-Dissolved			94.8		%		70-130	26-APR-21
Uranium (U)-Dissolved			N/A	MS-B	%		-	26-APR-21
Vanadium (V)-Dissolved			96.6		%		70-130	26-APR-21
Zinc (Zn)-Dissolved			77.7		%		70-130	26-APR-21
Zirconium (Zr)-Dissolved			104.6		%		70-130	26-APR-21
NH3-F-WT	Water							
Batch R5441175								
WG3523559-3 DUP		**L2578321-15**						
Ammonia, Total (as N)		0.013	0.014		mg/L	4.5	20	26-APR-21
WG3523559-2 LCS								
Ammonia, Total (as N)			106.6		%		85-115	26-APR-21
WG3523559-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	26-APR-21
WG3523559-4 MS		**L2578321-15**						
Ammonia, Total (as N)			108.7		%		75-125	26-APR-21
Batch R5445318								
WG3525861-3 DUP		**L2579947-3**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	01-MAY-21
WG3525861-2 LCS								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	Water							
Batch R5445318								
WG3525861-2 LCS								
Ammonia, Total (as N)			108.3		%		85-115	01-MAY-21
WG3525861-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	01-MAY-21
WG3525861-4 MS		**L2579947-3**						
Ammonia, Total (as N)			103.0		%		75-125	01-MAY-21
NO2-IC-WT	Water							
Batch R5441976								
WG3524393-19 DUP		**WG3524393-18**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-APR-21
WG3524393-17 LCS								
Nitrite (as N)			101.0		%		90-110	26-APR-21
WG3524393-16 MB								
Nitrite (as N)			<0.010		mg/L		0.01	26-APR-21
WG3524393-20 MS		**WG3524393-18**						
Nitrite (as N)			101.2		%		75-125	26-APR-21
Batch R5442659								
WG3525158-10 DUP		**WG3525158-8**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-APR-21
WG3525158-7 LCS								
Nitrite (as N)			101.1		%		90-110	27-APR-21
WG3525158-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	27-APR-21
WG3525158-9 MS		**WG3525158-8**						
Nitrite (as N)			100.7		%		75-125	27-APR-21
NO3-IC-WT	Water							
Batch R5441976								
WG3524393-19 DUP		**WG3524393-18**						
Nitrate (as N)		4.65	4.65		mg/L	0.0	20	26-APR-21
WG3524393-17 LCS								
Nitrate (as N)			100.0		%		90-110	26-APR-21
WG3524393-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	26-APR-21
WG3524393-20 MS		**WG3524393-18**						
Nitrate (as N)			N/A	MS-B	%		-	26-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	Water							
Batch R5442659								
WG3525158-10 DUP		**WG3525158-8**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	27-APR-21
WG3525158-7 LCS								
Nitrate (as N)			99.7		%		90-110	27-APR-21
WG3525158-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	27-APR-21
WG3525158-9 MS		**WG3525158-8**						
Nitrate (as N)			97.0		%		75-125	27-APR-21
PH-WT	Water							
Batch R5441402								
WG3523633-4 DUP		**WG3523633-3**						
pH		7.76	7.78	J	pH units	0.02	0.2	24-APR-21
WG3523633-2 LCS								
pH			7.02		pH units		6.9-7.1	24-APR-21
Batch R5441406								
WG3523635-4 DUP		**WG3523635-3**						
pH		8.00	7.99	J	pH units	0.01	0.2	24-APR-21
WG3523635-2 LCS								
pH			7.02		pH units		6.9-7.1	24-APR-21
Batch R5441615								
WG3524080-4 DUP		**WG3524080-3**						
pH		7.84	7.75	J	pH units	0.09	0.2	26-APR-21
WG3524080-2 LCS								
pH			7.03		pH units		6.9-7.1	26-APR-21
Batch R5441631								
WG3524283-6 DUP		**WG3524283-5**						
pH		7.67	7.68	J	pH units	0.01	0.2	26-APR-21
WG3524283-2 LCS								
pH			7.01		pH units		6.9-7.1	26-APR-21
PO4-DO-COL-WT	Water							
Batch R5441758								
WG3524485-3 DUP		**L2579525-1**						
Orthophosphate-Dissolved (as P)		0.0031	<0.0030	RPD-NA	mg/L	N/A	20	27-APR-21
WG3524485-2 LCS								
Orthophosphate-Dissolved (as P)			108.2		%		80-120	27-APR-21
WG3524485-1 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	27-APR-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-WT	Water							
Batch R5441758								
WG3524485-4 MS		**L2579525-1**						
Orthophosphate-Dissolved (as P)			109.7		%		70-130	27-APR-21
SO4-IC-N-WT	Water							
Batch R5441976								
WG3524393-19 DUP		**WG3524393-18**						
Sulfate (SO4)		32.7	32.7		mg/L	0.0	20	26-APR-21
WG3524393-17 LCS								
Sulfate (SO4)			101.8		%		90-110	26-APR-21
WG3524393-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-APR-21
WG3524393-20 MS		**WG3524393-18**						
Sulfate (SO4)			103.1		%		75-125	26-APR-21
Batch R5442659								
WG3525158-10 DUP		**WG3525158-8**						
Sulfate (SO4)		30.9	30.9		mg/L	0.0	20	27-APR-21
WG3525158-7 LCS								
Sulfate (SO4)			101.8		%		90-110	27-APR-21
WG3525158-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	27-APR-21
WG3525158-9 MS		**WG3525158-8**						
Sulfate (SO4)			102.5		%		75-125	27-APR-21
SOLIDS-TDS-WT	Water							
Batch R5441806								
WG3523939-3 DUP		**L2579639-1**						
Total Dissolved Solids		311	319		mg/L	2.5	20	26-APR-21
WG3523939-2 LCS								
Total Dissolved Solids			101.4		%		85-115	26-APR-21
WG3523939-1 MB								
Total Dissolved Solids			<10		mg/L		10	26-APR-21
TURBIDITY-WT	Water							
Batch R5440781								
WG3523453-3 DUP		**L2579815-16**						
Turbidity		293	305		NTU	4.0	15	24-APR-21
WG3523453-2 LCS								
Turbidity			97.0		%		85-115	24-APR-21
WG3523453-1 MB								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WT	Water							
Batch R5440781								
WG3523453-1 MB								
Turbidity			<0.10		NTU		0.1	24-APR-21
Batch R5440782								
WG3523454-3 DUP		**L2579824-1**						
Turbidity		139	139		NTU	0.0	15	24-APR-21
WG3523454-2 LCS								
Turbidity			97.0		%		85-115	24-APR-21
WG3523454-1 MB								
Turbidity			<0.10		NTU		0.1	24-APR-21

Quality Control Report

Workorder: L2579646 Report Date: 03-MAY-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

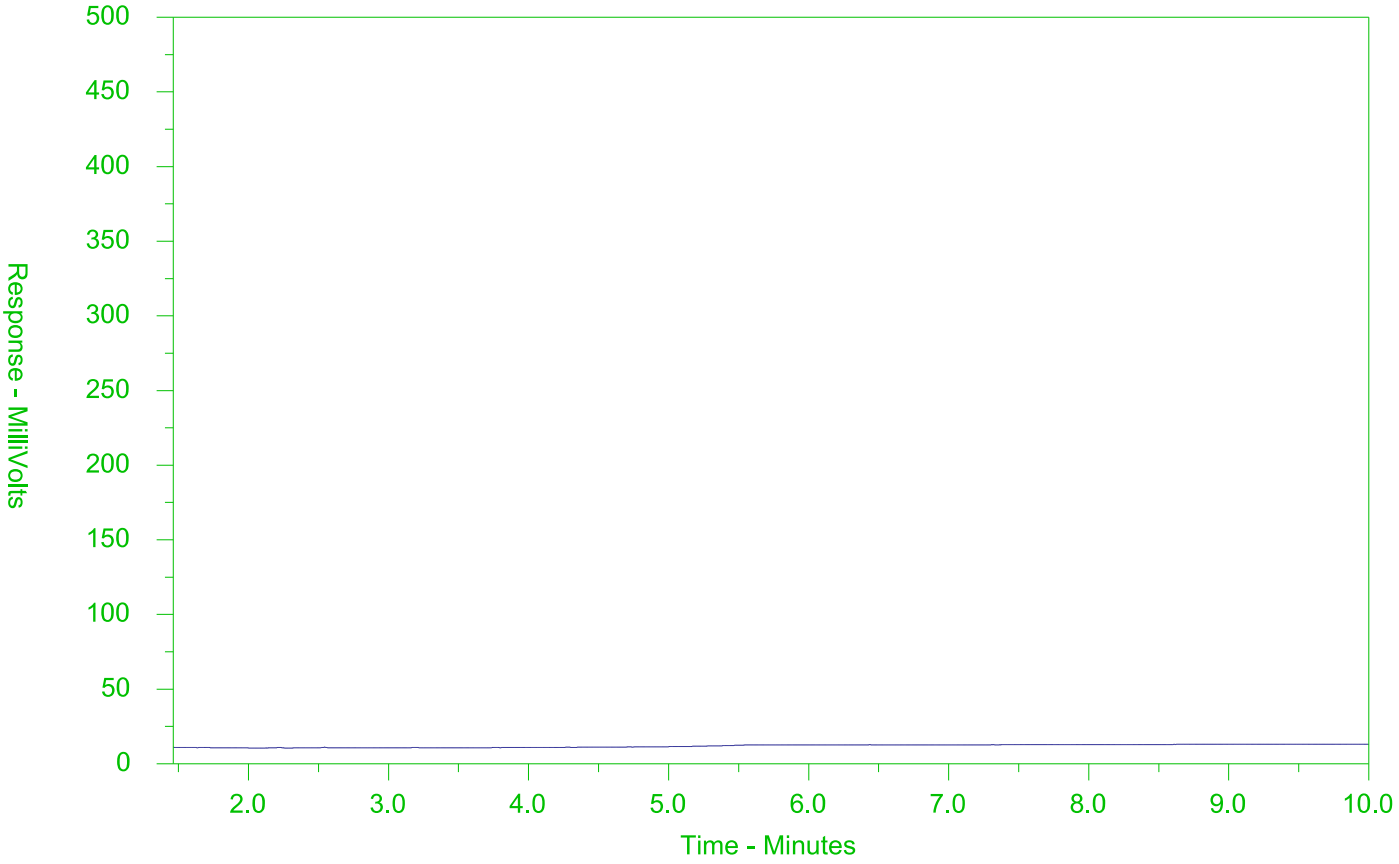
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

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

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-1
Client Sample ID: MW101-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

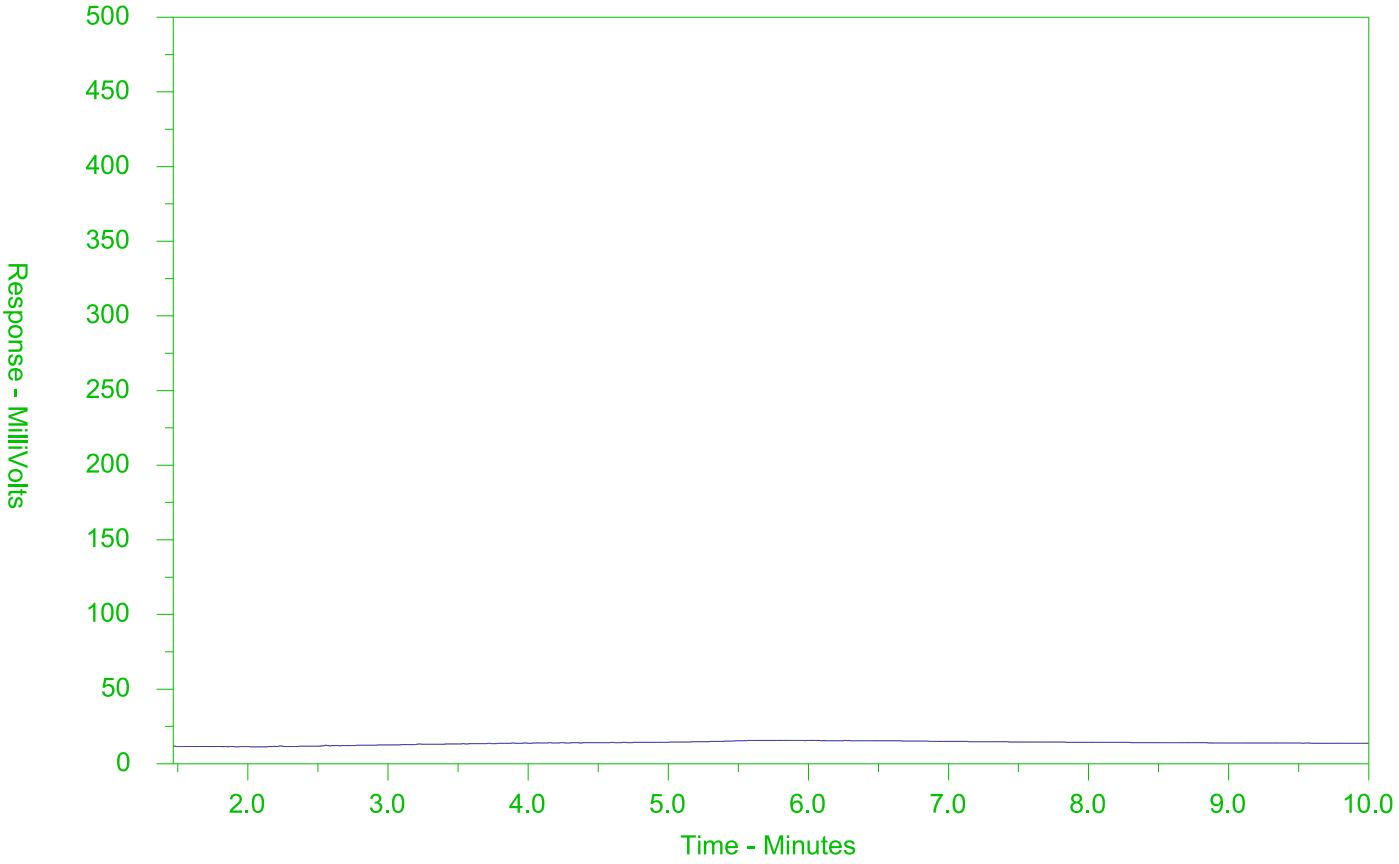
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-2
Client Sample ID: MW102-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

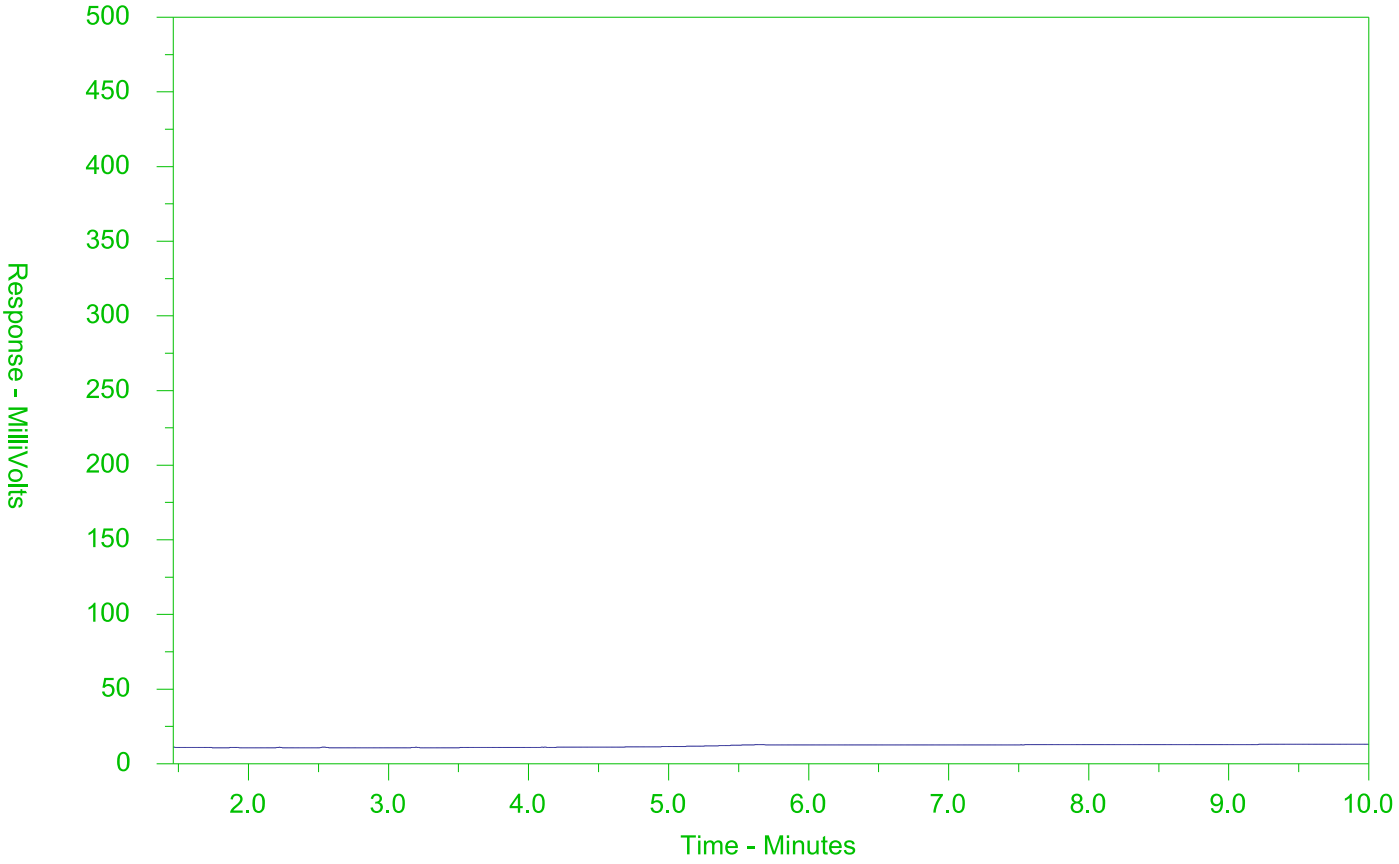
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-3
Client Sample ID: MW103-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

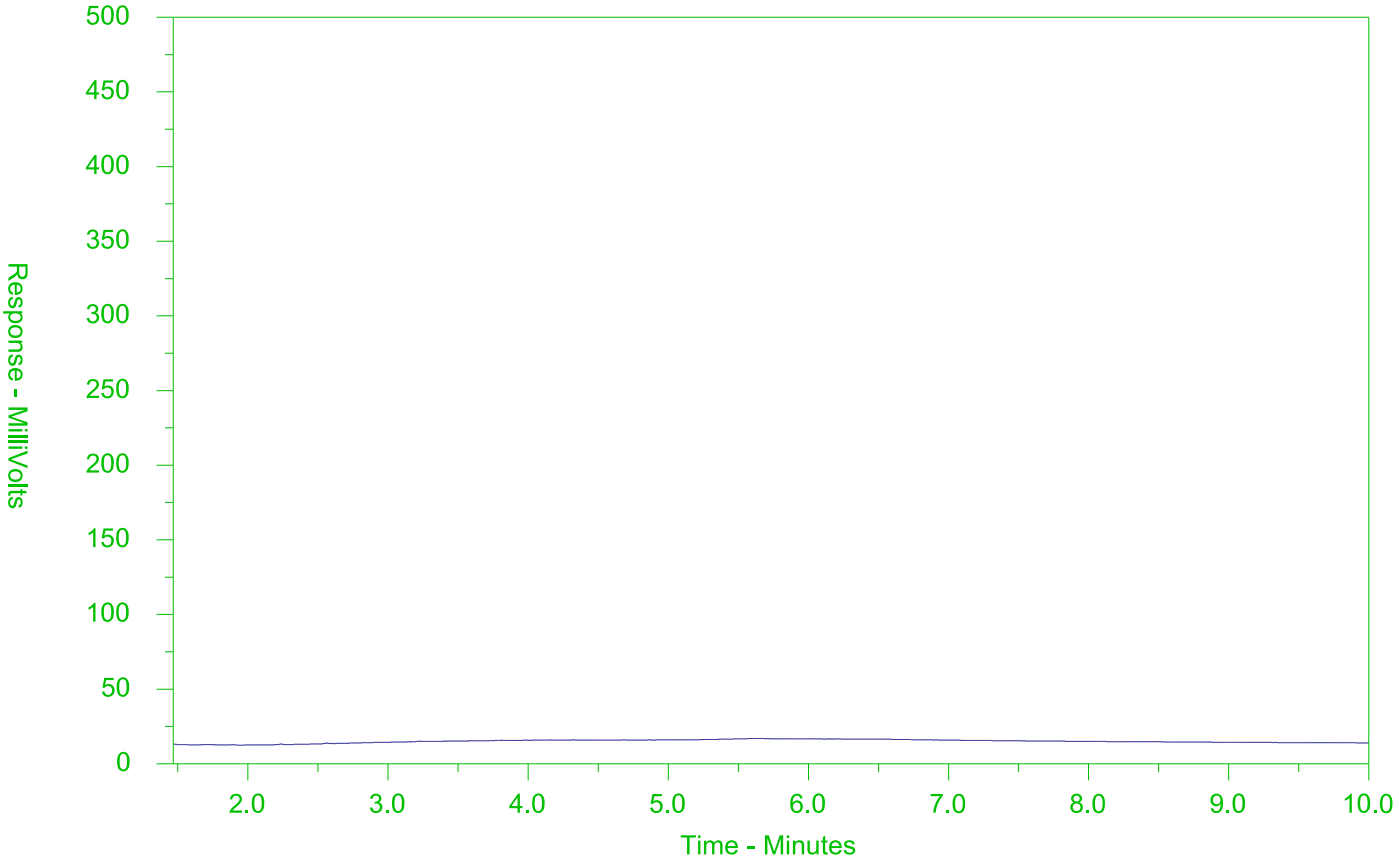
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-4
Client Sample ID: MW104-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

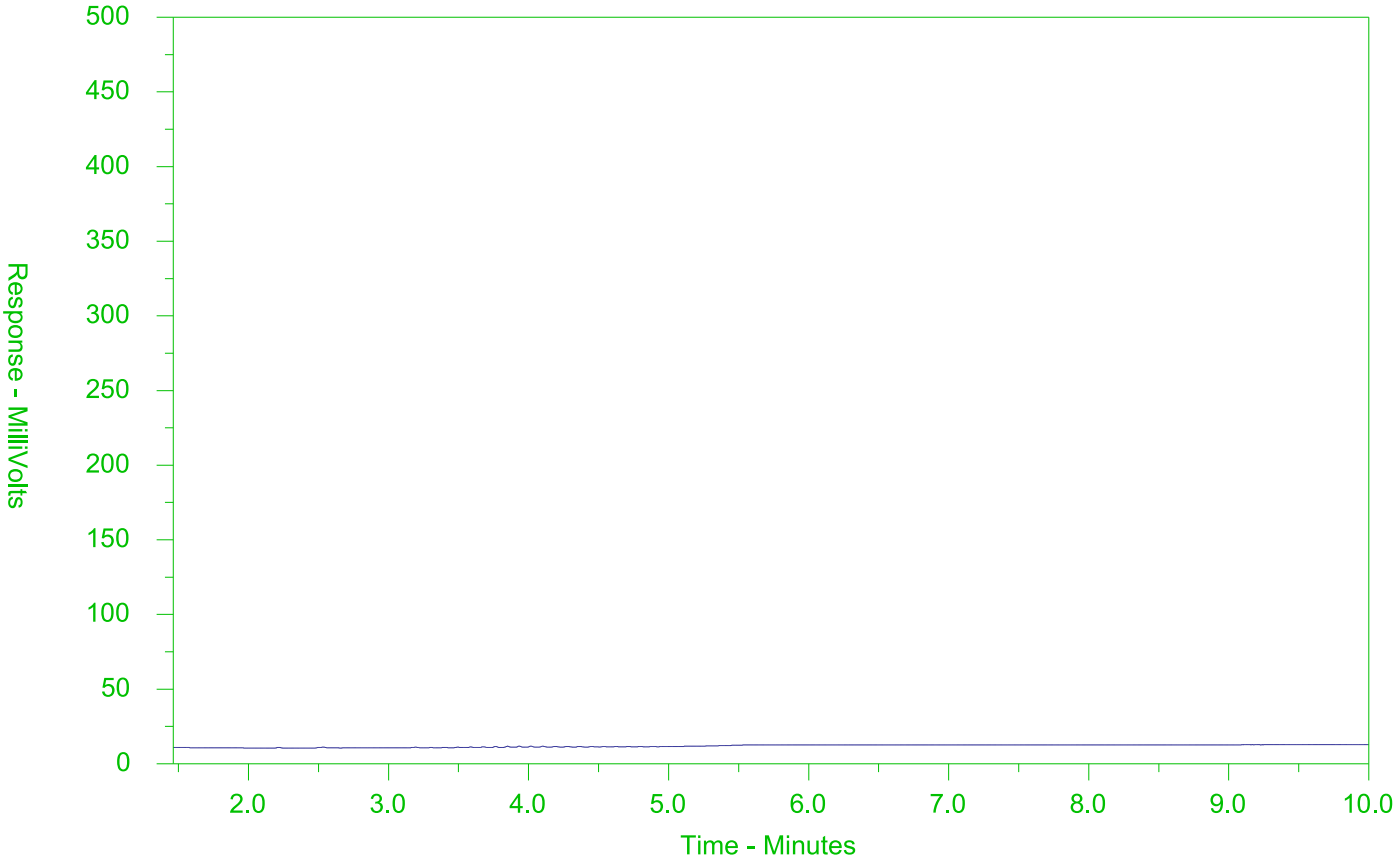
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-5
Client Sample ID: MW105-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

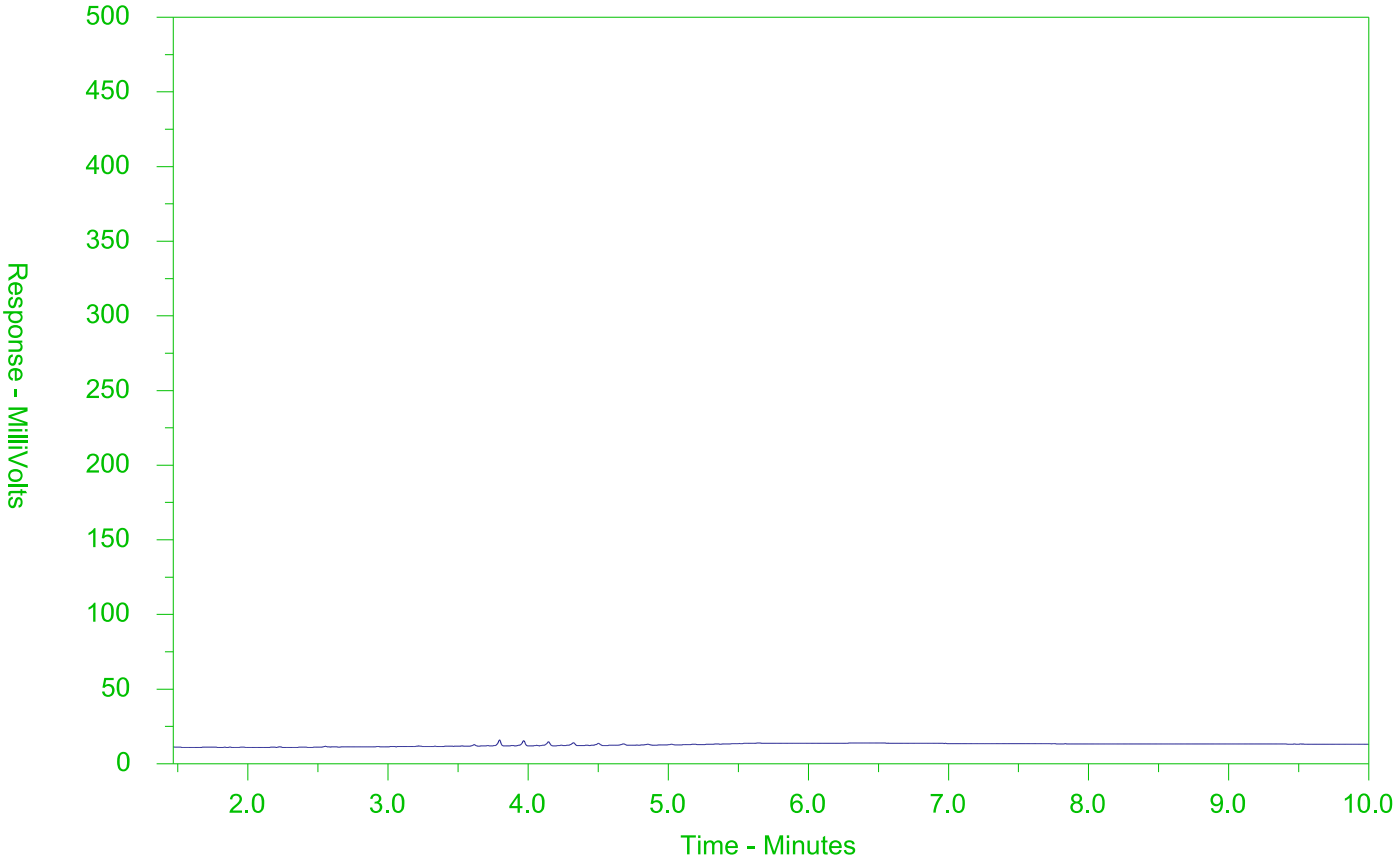
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-6
Client Sample ID: MW106-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

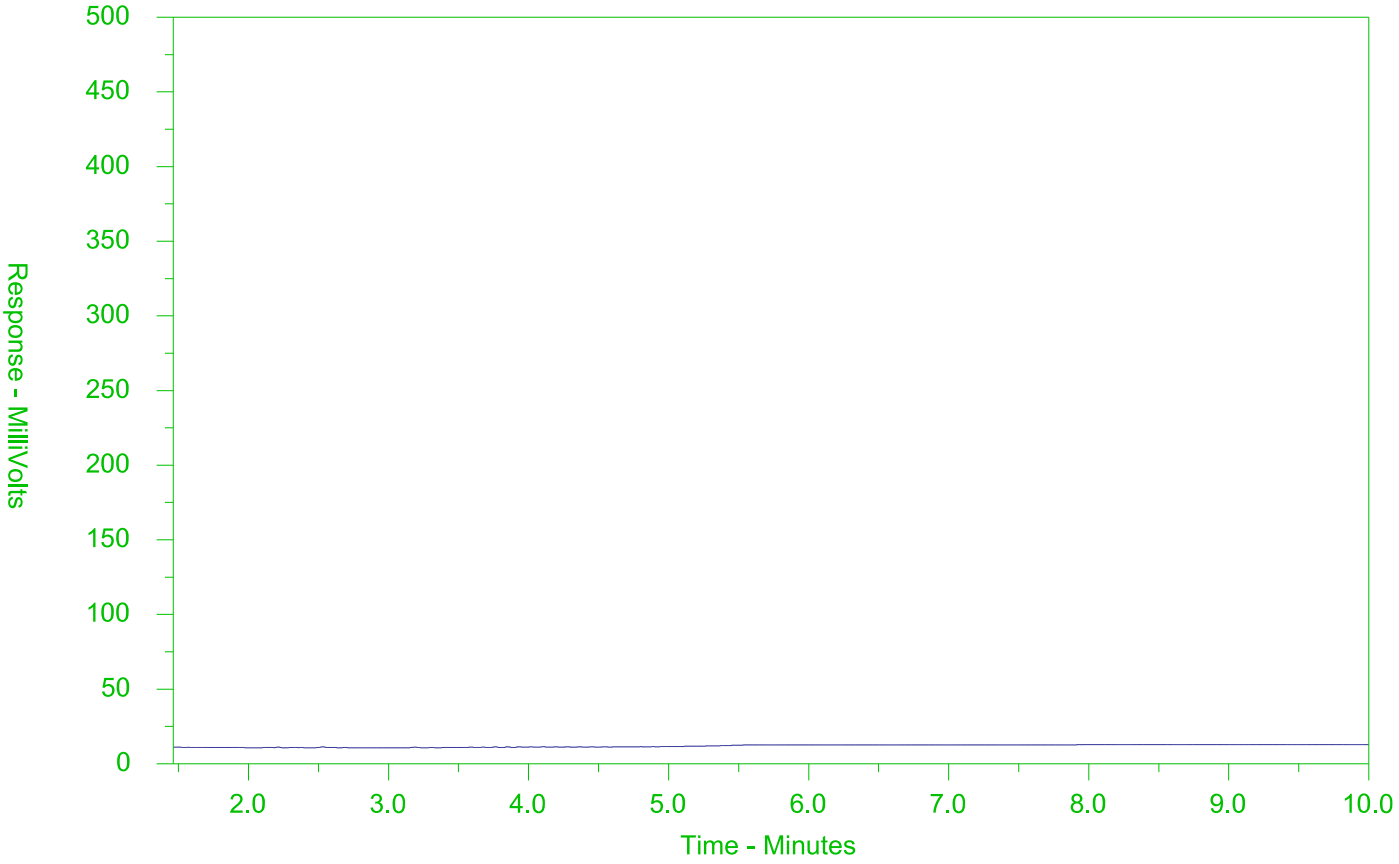
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-7
Client Sample ID: MW107-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

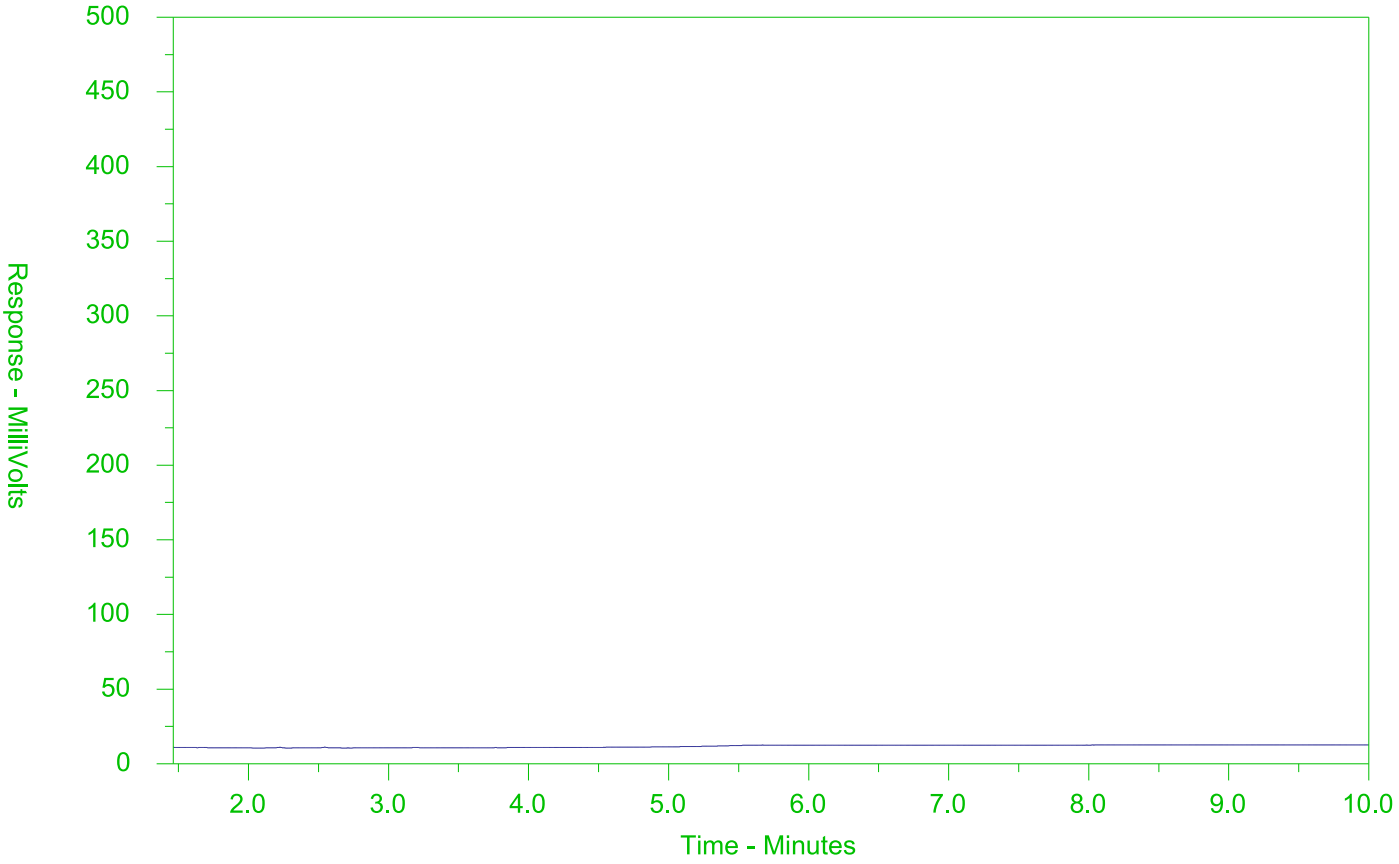
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-8
Client Sample ID: MW108-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

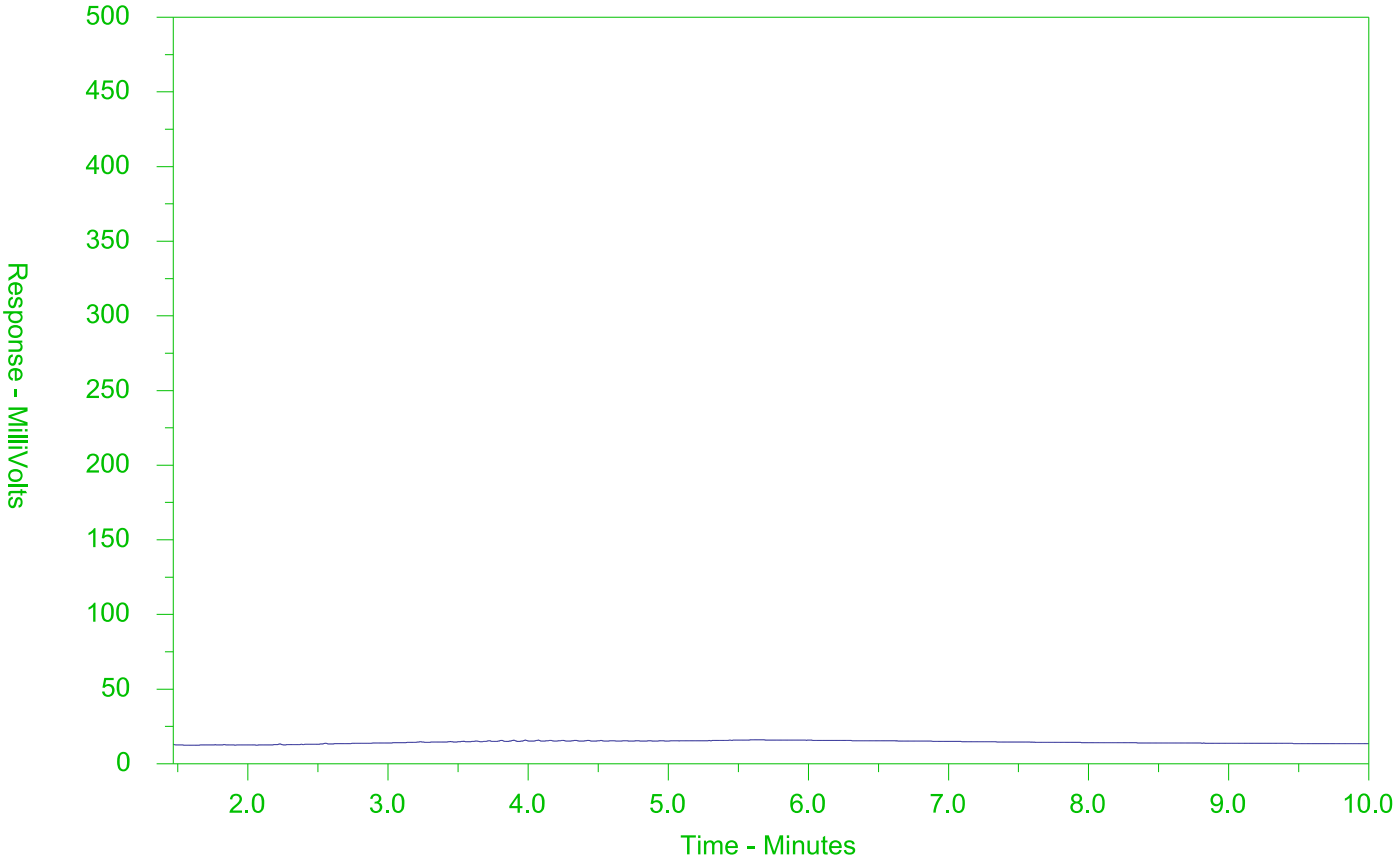
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2579646-9
Client Sample ID: MW109-20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of C

L2579646-COFC

COC Number: 20 - 894223

Page of

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	MTE Consultants Inc.
Contact:	Fraser Cummings
Phone:	519-743-6500
Company address below will appear on the final report	
Street:	520 Bingemans Centre Dr.
City/Province:	Kitchener ON
Postal Code:	N2B 3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: FCummings@mte85.com

Email 2:

Email 3:

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: FCummings@mte85.com

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:

Job #: 46639-100

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only): L2579646

ALS Contact: EH Sampler: TFC

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Gen Chem Pkg #1	BTEX	F1 - F4	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MW101-20	22-Apr-21	14:36	GW	7	✓	✓	✓			
	MW102-20		13:42		7	✓	✓	✓			
	MW103-20		16:26		7	✓	✓	✓			
	MW104-20		17:42		7	✓	✓	✓			
	MW105-20		10:00		7	✓	✓	✓			
	MW106-20		12:20		7	✓	✓	✓			
	MW107-20		11:00		7	✓	✓	✓			
	MW108-20		12:55		7	✓	✓	✓			
	MW109-20		15:25		7	✓	✓	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

One of the PAH Amber Bottles for MW104-20 the lid is cracked (identified prior to filling up) TFC

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			-1.3	-1.1	

SHIPMENT RELEASE (client use)

Released by: Date: 22/4/21 Time: 18:39

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 4/23/21 Time: 0800

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

MTE CONSULTANTS INC. (Kitchener)
ATTN: FRASER CUMMINGS
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9

Date Received: 16- SEP- 21
Report Date: 23- SEP- 21 15:02 (MT)
Version: FINAL

Client Phone: 519- 743- 6500

Certificate of Analysis

Lab Work Order #: L2640507
Project P.O. #: NOT SUBMITTED
Job Reference: 46639- 100
C of C Numbers:
Legal Site Desc:

Emily Hansen
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-1 MW101- 20 Sampled By: CLIENT on 16-SEP-21 @ 08:50 Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU		17-SEP-21	R5586361
Conductivity	942		1.0	umhos/cm		17-SEP-21	R5590661
Hardness (as CaCO3)	345		0.50	mg/L		20-SEP-21	
pH	7.92		0.10	pH units		17-SEP-21	R5590661
Total Dissolved Solids	492	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	1.43		0.10	NTU	17-SEP-21	17-SEP-21	R5586811
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	284		1.0	mg/L		17-SEP-21	R5590661
Ammonia, Total (as N)	0.011		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	98.8		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.068		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	6.32		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	21.3		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00012		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.129		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	0.0000073		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	87.1		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00040		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	30.9		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000228		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.31		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000232		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	5.72		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	57.5		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-1 MW101- 20 Sampled By: CLIENT on 16-SEP-21 @ 08:50 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.120		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000433		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0038		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		22-SEP-21	R5591796
Ethylbenzene	<0.50		0.50	ug/L		22-SEP-21	R5591796
Toluene	<0.50		0.50	ug/L		22-SEP-21	R5591796
o-Xylene	<0.30		0.30	ug/L		22-SEP-21	R5591796
m+p-Xylenes	<0.40		0.40	ug/L		22-SEP-21	R5591796
Xylenes (Total)	<0.50		0.50	ug/L		22-SEP-21	
Surrogate: 4-Bromofluorobenzene	97.3		70-130	%		22-SEP-21	R5591796
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		22-SEP-21	R5591796
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		22-SEP-21	R5591796
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	90.9		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	94.9		60-140	%		22-SEP-21	R5591796
L2640507-2 MW102- 20 Sampled By: CLIENT on 16-SEP-21 @ 09:47 Matrix: WATER							
Physical Tests							
Colour, Apparent	18.0		2.0	CU		17-SEP-21	R5586361
Conductivity	593		1.0	umhos/cm		17-SEP-21	R5590661
Hardness (as CaCO3)	309		0.50	mg/L		20-SEP-21	
pH	7.89		0.10	pH units		17-SEP-21	R5590661
Total Dissolved Solids	356	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	159		0.10	NTU	17-SEP-21	17-SEP-21	R5586811
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	271		1.0	mg/L		17-SEP-21	R5590661
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	8.59		0.50	mg/L		17-SEP-21	R5587323

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-2 MW102- 20 Sampled By: CLIENT on 16-SEP-21 @ 09:47 Matrix: WATER							
Anions and Nutrients							
Fluoride (F)	0.074		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	4.46		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	31.2		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	0.0107		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00015		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.220		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	0.0000062		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	74.5		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00030		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	30.0		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00131		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000434		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.17		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000264		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.32		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	2.66		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.0963		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000597		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0011		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-2 MW102- 20 Sampled By: CLIENT on 16-SEP-21 @ 09:47 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		22-SEP-21	R5591796
Ethylbenzene	<0.50	OWP	0.50	ug/L		22-SEP-21	R5591796
Toluene	<0.50	OWP	0.50	ug/L		22-SEP-21	R5591796
o-Xylene	<0.30	OWP	0.30	ug/L		22-SEP-21	R5591796
m+p-Xylenes	<0.40	OWP	0.40	ug/L		22-SEP-21	R5591796
Xylenes (Total)	<0.50		0.50	ug/L		22-SEP-21	
Surrogate: 4-Bromofluorobenzene	96.7		70-130	%		22-SEP-21	R5591796
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%		22-SEP-21	R5591796
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		22-SEP-21	R5591796
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	93.8		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	90.2		60-140	%		22-SEP-21	R5591796
L2640507-3 MW103- 20 Sampled By: CLIENT on 16-SEP-21 @ 10:35 Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU		17-SEP-21	R5586361
Conductivity	636		1.0	umhos/cm		17-SEP-21	R5592542
Hardness (as CaCO3)	332		0.50	mg/L		20-SEP-21	
pH	7.94		0.10	pH units		17-SEP-21	R5592542
Total Dissolved Solids	335	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	0.63		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	307		1.0	mg/L		17-SEP-21	R5592542
Ammonia, Total (as N)	0.029		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	8.90		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.054		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	4.89		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	9.50		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00015		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-3 MW103- 20 Sampled By: CLIENT on 16-SEP-21 @ 10:35 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	0.0773		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	77.7		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	0.00064		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00031		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	33.6		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000173		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	0.870		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000217		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.47		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	3.28		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.0857		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000399		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0023		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50		0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30		0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40		0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	99.6		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		21-SEP-21	R5590205

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-3 MW103- 20 Sampled By: CLIENT on 16-SEP-21 @ 10:35 Matrix: WATER							
Hydrocarbons							
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	94.0		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	80.6		60-140	%		21-SEP-21	R5590205
L2640507-4 MW104- 20 Sampled By: CLIENT on 16-SEP-21 @ 11:16 Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU		17-SEP-21	R5586361
Conductivity	613		1.0	umhos/cm		18-SEP-21	R5587656
Hardness (as CaCO3)	318		0.50	mg/L		20-SEP-21	
pH	8.00		0.10	pH units		18-SEP-21	R5587656
Total Dissolved Solids	352	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	2.47		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	251		1.0	mg/L		18-SEP-21	R5587656
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	16.9		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.064		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	8.80		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	11.4		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.0617		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	74.5		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00087		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-4 MW104- 20 Sampled By: CLIENT on 16-SEP-21 @ 11:16 Matrix: WATER							
Dissolved Metals							
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	32.0		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000174		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	0.909		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000343		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	4.84		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	2.85		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.0696		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000298		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0028		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50		0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30		0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40		0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	92.0		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	84.6		60-140	%		21-SEP-21	R5590205
L2640507-5 MW105- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:52 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-5 MW105- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:52 Matrix: WATER							
Physical Tests							
Colour, Apparent	3.4		2.0	CU		17-SEP-21	R5586361
Conductivity	848		1.0	umhos/cm		18-SEP-21	R5587676
Hardness (as CaCO3)	347		0.50	mg/L		20-SEP-21	
pH	7.93		0.10	pH units		18-SEP-21	R5587676
Total Dissolved Solids	520	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	41.5		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	248		1.0	mg/L		18-SEP-21	R5587676
Alkalinity, Total (as CaCO3)	286		1.0	mg/L		22-SEP-21	R5594456
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	100		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.058		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	7.75		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	0.0036		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	10.2		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00016		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.207		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	87.6		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	0.00051		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00093		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	31.2		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00068		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000321		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.48		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000241		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.88		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	44.8		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-5 MW105- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:52 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.124		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	0.000013		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000582		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0020		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50		0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30		0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40		0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	87.6		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	82.1		60-140	%		21-SEP-21	R5590205
L2640507-6 MW106- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:11 Matrix: WATER							
Physical Tests							
Colour, Apparent	27.9		2.0	CU		17-SEP-21	R5586361
Conductivity	610		1.0	umhos/cm		18-SEP-21	R5587669
Hardness (as CaCO3)	348		0.50	mg/L		20-SEP-21	
pH	7.86		0.10	pH units		18-SEP-21	R5587669
Total Dissolved Solids	343	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	571		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	339		1.0	mg/L		18-SEP-21	R5587669
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	4.27		0.50	mg/L		17-SEP-21	R5587323

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-6 MW106- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:11 Matrix: WATER							
Anions and Nutrients							
Fluoride (F)	0.058		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	4.54		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	11.7		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	0.0103		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00012		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.106		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	83.0		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00026		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	0.014		0.010	mg/L	17-SEP-21	20-SEP-21	R5587486
Lead (Pb)-Dissolved	0.000059		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	34.2		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00122		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000232		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	0.869		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000213		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.58		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	1.93		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.0916		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	0.00044		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000532		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0018		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-6 MW106- 20 Sampled By: CLIENT on 16-SEP-21 @ 13:11 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30	OWP	0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40	OWP	0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	88.1		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	69.6		60-140	%		21-SEP-21	R5590205
L2640507-7 MW107- 20 Sampled By: CLIENT on 16-SEP-21 @ 14:31 Matrix: WATER							
Physical Tests							
Colour, Apparent	3.2		2.0	CU		17-SEP-21	R5586361
Conductivity	1150		1.0	umhos/cm		18-SEP-21	R5587676
Hardness (as CaCO3)	377		0.50	mg/L		20-SEP-21	
pH	7.89		0.10	pH units		18-SEP-21	R5587676
Total Dissolved Solids	659	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	16.3		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	268		1.0	mg/L		22-SEP-21	R5594456
Alkalinity, Total (as CaCO3)	271		1.0	mg/L		18-SEP-21	R5587676
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	182	DLDS	2.5	mg/L		17-SEP-21	R5587323
Fluoride (F)	<0.10	DLDS	0.10	mg/L		17-SEP-21	R5587323
Nitrate (as N)	7.82	DLDS	0.10	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.050	DLDS	0.050	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	15.4	DLDS	1.5	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-7 MW107- 20 Sampled By: CLIENT on 16-SEP-21 @ 14:31 Matrix: WATER							
Dissolved Metals							
Arsenic (As)-Dissolved	0.00014		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.214		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	99.6		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00153		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	31.1		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00159		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000268		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.70		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000248		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.75		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	85.5		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.160		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000528		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0012		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50		0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50		0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30		0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40		0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	99.3		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		21-SEP-21	R5590205
Hydrocarbons							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-7 MW107- 20 Sampled By: CLIENT on 16-SEP-21 @ 14:31 Matrix: WATER							
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	79.2		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	84.2		60-140	%		21-SEP-21	R5590205
L2640507-8 MW108- 20 Sampled By: CLIENT on 16-SEP-21 @ 12:37 Matrix: WATER							
Physical Tests							
Colour, Apparent	20.4		2.0	CU		17-SEP-21	R5586361
Conductivity	568		1.0	umhos/cm		18-SEP-21	R5587669
Hardness (as CaCO3)	327		0.50	mg/L		20-SEP-21	
pH	7.91		0.10	pH units		18-SEP-21	R5587669
Total Dissolved Solids	329	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	550		0.10	NTU	17-SEP-21	17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	290		1.0	mg/L		18-SEP-21	R5587669
Ammonia, Total (as N)	<0.010		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	7.42		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.065		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	5.17		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	9.58		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	0.0190		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00015		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.0842		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	80.0		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00028		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-8 MW108- 20 Sampled By: CLIENT on 16-SEP-21 @ 12:37 Matrix: WATER							
Dissolved Metals							
Iron (Fe)-Dissolved	0.017		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	0.000094		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	30.9		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00245		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000271		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.14		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000181		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	6.39		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	1.81		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Strontium (Sr)-Dissolved	0.0962		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00040	DLUI	0.00040	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000474		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0018		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30	OWP	0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40	OWP	0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	98.8		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	91.0		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	80.7		60-140	%		21-SEP-21	R5590205
L2640507-9 MW109- 20 CLIENT on 16-SEP-21 @ 11:57							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-9 MW109- 20 Sampled By: CLIENT on 16-SEP-21 @ 11:57 Matrix: WATER							
Physical Tests							
Colour, Apparent	37.5		2.0	CU		17-SEP-21	R5586361
Conductivity	593		1.0	umhos/cm		18-SEP-21	R5587669
Hardness (as CaCO3)	307		0.50	mg/L		20-SEP-21	
pH	7.95		0.10	pH units		18-SEP-21	R5587669
Total Dissolved Solids	318	DLDS	20	mg/L		19-SEP-21	R5588157
Turbidity	>4000	TMV	0.10	NTU		17-SEP-21	R5590697
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	271		1.0	mg/L		18-SEP-21	R5587669
Ammonia, Total (as N)	0.018		0.010	mg/L		20-SEP-21	R5587942
Chloride (Cl)	12.7		0.50	mg/L		17-SEP-21	R5587323
Fluoride (F)	0.054		0.020	mg/L		17-SEP-21	R5587323
Nitrate (as N)	3.76		0.020	mg/L		17-SEP-21	R5587323
Nitrite (as N)	<0.010		0.010	mg/L		17-SEP-21	R5587323
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		20-SEP-21	R5588140
Sulfate (SO4)	28.7		0.30	mg/L		17-SEP-21	R5587323
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					17-SEP-21	R5585895
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Arsenic (As)-Dissolved	0.00012		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Barium (Ba)-Dissolved	0.0880		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Boron (B)-Dissolved	<0.010		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Calcium (Ca)-Dissolved	75.4		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Copper (Cu)-Dissolved	0.00071		0.00020	mg/L	17-SEP-21	17-SEP-21	R5587486
Iron (Fe)-Dissolved	0.014		0.010	mg/L	17-SEP-21	17-SEP-21	R5587486
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Magnesium (Mg)-Dissolved	28.8		0.0050	mg/L	17-SEP-21	17-SEP-21	R5587486
Manganese (Mn)-Dissolved	0.00056		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Molybdenum (Mo)-Dissolved	0.000223		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Potassium (K)-Dissolved	1.04		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Selenium (Se)-Dissolved	0.000244		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silicon (Si)-Dissolved	5.73		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	17-SEP-21	17-SEP-21	R5587486
Sodium (Na)-Dissolved	5.81		0.050	mg/L	17-SEP-21	17-SEP-21	R5587486

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2640507-9 MW109- 20 Sampled By: CLIENT on 16-SEP-21 @ 11:57 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.0922		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	17-SEP-21	17-SEP-21	R5587486
Uranium (U)-Dissolved	0.000423		0.000010	mg/L	17-SEP-21	17-SEP-21	R5587486
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	17-SEP-21	17-SEP-21	R5587486
Zinc (Zn)-Dissolved	0.0016		0.0010	mg/L	17-SEP-21	17-SEP-21	R5587486
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	17-SEP-21	17-SEP-21	R5587486
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Ethylbenzene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
Toluene	<0.50	OWP	0.50	ug/L		21-SEP-21	R5590205
o-Xylene	<0.30	OWP	0.30	ug/L		21-SEP-21	R5590205
m+p-Xylenes	<0.40	OWP	0.40	ug/L		21-SEP-21	R5590205
Xylenes (Total)	<0.50		0.50	ug/L		21-SEP-21	
Surrogate: 4-Bromofluorobenzene	99.2		70-130	%		21-SEP-21	R5590205
Surrogate: 1,4-Difluorobenzene	99.6		70-130	%		21-SEP-21	R5590205
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L		21-SEP-21	R5590205
F1-BTEX	<25		25	ug/L		23-SEP-21	
F2 (C10-C16)	<100		100	ug/L	21-SEP-21	23-SEP-21	R5595460
F3 (C16-C34)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
F4 (C34-C50)	<250		250	ug/L	21-SEP-21	23-SEP-21	R5595460
Total Hydrocarbons (C6-C50)	<370		370	ug/L		23-SEP-21	
Chrom. to baseline at nC50	YES				21-SEP-21	23-SEP-21	R5595460
Surrogate: 2-Bromobenzotrifluoride	92.4		60-140	%	21-SEP-21	23-SEP-21	R5595460
Surrogate: 3,4-Dichlorotoluene	76.7		60-140	%		21-SEP-21	R5590205

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Ethylbenzene	MS-B	L2640507-3, -4, -5, -6, -7, -8, -9
Matrix Spike	m+p-Xylenes	MS-B	L2640507-3, -4, -5, -6, -7, -8, -9
Matrix Spike	Chloride (Cl)	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nitrate (as N)	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L2640507-1, -2, -3, -4, -5, -6, -7, -8, -9

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLUI	Detection Limit Raised: Unknown Interference generated an apparent false positive test result.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
TMV	Turbidity exceeded upper limit of the nephelometric method. Minimum value reported.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	APHA 2320B

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint.

BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

COLOUR-APPARENT-WT	Water	Colour	APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

Reference Information

In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the ìReference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil ñTier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

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

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

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

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

NO2-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PO4-DO-COL-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Reference Information

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

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

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

Quality Control Report

Workorder: L2640507 Report Date: 23-SEP-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	Water							
Batch R5587656								
WG3620176-4 DUP		**WG3620176-3**						
Alkalinity, Total (as CaCO3)		111	91.7		mg/L	19	20	18-SEP-21
WG3620176-2 LCS								
Alkalinity, Total (as CaCO3)			111.6		%		85-115	18-SEP-21
WG3620176-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	18-SEP-21
Batch R5587669								
WG3620177-4 DUP		**WG3620177-3**						
Alkalinity, Total (as CaCO3)		330	317		mg/L	3.8	20	18-SEP-21
WG3620177-2 LCS								
Alkalinity, Total (as CaCO3)			107.5		%		85-115	18-SEP-21
WG3620177-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	18-SEP-21
Batch R5587676								
WG3620180-4 DUP		**WG3620180-3**						
Alkalinity, Total (as CaCO3)		410	407		mg/L	0.8	20	18-SEP-21
WG3620180-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	18-SEP-21
Batch R5590661								
WG3620028-4 DUP		**WG3620028-3**						
Alkalinity, Total (as CaCO3)		260	257		mg/L	1.2	20	17-SEP-21
WG3620028-2 LCS								
Alkalinity, Total (as CaCO3)			108.2		%		85-115	17-SEP-21
WG3620028-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	17-SEP-21
Batch R5592542								
WG3620029-4 DUP		**WG3620029-3**						
Alkalinity, Total (as CaCO3)		191	175		mg/L	8.8	20	17-SEP-21
WG3620029-2 LCS								
Alkalinity, Total (as CaCO3)			109.0		%		85-115	17-SEP-21
WG3620029-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	17-SEP-21
Batch R5594456								
WG3621836-4 DUP		**WG3621836-3**						
Alkalinity, Total (as CaCO3)		372	371		mg/L	0.2	20	22-SEP-21
WG3621836-2 LCS								
Alkalinity, Total (as CaCO3)			114.5		%		85-115	22-SEP-21
WG3621836-1 MB								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	Water							
Batch R5594456								
WG3621836-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	22-SEP-21
BTX-511-HS-WT	Water							
Batch R5590205								
WG3620476-4 DUP		**WG3620476-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	21-SEP-21
Ethylbenzene		172	226		ug/L	27	30	21-SEP-21
m+p-Xylenes		500	671		ug/L	29	30	21-SEP-21
o-Xylene		9.20	12.1		ug/L	27	30	21-SEP-21
Toluene		0.58	0.78		ug/L	29	30	21-SEP-21
WG3620476-1 LCS								
Benzene			102.9		%		70-130	21-SEP-21
Ethylbenzene			95.8		%		70-130	21-SEP-21
m+p-Xylenes			101.7		%		70-130	21-SEP-21
o-Xylene			99.0		%		70-130	21-SEP-21
Toluene			103.0		%		70-130	21-SEP-21
WG3620476-2 MB								
Benzene			<0.50		ug/L		0.5	21-SEP-21
Ethylbenzene			<0.50		ug/L		0.5	21-SEP-21
m+p-Xylenes			<0.40		ug/L		0.4	21-SEP-21
o-Xylene			<0.30		ug/L		0.3	21-SEP-21
Toluene			<0.50		ug/L		0.5	21-SEP-21
Surrogate: 1,4-Difluorobenzene			100.5		%		70-130	21-SEP-21
Surrogate: 4-Bromofluorobenzene			99.1		%		70-130	21-SEP-21
WG3620476-5 MS		**WG3620476-3**						
Benzene			105.5		%		50-140	21-SEP-21
Ethylbenzene			N/A	MS-B	%		-	21-SEP-21
m+p-Xylenes			N/A	MS-B	%		-	21-SEP-21
o-Xylene			102.1		%		50-140	21-SEP-21
Toluene			103.2		%		50-140	21-SEP-21
Batch R5591796								
WG3621615-4 DUP		**WG3621615-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-SEP-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R5591796								
WG3621615-4 DUP		**WG3621615-3**						
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	22-SEP-21
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	22-SEP-21
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-SEP-21
WG3621615-1 LCS								
Benzene			104.6		%		70-130	22-SEP-21
Ethylbenzene			98.4		%		70-130	22-SEP-21
m+p-Xylenes			107.0		%		70-130	22-SEP-21
o-Xylene			100.9		%		70-130	22-SEP-21
Toluene			105.5		%		70-130	22-SEP-21
WG3621615-2 MB								
Benzene			<0.50		ug/L		0.5	22-SEP-21
Ethylbenzene			<0.50		ug/L		0.5	22-SEP-21
m+p-Xylenes			<0.40		ug/L		0.4	22-SEP-21
o-Xylene			<0.30		ug/L		0.3	22-SEP-21
Toluene			<0.50		ug/L		0.5	22-SEP-21
Surrogate: 1,4-Difluorobenzene			100.2		%		70-130	22-SEP-21
Surrogate: 4-Bromofluorobenzene			96.1		%		70-130	22-SEP-21
WG3621615-5 MS		**WG3621615-3**						
Benzene			108.1		%		50-140	22-SEP-21
Ethylbenzene			100.7		%		50-140	22-SEP-21
m+p-Xylenes			109.4		%		50-140	22-SEP-21
o-Xylene			103.2		%		50-140	22-SEP-21
Toluene			111.4		%		50-140	22-SEP-21
CL-IC-N-WT	Water							
Batch R5587323								
WG3619689-14 DUP		**L2640507-5**						
Chloride (Cl)		100	100		mg/L	0.0	20	17-SEP-21
WG3619689-9 DUP		**L2640415-8**						
Chloride (Cl)		82.4	82.4		mg/L	0.0	20	17-SEP-21
WG3619689-12 LCS								
Chloride (Cl)			99.3		%		90-110	17-SEP-21
WG3619689-7 LCS								
Chloride (Cl)			99.2		%		90-110	17-SEP-21
WG3619689-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-WT	Water							
Batch R5587323								
WG3619689-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-SEP-21
WG3619689-10 MS		**L2640415-8**						
Chloride (Cl)			98.0		%		75-125	17-SEP-21
WG3619689-15 MS		**L2640507-5**						
Chloride (Cl)			N/A	MS-B	%		-	17-SEP-21
COLOUR-APPARENT-WT	Water							
Batch R5586361								
WG3619803-3 DUP		**L2640525-4**						
Colour, Apparent		11.1	11.2		CU	1.3	20	17-SEP-21
WG3619803-2 LCS								
Colour, Apparent			102.1		%		85-115	17-SEP-21
WG3619803-1 MB								
Colour, Apparent			<2.0		CU		2	17-SEP-21
EC-WT	Water							
Batch R5587656								
WG3620176-4 DUP		**WG3620176-3**						
Conductivity		224	222		umhos/cm	0.9	10	18-SEP-21
WG3620176-2 LCS								
Conductivity			104.8		%		90-110	18-SEP-21
WG3620176-1 MB								
Conductivity			<1.0		umhos/cm		1	18-SEP-21
Batch R5587669								
WG3620177-4 DUP		**WG3620177-3**						
Conductivity		970	978		umhos/cm	0.8	10	18-SEP-21
WG3620177-2 LCS								
Conductivity			104.5		%		90-110	18-SEP-21
WG3620177-1 MB								
Conductivity			<1.0		umhos/cm		1	18-SEP-21
Batch R5587676								
WG3620180-4 DUP		**WG3620180-3**						
Conductivity		1620	1610		umhos/cm	0.6	10	18-SEP-21
WG3620180-2 LCS								
Conductivity			104.2		%		90-110	18-SEP-21
WG3620180-1 MB								
Conductivity			<1.0		umhos/cm		1	18-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	Water							
Batch R5590661								
WG3620028-4 DUP		**WG3620028-3**						
Conductivity		842	834		umhos/cm	1.0	10	17-SEP-21
WG3620028-2 LCS								
Conductivity			104.9		%		90-110	17-SEP-21
WG3620028-1 MB								
Conductivity			<1.0		umhos/cm		1	17-SEP-21
Batch R5592542								
WG3620029-4 DUP		**WG3620029-3**						
Conductivity		760	762		umhos/cm	0.3	10	17-SEP-21
WG3620029-2 LCS								
Conductivity			106.9		%		90-110	17-SEP-21
WG3620029-1 MB								
Conductivity			<1.0		umhos/cm		1	17-SEP-21
F-IC-N-WT	Water							
Batch R5587323								
WG3619689-14 DUP		**L2640507-5**						
Fluoride (F)		0.058	0.058		mg/L	0.0	20	17-SEP-21
WG3619689-9 DUP		**L2640415-8**						
Fluoride (F)		0.225	0.223		mg/L	0.9	20	17-SEP-21
WG3619689-12 LCS								
Fluoride (F)			101.5		%		90-110	17-SEP-21
WG3619689-7 LCS								
Fluoride (F)			101.2		%		90-110	17-SEP-21
WG3619689-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	17-SEP-21
WG3619689-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	17-SEP-21
WG3619689-10 MS		**L2640415-8**						
Fluoride (F)			94.3		%		75-125	17-SEP-21
WG3619689-15 MS		**L2640507-5**						
Fluoride (F)			97.5		%		75-125	17-SEP-21
F1-HS-511-WT	Water							
Batch R5590205								
WG3620476-4 DUP		**WG3620476-3**						
F1 (C6-C10)		1550	1540		ug/L	0.7	30	21-SEP-21
WG3620476-1 LCS								
F1 (C6-C10)			89.5		%		80-120	21-SEP-21
WG3620476-2 MB								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	Water							
Batch R5590205								
WG3620476-2 MB								
F1 (C6-C10)			<25		ug/L		25	21-SEP-21
Surrogate: 3,4-Dichlorotoluene			98.8		%		60-140	21-SEP-21
WG3620476-5 MS		**WG3620476-3**						
F1 (C6-C10)			71.9		%		60-140	21-SEP-21
Batch R5591796								
WG3621615-4 DUP		**WG3621615-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	22-SEP-21
WG3621615-1 LCS								
F1 (C6-C10)			92.7		%		80-120	22-SEP-21
WG3621615-2 MB								
F1 (C6-C10)			<25		ug/L		25	22-SEP-21
Surrogate: 3,4-Dichlorotoluene			98.6		%		60-140	22-SEP-21
WG3621615-5 MS		**WG3621615-3**						
F1 (C6-C10)			89.7		%		60-140	22-SEP-21
F2-F4-511-WT	Water							
Batch R5595460								
WG3621356-2 LCS								
F2 (C10-C16)			106.4		%		70-130	23-SEP-21
F3 (C16-C34)			111.9		%		70-130	23-SEP-21
F4 (C34-C50)			106.0		%		70-130	23-SEP-21
WG3621356-1 MB								
F2 (C10-C16)			<100		ug/L		100	23-SEP-21
F3 (C16-C34)			<250		ug/L		250	23-SEP-21
F4 (C34-C50)			<250		ug/L		250	23-SEP-21
Surrogate: 2-Bromobenzotrifluoride			88.6		%		60-140	23-SEP-21
MET-D-CCMS-WT	Water							
Batch R5587486								
WG3619231-4 DUP		**WG3619231-3**						
Aluminum (Al)-Dissolved		0.0285	0.0301		mg/L	5.5	20	17-SEP-21
Antimony (Sb)-Dissolved		0.00023	0.00022		mg/L	2.9	20	17-SEP-21
Arsenic (As)-Dissolved		0.00059	0.00062		mg/L	5.0	20	17-SEP-21
Barium (Ba)-Dissolved		0.00466	0.00475		mg/L	1.9	20	17-SEP-21
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-SEP-21
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-SEP-21
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5587486								
WG3619231-4 DUP		**WG3619231-3**						
Cadmium (Cd)-Dissolved		<0.0000050	0.0000056	RPD-NA	mg/L	N/A	20	17-SEP-21
Calcium (Ca)-Dissolved		12.7	12.7		mg/L	0.4	20	17-SEP-21
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-SEP-21
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-SEP-21
Copper (Cu)-Dissolved		0.00188	0.00186		mg/L	1.4	20	17-SEP-21
Iron (Fe)-Dissolved		0.022	0.021		mg/L	2.5	20	17-SEP-21
Lead (Pb)-Dissolved		0.000183	0.000181		mg/L	1.0	20	17-SEP-21
Magnesium (Mg)-Dissolved		1.69	1.71		mg/L	1.0	20	17-SEP-21
Manganese (Mn)-Dissolved		0.00128	0.00127		mg/L	0.7	20	17-SEP-21
Molybdenum (Mo)-Dissolved		0.00106	0.00109		mg/L	2.3	20	17-SEP-21
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-SEP-21
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	17-SEP-21
Potassium (K)-Dissolved		1.50	1.51		mg/L	0.9	20	17-SEP-21
Selenium (Se)-Dissolved		0.000105	0.000109		mg/L	3.7	20	17-SEP-21
Silicon (Si)-Dissolved		0.242	0.238		mg/L	1.4	20	17-SEP-21
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-SEP-21
Sodium (Na)-Dissolved		10.9	11.0		mg/L	1.0	20	17-SEP-21
Strontium (Sr)-Dissolved		0.0765	0.0757		mg/L	1.0	20	17-SEP-21
Thallium (Tl)-Dissolved		0.000013	0.000012		mg/L	12	20	17-SEP-21
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-SEP-21
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	17-SEP-21
Tungsten (W)-Dissolved		0.00031	0.00030		mg/L	2.3	20	17-SEP-21
Uranium (U)-Dissolved		0.000102	0.000102		mg/L	0.1	20	17-SEP-21
Vanadium (V)-Dissolved		0.00073	0.00073		mg/L	0.5	20	17-SEP-21
Zinc (Zn)-Dissolved		0.0010	0.0011		mg/L	2.4	20	17-SEP-21
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	17-SEP-21
WG3619231-2 LCS								
Aluminum (Al)-Dissolved			97.7		%		80-120	17-SEP-21
Antimony (Sb)-Dissolved			98.2		%		80-120	17-SEP-21
Arsenic (As)-Dissolved			98.5		%		80-120	17-SEP-21
Barium (Ba)-Dissolved			98.5		%		80-120	17-SEP-21
Beryllium (Be)-Dissolved			96.3		%		80-120	17-SEP-21
Bismuth (Bi)-Dissolved			96.8		%		80-120	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5587486								
WG3619231-2 LCS								
Boron (B)-Dissolved			90.3		%		80-120	17-SEP-21
Cadmium (Cd)-Dissolved			95.6		%		80-120	17-SEP-21
Calcium (Ca)-Dissolved			94.9		%		80-120	17-SEP-21
Chromium (Cr)-Dissolved			96.1		%		80-120	17-SEP-21
Cobalt (Co)-Dissolved			96.8		%		80-120	17-SEP-21
Copper (Cu)-Dissolved			96.6		%		80-120	17-SEP-21
Iron (Fe)-Dissolved			96.0		%		80-120	17-SEP-21
Lead (Pb)-Dissolved			97.5		%		80-120	17-SEP-21
Magnesium (Mg)-Dissolved			98.2		%		80-120	17-SEP-21
Manganese (Mn)-Dissolved			96.8		%		80-120	17-SEP-21
Molybdenum (Mo)-Dissolved			98.7		%		80-120	17-SEP-21
Nickel (Ni)-Dissolved			95.6		%		80-120	17-SEP-21
Phosphorus (P)-Dissolved			105.8		%		80-120	17-SEP-21
Potassium (K)-Dissolved			97.3		%		80-120	17-SEP-21
Selenium (Se)-Dissolved			94.5		%		80-120	17-SEP-21
Silicon (Si)-Dissolved			98.6		%		60-140	17-SEP-21
Silver (Ag)-Dissolved			102.0		%		80-120	17-SEP-21
Sodium (Na)-Dissolved			96.5		%		80-120	17-SEP-21
Strontium (Sr)-Dissolved			99.2		%		80-120	17-SEP-21
Thallium (Tl)-Dissolved			97.3		%		80-120	17-SEP-21
Tin (Sn)-Dissolved			97.5		%		80-120	17-SEP-21
Titanium (Ti)-Dissolved			94.7		%		80-120	17-SEP-21
Tungsten (W)-Dissolved			96.3		%		80-120	17-SEP-21
Uranium (U)-Dissolved			98.8		%		80-120	17-SEP-21
Vanadium (V)-Dissolved			96.6		%		80-120	17-SEP-21
Zinc (Zn)-Dissolved			99.5		%		80-120	17-SEP-21
Zirconium (Zr)-Dissolved			97.0		%		80-120	17-SEP-21
WG3619231-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	17-SEP-21
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5587486								
WG3619231-1 MB								
Boron (B)-Dissolved			<0.010		mg/L		0.01	17-SEP-21
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	17-SEP-21
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	17-SEP-21
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	17-SEP-21
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	17-SEP-21
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	17-SEP-21
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	17-SEP-21
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	17-SEP-21
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	17-SEP-21
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	17-SEP-21
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	17-SEP-21
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	17-SEP-21
Potassium (K)-Dissolved			<0.050		mg/L		0.05	17-SEP-21
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	17-SEP-21
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-SEP-21
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	17-SEP-21
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	17-SEP-21
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	17-SEP-21
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	17-SEP-21
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	17-SEP-21
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	17-SEP-21
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	17-SEP-21
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	17-SEP-21
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	17-SEP-21
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	17-SEP-21
WG3619231-5 MS		**WG3619231-3**						
Aluminum (Al)-Dissolved			98.3		%		70-130	17-SEP-21
Antimony (Sb)-Dissolved			106.7		%		70-130	17-SEP-21
Arsenic (As)-Dissolved			110.8		%		70-130	17-SEP-21
Barium (Ba)-Dissolved			100.1		%		70-130	17-SEP-21
Beryllium (Be)-Dissolved			108.8		%		70-130	17-SEP-21
Bismuth (Bi)-Dissolved			95.2		%		70-130	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	Water							
Batch R5587486								
WG3619231-5 MS		**WG3619231-3**						
Boron (B)-Dissolved			96.3		%		70-130	17-SEP-21
Cadmium (Cd)-Dissolved			105.2		%		70-130	17-SEP-21
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	17-SEP-21
Chromium (Cr)-Dissolved			98.5		%		70-130	17-SEP-21
Cobalt (Co)-Dissolved			99.9		%		70-130	17-SEP-21
Copper (Cu)-Dissolved			97.8		%		70-130	17-SEP-21
Iron (Fe)-Dissolved			95.0		%		70-130	17-SEP-21
Lead (Pb)-Dissolved			100.0		%		70-130	17-SEP-21
Magnesium (Mg)-Dissolved			97.3		%		70-130	17-SEP-21
Manganese (Mn)-Dissolved			99.3		%		70-130	17-SEP-21
Molybdenum (Mo)-Dissolved			103.9		%		70-130	17-SEP-21
Nickel (Ni)-Dissolved			98.1		%		70-130	17-SEP-21
Phosphorus (P)-Dissolved			116.8		%		70-130	17-SEP-21
Potassium (K)-Dissolved			96.6		%		70-130	17-SEP-21
Selenium (Se)-Dissolved			118.3		%		70-130	17-SEP-21
Silicon (Si)-Dissolved			100.8		%		70-130	17-SEP-21
Silver (Ag)-Dissolved			104.9		%		70-130	17-SEP-21
Sodium (Na)-Dissolved			N/A	MS-B	%		-	17-SEP-21
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	17-SEP-21
Thallium (Tl)-Dissolved			100.2		%		70-130	17-SEP-21
Tin (Sn)-Dissolved			100.6		%		70-130	17-SEP-21
Titanium (Ti)-Dissolved			100.8		%		70-130	17-SEP-21
Tungsten (W)-Dissolved			100.5		%		70-130	17-SEP-21
Uranium (U)-Dissolved			102.3		%		70-130	17-SEP-21
Vanadium (V)-Dissolved			101.0		%		70-130	17-SEP-21
Zinc (Zn)-Dissolved			108.6		%		70-130	17-SEP-21
Zirconium (Zr)-Dissolved			102.5		%		70-130	17-SEP-21
NH3-F-WT	Water							
Batch R5587942								
WG3619797-3 DUP		**L2640599-3**						
Ammonia, Total (as N)		0.024	0.025		mg/L	5.7	20	20-SEP-21
WG3619797-2 LCS								
Ammonia, Total (as N)			106.0		%		85-115	20-SEP-21
WG3619797-1 MB								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	Water							
Batch R5587942								
WG3619797-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	20-SEP-21
WG3619797-4 MS		**L2640599-3**						
Ammonia, Total (as N)			107.3		%		75-125	20-SEP-21
NO2-IC-WT	Water							
Batch R5587323								
WG3619689-14 DUP		**L2640507-5**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-SEP-21
WG3619689-9 DUP		**L2640415-8**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-SEP-21
WG3619689-12 LCS								
Nitrite (as N)			98.6		%		90-110	17-SEP-21
WG3619689-7 LCS								
Nitrite (as N)			98.7		%		90-110	17-SEP-21
WG3619689-11 MB								
Nitrite (as N)			<0.010		mg/L		0.01	17-SEP-21
WG3619689-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	17-SEP-21
WG3619689-10 MS		**L2640415-8**						
Nitrite (as N)			98.8		%		75-125	17-SEP-21
WG3619689-15 MS		**L2640507-5**						
Nitrite (as N)			100.5		%		75-125	17-SEP-21
NO3-IC-WT	Water							
Batch R5587323								
WG3619689-14 DUP		**L2640507-5**						
Nitrate (as N)		7.75	7.74		mg/L	0.0	20	17-SEP-21
WG3619689-9 DUP		**L2640415-8**						
Nitrate (as N)		0.478	0.477		mg/L	0.1	20	17-SEP-21
WG3619689-12 LCS								
Nitrate (as N)			98.9		%		90-110	17-SEP-21
WG3619689-7 LCS								
Nitrate (as N)			99.1		%		90-110	17-SEP-21
WG3619689-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	17-SEP-21
WG3619689-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	17-SEP-21
WG3619689-10 MS		**L2640415-8**						
Nitrate (as N)			98.9		%		75-125	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	Water							
Batch R5587323								
WG3619689-15 MS		**L2640507-5**						
Nitrate (as N)			N/A	MS-B	%		-	17-SEP-21
PH-WT	Water							
Batch R5587656								
WG3620176-4 DUP		**WG3620176-3**						
pH		8.25	8.26	J	pH units	0.01	0.2	18-SEP-21
WG3620176-2 LCS								
pH			7.00		pH units		6.9-7.1	18-SEP-21
Batch R5587669								
WG3620177-4 DUP		**WG3620177-3**						
pH		8.04	8.03	J	pH units	0.01	0.2	18-SEP-21
WG3620177-2 LCS								
pH			7.01		pH units		6.9-7.1	18-SEP-21
Batch R5587676								
WG3620180-4 DUP		**WG3620180-3**						
pH		7.96	8.02	J	pH units	0.06	0.2	18-SEP-21
WG3620180-2 LCS								
pH			7.03		pH units		6.9-7.1	18-SEP-21
Batch R5590661								
WG3620028-4 DUP		**WG3620028-3**						
pH		8.17	8.12	J	pH units	0.05	0.2	17-SEP-21
WG3620028-2 LCS								
pH			7.00		pH units		6.9-7.1	17-SEP-21
Batch R5592542								
WG3620029-4 DUP		**WG3620029-3**						
pH		8.27	8.21	J	pH units	0.06	0.2	17-SEP-21
WG3620029-2 LCS								
pH			7.00		pH units		6.9-7.1	17-SEP-21
PO4-DO-COL-WT	Water							
Batch R5588140								
WG3620694-11 DUP		**L2640507-1**						
Orthophosphate-Dissolved (as P)		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	20-SEP-21
WG3620694-10 LCS								
Orthophosphate-Dissolved (as P)			95.7		%		80-120	20-SEP-21
WG3620694-9 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	20-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-COL-WT	Water							
Batch R5588140								
WG3620694-12 MS		**L2640507-1**						
Orthophosphate-Dissolved (as P)			98.7		%		70-130	20-SEP-21
SO4-IC-N-WT	Water							
Batch R5587323								
WG3619689-14 DUP		**L2640507-5**						
Sulfate (SO4)		10.2	10.2		mg/L	0.2	20	17-SEP-21
WG3619689-9 DUP		**L2640415-8**						
Sulfate (SO4)		245	245		mg/L	0.1	20	17-SEP-21
WG3619689-12 LCS								
Sulfate (SO4)			100.0		%		90-110	17-SEP-21
WG3619689-7 LCS								
Sulfate (SO4)			100.0		%		90-110	17-SEP-21
WG3619689-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-SEP-21
WG3619689-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-SEP-21
WG3619689-10 MS		**L2640415-8**						
Sulfate (SO4)			N/A	MS-B	%		-	17-SEP-21
WG3619689-15 MS		**L2640507-5**						
Sulfate (SO4)			101.1		%		75-125	17-SEP-21
SOLIDS-TDS-WT	Water							
Batch R5588157								
WG3620349-3 DUP		**L2640507-4**						
Total Dissolved Solids		352	350		mg/L	0.7	20	19-SEP-21
WG3620349-2 LCS								
Total Dissolved Solids			99.7		%		85-115	19-SEP-21
WG3620349-1 MB								
Total Dissolved Solids			<10		mg/L		10	19-SEP-21
TURBIDITY-WT	Water							
Batch R5586811								
WG3619393-3 DUP		**L2640599-2**						
Turbidity		257	251		NTU	2.4	15	17-SEP-21
WG3619393-2 LCS								
Turbidity			102.0		%		85-115	17-SEP-21
WG3619393-1 MB								
Turbidity			<0.10		NTU		0.1	17-SEP-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WT	Water							
Batch R5590697								
WG3619401-3 DUP		**L2640507-8**						
Turbidity		550	556		NTU	1.1	15	17-SEP-21
WG3619401-2 LCS								
Turbidity			99.96		%		85-115	17-SEP-21
WG3619401-1 MB								
Turbidity			<0.10		NTU		0.1	17-SEP-21

Quality Control Report

Workorder: L2640507 Report Date: 23-SEP-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

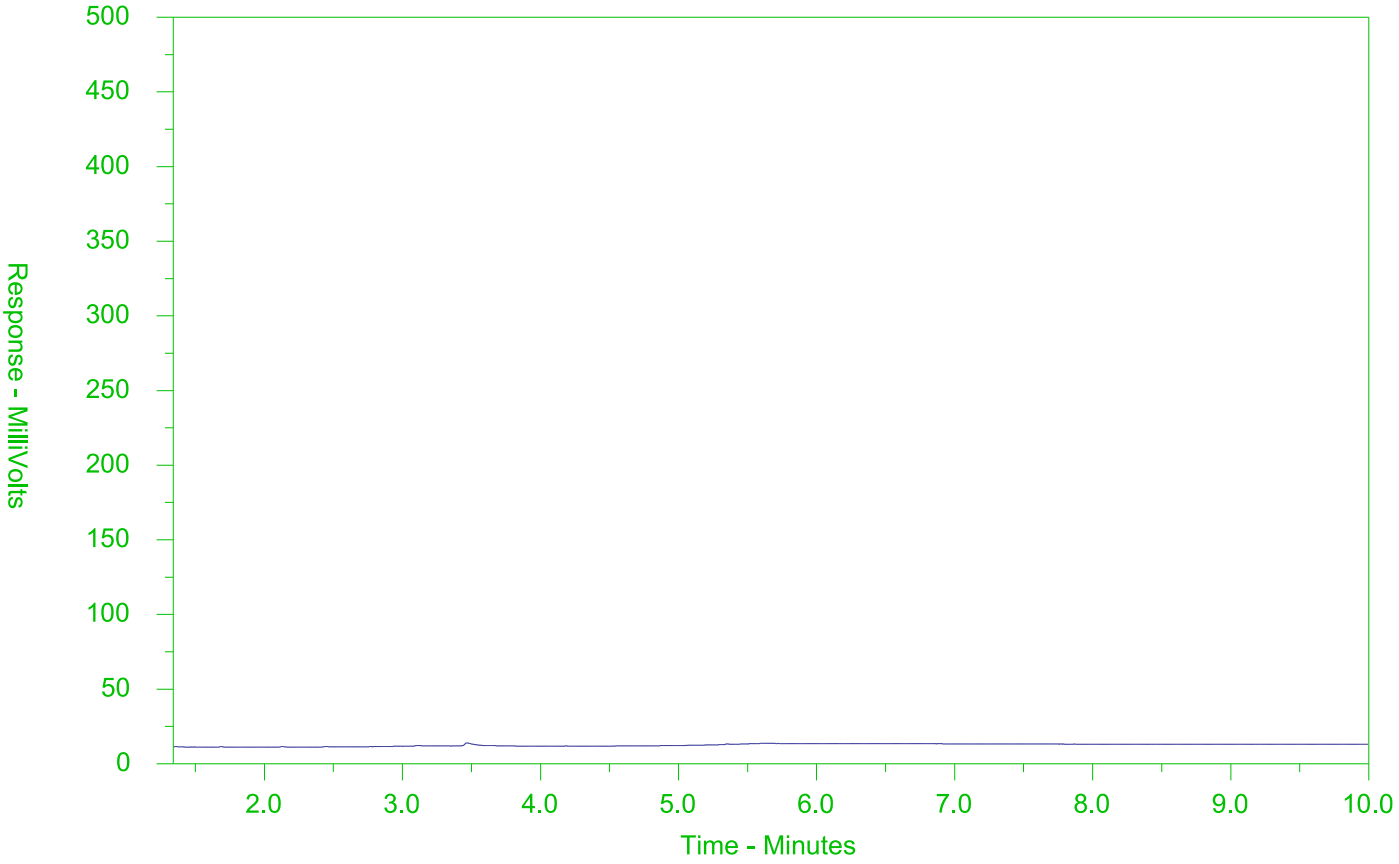
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

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

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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-1
Client Sample ID: MW101- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

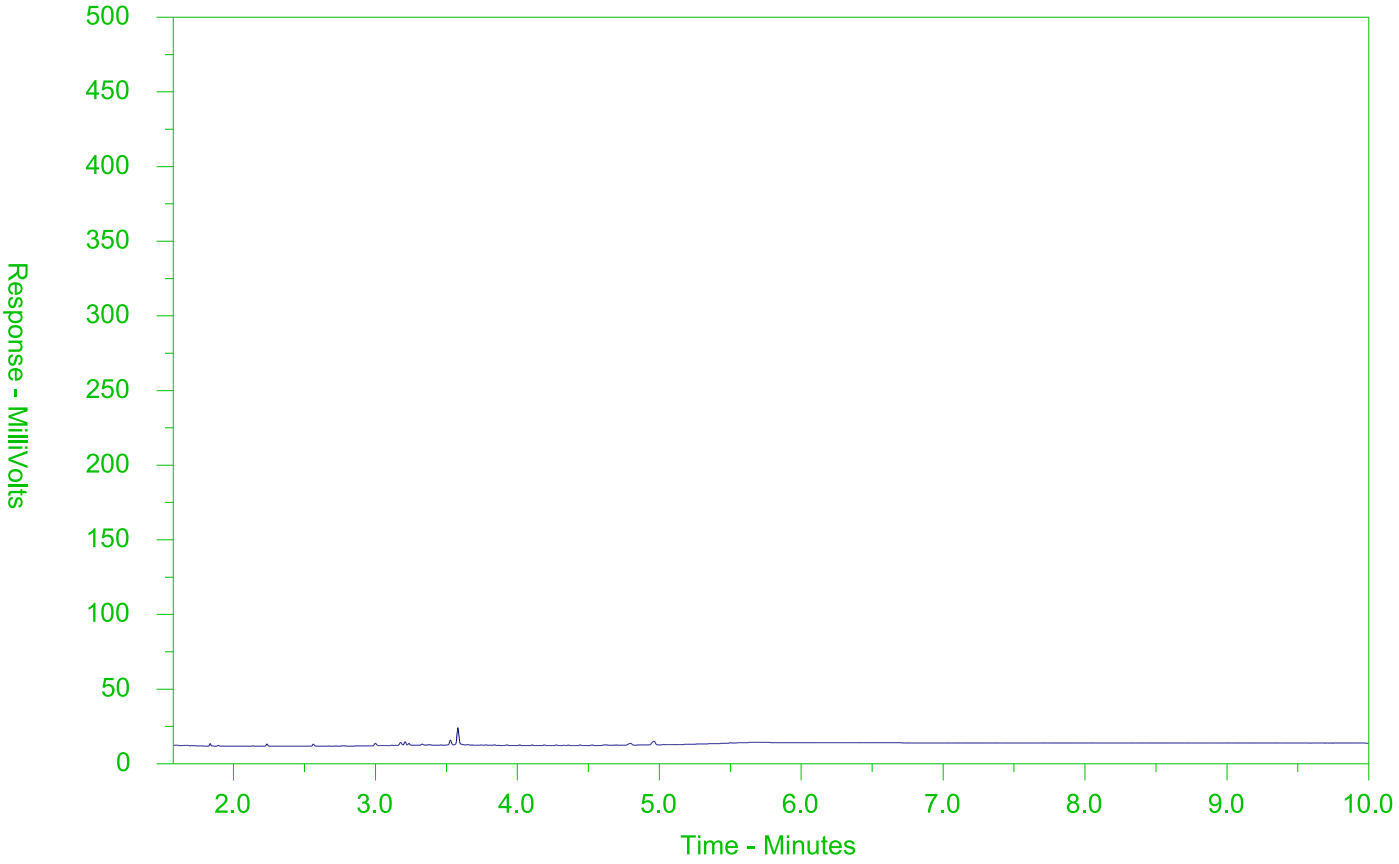
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-2
Client Sample ID: MW102- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

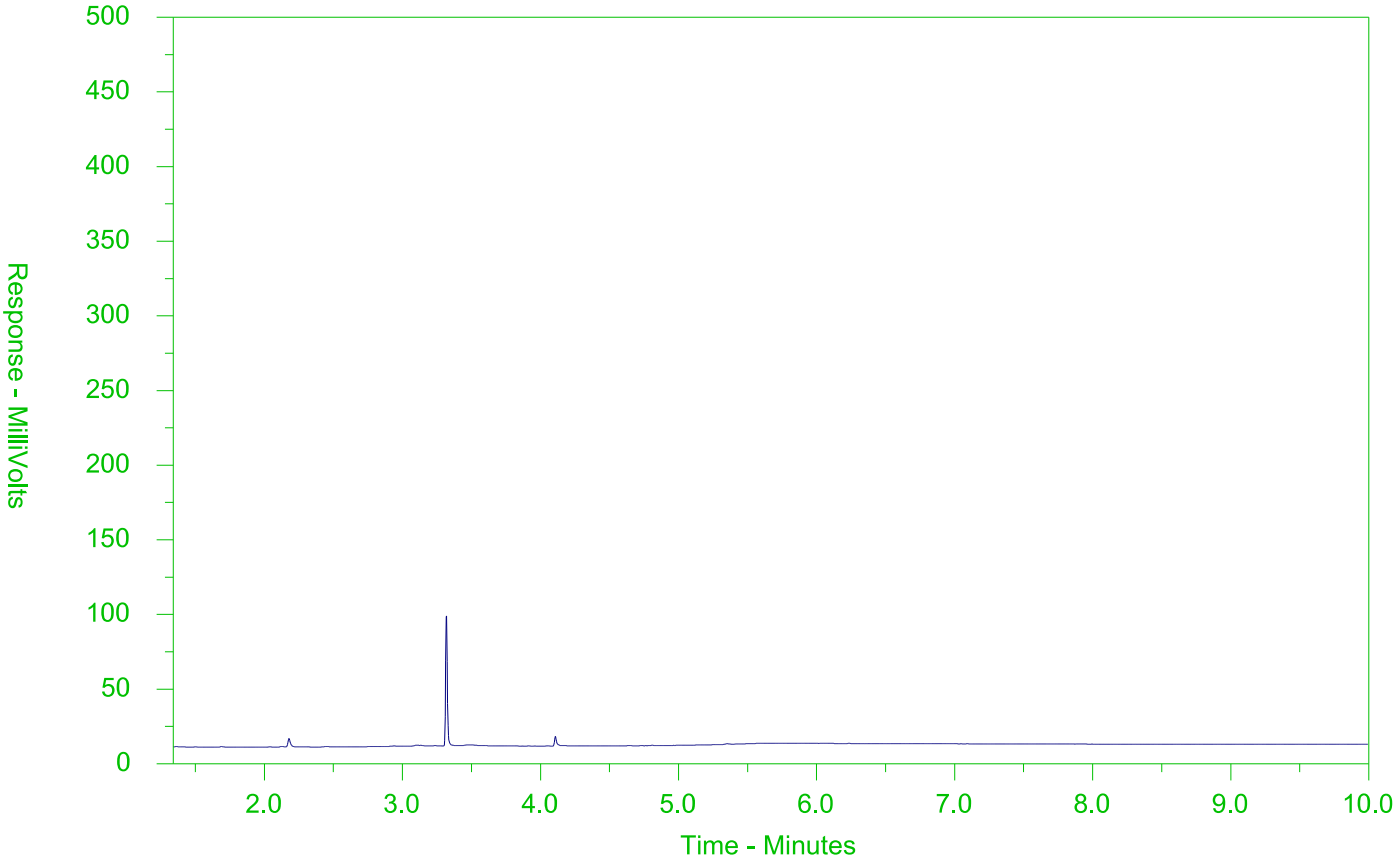
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-3
Client Sample ID: MW103- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

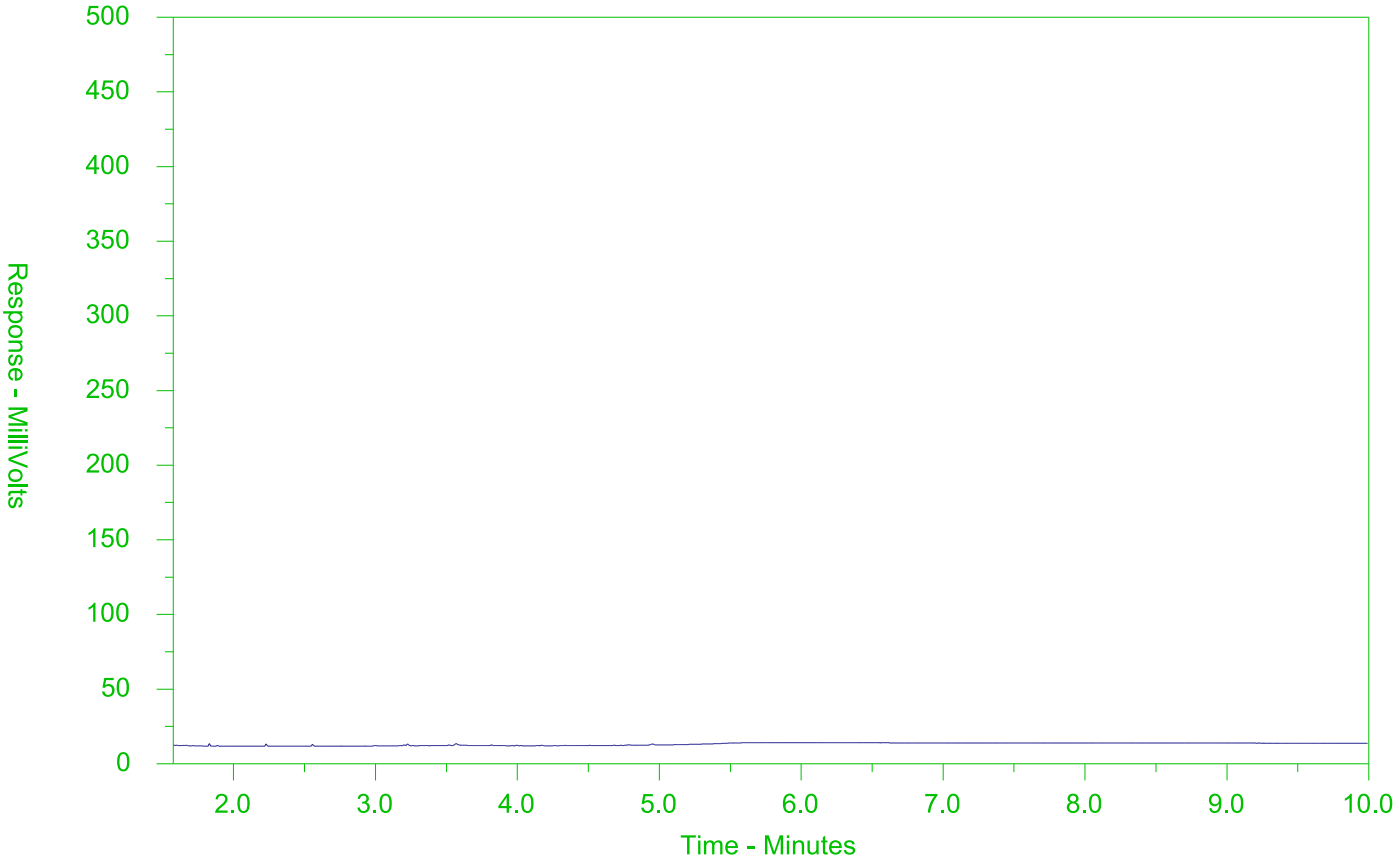
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-4
Client Sample ID: MW104- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

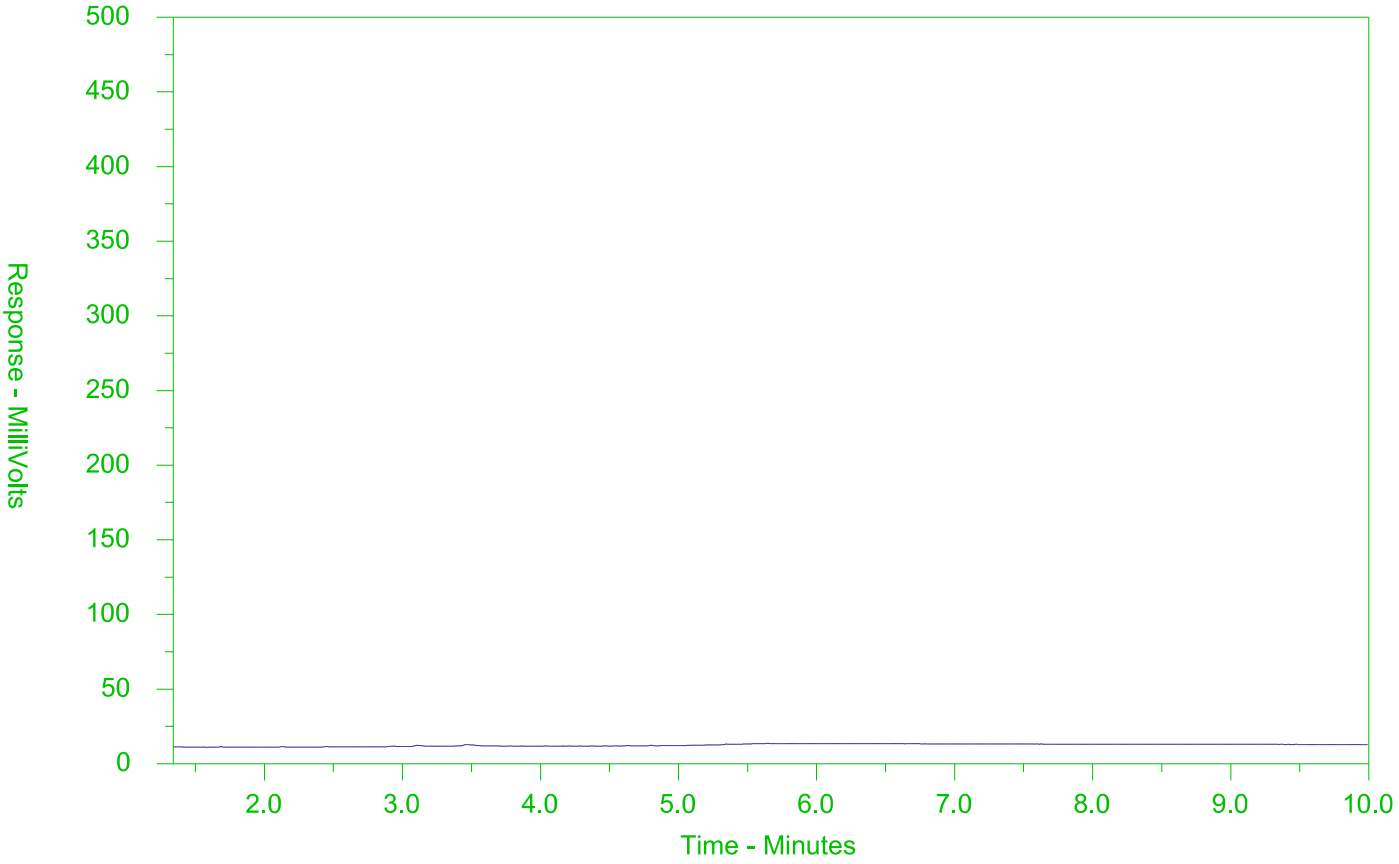
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-5
Client Sample ID: MW105- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

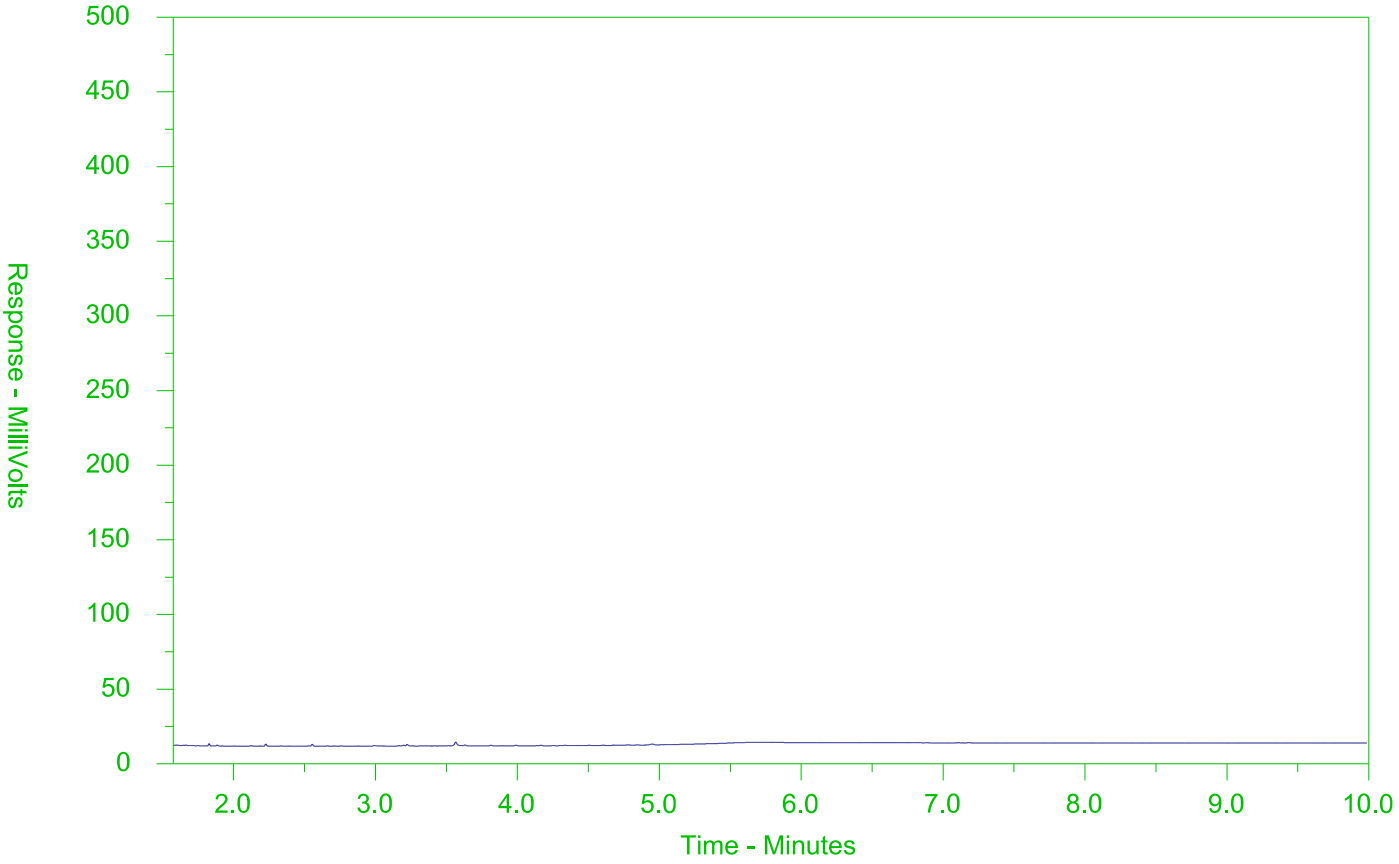
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-6
Client Sample ID: MW106- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

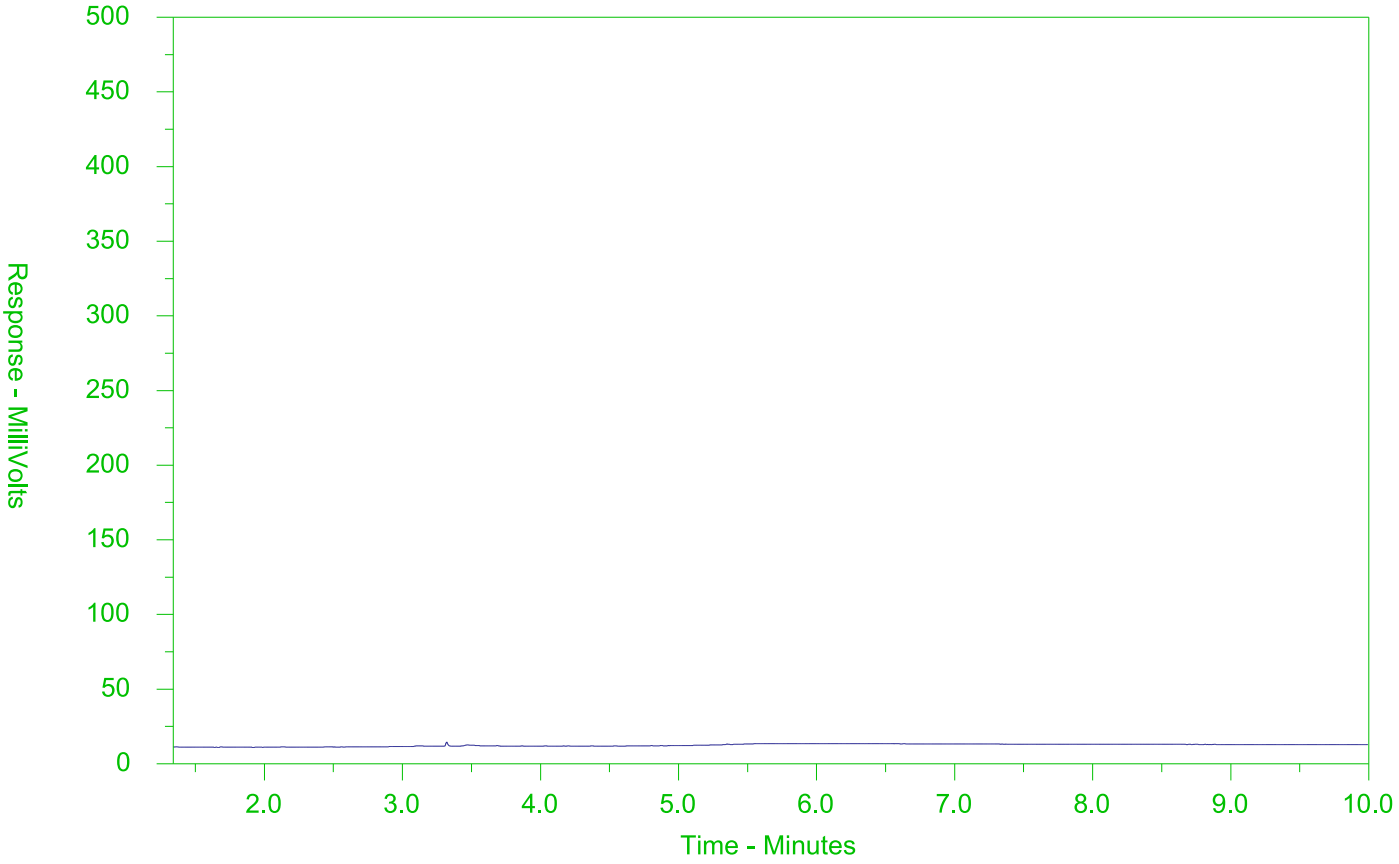
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-7
Client Sample ID: MW107- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

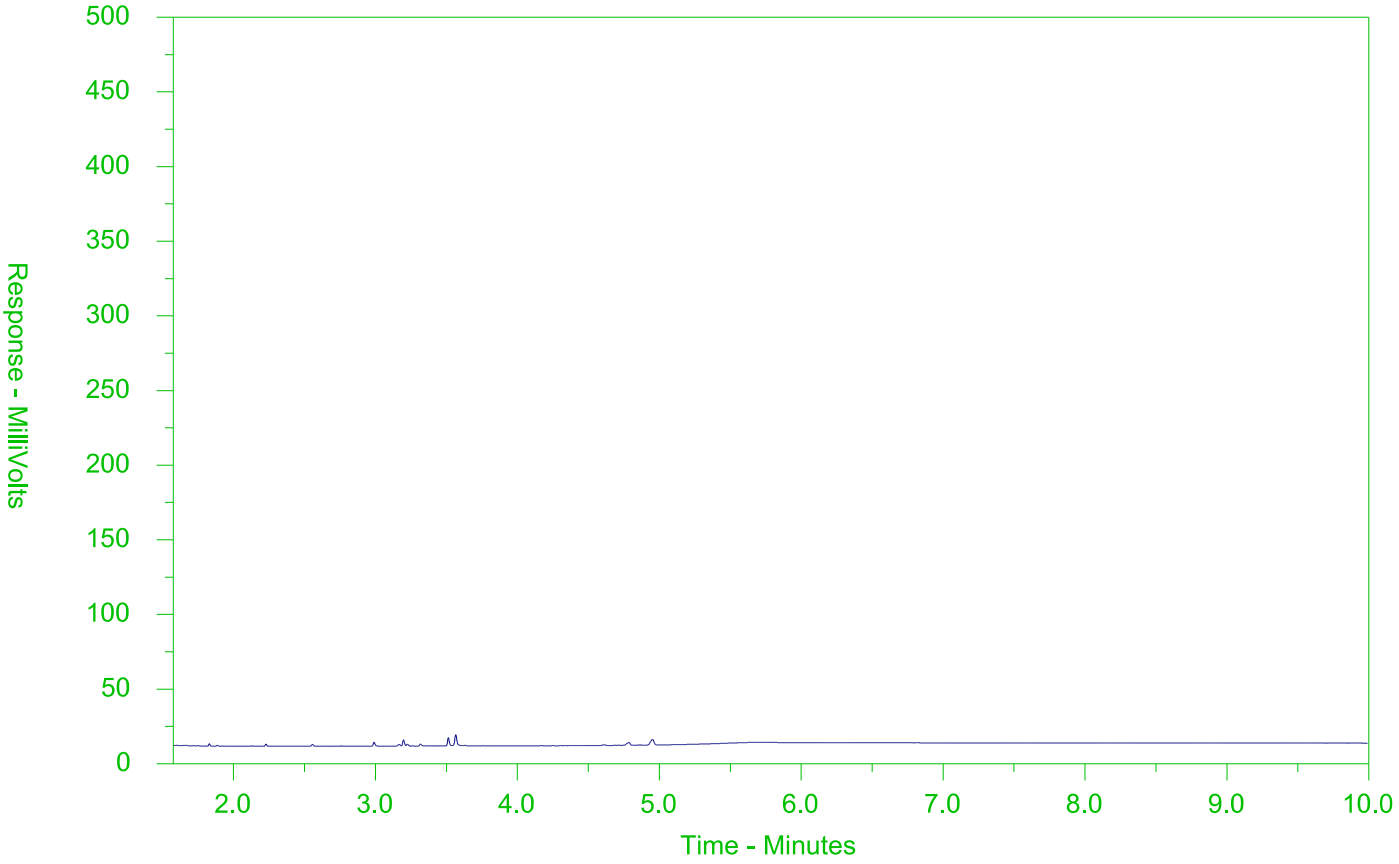
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-8
Client Sample ID: MW108- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

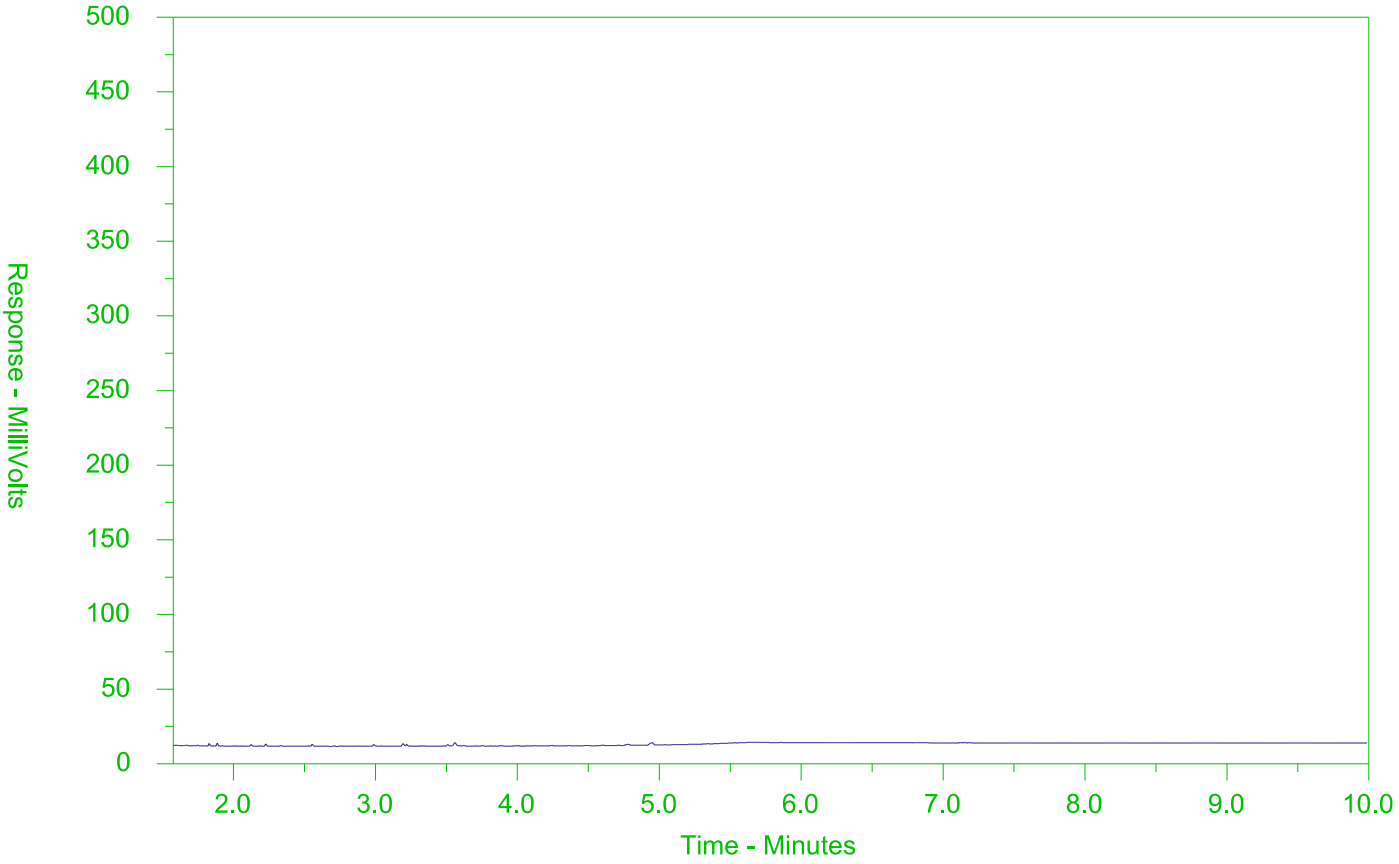
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2640507-9
Client Sample ID: MW109- 20



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

rm

COC Number: 20 - 898222

MC

Page 1 of 1

L2640507-COFC

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	MTE CONSULTANTS INC
Contact:	FRASER CUMMINGS
Phone:	519-743-6500
	Company address below will appear on the final report
Street:	520 BINGEMANS CENTRE DR
City/Province:	KITCHENER / ON
Postal Code:	N2B
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Project Information

ALS Account # / Quote #:	
Job #:	~~466930~~ 46639-100
PO / AFE:	
LSD:	

ALS Lab Work Order # (ALS use only): L2640507

Reports / Recipients

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: FCUMMINGS@MTE85.COM

Email 2: LGRAY@MTE85.COM

Email 3: JKAMUTZKI@MTE85.COM

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: FCUMMINGS@MTE85.COM

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests.

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	GEN CHEM PKG #1	BTEX	F1-F4	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MW101-20	16-SEP-21	08:50	GW	7	/	/	/			
	MW102-20		09:47		7	/	/	/			
	MW103-20		10:35		7	/	/	/			
	MW104-20		11:16		7	/	/	/			
	MW105-20		13:52		7	/	/	/			
	MW106-20		13:11		7	/	/	/			
	MW107-20		14:31		7	/	/	/			
	MW108-20		12:37		7	/	/	/			
	MW109-20		11:57		7	/	/	/			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
			6.9				

SHIPMENT RELEASE (client use)

Released by: | Date: 16-SEP-21 | Time: 15:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: | Date: | Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: KS | Date: 09/16/2021 | Time: 17:15

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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 back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS 2020 FRONT

MTE CONSULTANTS INC. (Kitchener)
ATTN: FRASER CUMMINGS
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9

Date Received: 16- NOV- 21
Report Date: 23- NOV- 21 13:38 (MT)
Version: FINAL

Client Phone: 519- 743- 6500

Certificate of Analysis

Lab Work Order #: L2663301
Project P.O. #: NOT SUBMITTED
Job Reference: 46639- 100
C of C Numbers:
Legal Site Desc:

Emily Hansen
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2663301-1 PW1							
Sampled By: TFC/JAK on 16-NOV-21 @ 10:30							
Matrix: WATER							
Physical Tests							
Colour, Apparent	13.1		2.0	CU	17-NOV-21		*5
Conductivity	605		3.0	umhos/cm	17-NOV-21		
pH	8.20		0.10	pH units	17-NOV-21		6.5-8.5
Total Dissolved Solids	338	DLDS	20	mg/L	17-NOV-21		500
Turbidity	44.6		0.10	NTU	17-NOV-21		*5
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	255		1.0	mg/L	17-NOV-21		
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	17-NOV-21		
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	17-NOV-21		
Alkalinity, Total (as CaCO3)	255		1.0	mg/L	17-NOV-21		30-500
Ammonia, Total (as N)	0.044		0.010	mg/L	17-NOV-21		
Bromide (Br)	<0.10		0.10	mg/L	17-NOV-21		
Chloride (Cl)	9.86		0.50	mg/L	17-NOV-21		250
Computed Conductivity	545			uS/cm	20-NOV-21		
Conductivity % Difference	-10			%	20-NOV-21		
Fluoride (F)	0.11		0.10	mg/L	17-NOV-21	1.5	
Hardness (as CaCO3)	317			mg/L	20-NOV-21		*80-100
Ion Balance	116			%	20-NOV-21		
Langelier Index	1			No Unit	20-NOV-21		
Nitrate (as N)	<0.020		0.020	mg/L	17-NOV-21	10	
Nitrite (as N)	<0.010		0.010	mg/L	17-NOV-21	1	
Saturation pH	7.18			pH	20-NOV-21		
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L	17-NOV-21		
TDS (Calculated)	324			mg/L	20-NOV-21		
Sulfate (SO4)	51.5		0.30	mg/L	17-NOV-21		500
Anion Sum	5.60			me/L	20-NOV-21		
Cation Sum	6.51			me/L	20-NOV-21		
Cation - Anion Balance	8			%	20-NOV-21		
Inorganic Parameters							
Silica	15500		2100	mg/L	16-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	17-NOV-21	0	
Total Coliform Background	1		0	CFU/100mL	17-NOV-21		
Total Coliforms	0		0	CFU/100mL	17-NOV-21	0	
Metals							
Sodium Adsorption Ratio	<0.10		0.10	SAR	19-NOV-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	19-NOV-21		100
Antimony (Sb)	<0.60		0.60	ug/L	19-NOV-21	6	
Arsenic (As)	8.3		1.0	ug/L	19-NOV-21	10.0	
Barium (Ba)	246		10	ug/L	19-NOV-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	19-NOV-21		
Bismuth (Bi)	<1.0		1.0	ug/L	19-NOV-21		
Boron (B)	<50		50	ug/L	19-NOV-21	5000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2663301-1 PW1							
Sampled By: TFC/JAK on 16-NOV-21 @ 10:30							
Matrix: WATER							
Total Metals							
Cadmium (Cd)	<0.10		0.10	ug/L	19-NOV-21	5	
Calcium (Ca)	72.3		0.50	mg/L	19-NOV-21		
Cesium (Cs)	<0.10		0.10	ug/L	19-NOV-21		
Chromium (Cr)	<1.0		1.0	ug/L	19-NOV-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	19-NOV-21		
Copper (Cu)	6.7		1.0	ug/L	19-NOV-21		1000
Iron (Fe)	3110		50	ug/L	19-NOV-21		*300
Lead (Pb)	<1.0		1.0	ug/L	19-NOV-21	10	
Lithium (Li)	<100		100	ug/L	19-NOV-21		
Magnesium (Mg)	33.2		0.50	mg/L	19-NOV-21		
Manganese (Mn)	61.9		1.0	ug/L	19-NOV-21		*50
Molybdenum (Mo)	<0.50		0.50	ug/L	19-NOV-21		
Nickel (Ni)	<1.0		1.0	ug/L	19-NOV-21		
Phosphorus (P)	<0.050		0.050	mg/L	19-NOV-21		
Potassium (K)	<1.0		1.0	mg/L	19-NOV-21		
Rubidium (Rb)	<2.0		2.0	ug/L	19-NOV-21		
Selenium (Se)	<1.0		1.0	ug/L	19-NOV-21	50	
Silicon (Si)	7200		1000	ug/L	19-NOV-21		
Silver (Ag)	<0.050		0.050	ug/L	19-NOV-21		
Sodium (Na)	3.81		0.50	mg/L	19-NOV-21	20	200
Strontium (Sr)	110		1.0	ug/L	19-NOV-21		
Sulfur (S)	17000		500	ug/L	19-NOV-21		
Tellurium (Te)	<2.0		2.0	ug/L	19-NOV-21		
Thallium (Tl)	<0.060		0.060	ug/L	19-NOV-21		
Thorium (Th)	<1.0		1.0	ug/L	19-NOV-21		
Tin (Sn)	<1.0		1.0	ug/L	19-NOV-21		
Titanium (Ti)	<2.0		2.0	ug/L	19-NOV-21		
Tungsten (W)	<6.0		6.0	ug/L	19-NOV-21		
Uranium (U)	<2.0		2.0	ug/L	19-NOV-21	20	
Vanadium (V)	<0.50		0.50	ug/L	19-NOV-21		
Zinc (Zn)	11.1		3.0	ug/L	19-NOV-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	19-NOV-21		
L2663301-2 RW2							
Sampled By: TFC/JAK on 16-NOV-21 @ 12:00							
Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU	17-NOV-21		5
Conductivity	609		3.0	umhos/cm	17-NOV-21		
pH	8.28		0.10	pH units	17-NOV-21		6.5-8.5
Total Dissolved Solids	333	DLDS	20	mg/L	17-NOV-21		500
Turbidity	1.66		0.10	NTU	17-NOV-21		5
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	227		1.0	mg/L	17-NOV-21		
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	17-NOV-21		
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	17-NOV-21		
Alkalinity, Total (as CaCO3)	227		1.0	mg/L	17-NOV-21		30-500

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2663301-2 RW2							
Sampled By: TFC/JAK on 16-NOV-21 @ 12:00							
Matrix: WATER							
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L	18-NOV-21		
Bromide (Br)	<0.10		0.10	mg/L	17-NOV-21		
Chloride (Cl)	33.2		0.50	mg/L	17-NOV-21		250
Computed Conductivity	540			uS/cm	20-NOV-21		
Conductivity % Difference	-12			%	20-NOV-21		
Fluoride (F)	<0.10		0.10	mg/L	17-NOV-21	1.5	
Hardness (as CaCO3)	279			mg/L	20-NOV-21		*80-100
Ion Balance	111			%	20-NOV-21		
Langelier Index	1			No Unit	20-NOV-21		
Nitrate (as N)	7.29		0.020	mg/L	17-NOV-21	10	
Nitrite (as N)	<0.010		0.010	mg/L	17-NOV-21	1	
Saturation pH	7.25			pH	20-NOV-21		
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L	17-NOV-21		
TDS (Calculated)	326			mg/L	20-NOV-21		
Sulfate (SO4)	16.0		0.30	mg/L	17-NOV-21		500
Anion Sum	5.58			me/L	20-NOV-21		
Cation Sum	6.18			me/L	20-NOV-21		
Cation - Anion Balance	5			%	20-NOV-21		
Inorganic Parameters							
Silica	13100		2100	mg/L	16-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	17-NOV-21	0	
Total Coliform Background	140	DLM	10	CFU/100mL	17-NOV-21		
Total Coliforms	520	DLM	10	CFU/100mL	17-NOV-21	*0	
Metals							
Sodium Adsorption Ratio	0.36		0.10	SAR	19-NOV-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	19-NOV-21		100
Antimony (Sb)	<0.60		0.60	ug/L	19-NOV-21	6	
Arsenic (As)	<1.0		1.0	ug/L	19-NOV-21	10.0	
Barium (Ba)	98		10	ug/L	19-NOV-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	19-NOV-21		
Bismuth (Bi)	<1.0		1.0	ug/L	19-NOV-21		
Boron (B)	<50		50	ug/L	19-NOV-21	5000	
Cadmium (Cd)	<0.10		0.10	ug/L	19-NOV-21	5	
Calcium (Ca)	67.3		0.50	mg/L	19-NOV-21		
Cesium (Cs)	<0.10		0.10	ug/L	19-NOV-21		
Chromium (Cr)	<1.0		1.0	ug/L	19-NOV-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	19-NOV-21		
Copper (Cu)	139		1.0	ug/L	19-NOV-21		1000
Iron (Fe)	122		50	ug/L	19-NOV-21		300
Lead (Pb)	<1.0		1.0	ug/L	19-NOV-21	10	
Lithium (Li)	<100		100	ug/L	19-NOV-21		
Magnesium (Mg)	26.9		0.50	mg/L	19-NOV-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2663301-2 RW2 Sampled By: TFC/JAK on 16-NOV-21 @ 12:00 Matrix: WATER									
Total Metals									
Manganese (Mn)	1.8		1.0	ug/L	19-NOV-21		50		
Molybdenum (Mo)	<0.50		0.50	ug/L	19-NOV-21				
Nickel (Ni)	<1.0		1.0	ug/L	19-NOV-21				
Phosphorus (P)	<0.050		0.050	mg/L	19-NOV-21				
Potassium (K)	<1.0		1.0	mg/L	19-NOV-21				
Rubidium (Rb)	<2.0		2.0	ug/L	19-NOV-21				
Selenium (Se)	<1.0		1.0	ug/L	19-NOV-21	50			
Silicon (Si)	6100		1000	ug/L	19-NOV-21				
Silver (Ag)	<0.050		0.050	ug/L	19-NOV-21				
Sodium (Na)	14.0		0.50	mg/L	19-NOV-21	20	200		
Strontium (Sr)	85.2		1.0	ug/L	19-NOV-21				
Sulfur (S)	5120		500	ug/L	19-NOV-21				
Tellurium (Te)	<2.0		2.0	ug/L	19-NOV-21				
Thallium (Tl)	<0.060		0.060	ug/L	19-NOV-21				
Thorium (Th)	<1.0		1.0	ug/L	19-NOV-21				
Tin (Sn)	<1.0		1.0	ug/L	19-NOV-21				
Titanium (Ti)	<2.0		2.0	ug/L	19-NOV-21				
Tungsten (W)	<6.0		6.0	ug/L	19-NOV-21				
Uranium (U)	<2.0		2.0	ug/L	19-NOV-21	20			
Vanadium (V)	<0.50		0.50	ug/L	19-NOV-21				
Zinc (Zn)	11.1		3.0	ug/L	19-NOV-21		5000		
Zirconium (Zr)	<0.80		0.80	ug/L	19-NOV-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ALK-SPEC-PCT-WT	Water	Automated Speciated Alkalinity	APHA 2320B

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

BR-IC-N-ONT-DW-WT	Water	Bromide in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-ONT-DW-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-APP-DW-WT	Water	Colour	APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-MF-DW-WT	Water	E. coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 ∝C for 24 – 2 h. Method ID: WT-TM-1200

EC-ONT-DW-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

ETL-SAR-CALC-WT	Water	Sodium Adsorption Ratio	Calculation
ETL-SILICA-CALC-WT	Water	Calculate from SI-TOT-WT	EPA 200.8
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

IONBALANCE-OP03-WT	Water	Detailed Ion Balance Calculation	APHA 1030E, 2330B, 2510A
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
NH3-F-ONT-DW-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

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

NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-ONT-DW-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PO4-DO-COL-DW-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ONT-DW-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-ONT-DW-WT	Water	Total Dissolved Solids	APHA 2540C

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

TC-MF-DW-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200

TCB-MF-DW-WT	Water	Total Coliform Background	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-ONT-DW-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

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

Chain of Custody numbers:

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

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2663301 Report Date: 23-NOV-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SPEC-PCT-WT	Water							
Batch R5654704								
WG3660252-4 DUP		**WG3660252-3**						
Alkalinity, Total (as CaCO3)		151	149		mg/L	1.3	20	17-NOV-21
Alkalinity, Bicarbonate (as CaCO3)		151	149		mg/L	1.3	20	17-NOV-21
Alkalinity, Carbonate (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-NOV-21
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3660252-2 LCS								
Alkalinity, Total (as CaCO3)			92.6		%		85-115	17-NOV-21
WG3660252-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	17-NOV-21
Alkalinity, Bicarbonate (as CaCO3)			<2.0		mg/L		4	17-NOV-21
Alkalinity, Carbonate (as CaCO3)			<2.0		mg/L		2	17-NOV-21
Alkalinity, Hydroxide (as CaCO3)			<2.0		mg/L		2	17-NOV-21
Batch R5654708								
WG3660254-4 DUP		**WG3660254-3**						
Alkalinity, Total (as CaCO3)		269	268		mg/L	0.2	20	17-NOV-21
Alkalinity, Bicarbonate (as CaCO3)		269	268		mg/L	0.2	20	17-NOV-21
Alkalinity, Carbonate (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-NOV-21
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3660254-2 LCS								
Alkalinity, Total (as CaCO3)			93.3		%		85-115	17-NOV-21
WG3660254-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	17-NOV-21
Alkalinity, Bicarbonate (as CaCO3)			<2.0		mg/L		4	17-NOV-21
Alkalinity, Carbonate (as CaCO3)			<2.0		mg/L		2	17-NOV-21
Alkalinity, Hydroxide (as CaCO3)			<2.0		mg/L		2	17-NOV-21
BR-IC-N-ONT-DW-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Bromide (Br)		<0.10	<0.10	RPD-NA	mg/L	N/A	25	17-NOV-21
WG3660094-17 LCS								
Bromide (Br)			98.4		%		70-130	17-NOV-21
WG3660094-16 MB								
Bromide (Br)			<0.10		mg/L		0.1	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Bromide (Br)			95.9		%		70-130	17-NOV-21
CL-IC-N-ONT-DW-WT	Water							

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-ONT-DW-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Chloride (Cl)		33.2	33.5		mg/L	0.7	25	17-NOV-21
WG3660094-17 LCS								
Chloride (Cl)			99.0		%		70-130	17-NOV-21
WG3660094-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Chloride (Cl)			100.0		%		70-130	17-NOV-21
COLOUR-APP-DW-WT	Water							
Batch R5652665								
WG3660436-3 DUP		**L2663301-2**						
Colour, Apparent		<2.0	<2.0	RPD-NA	CU	N/A	25	17-NOV-21
WG3660436-2 LCS								
Colour, Apparent			100.7		%		70-130	17-NOV-21
WG3660436-1 MB								
Colour, Apparent			<2.0		CU		2	17-NOV-21
EC-MF-DW-WT	Water							
Batch R5653441								
WG3659927-1 MB								
E. Coli			0		CFU/100mL		1	17-NOV-21
EC-ONT-DW-WT	Water							
Batch R5654704								
WG3660252-4 DUP		**WG3660252-3**						
Conductivity		2100	2110		umhos/cm	0.5	25	17-NOV-21
WG3660252-2 LCS								
Conductivity			99.4		%		70-130	17-NOV-21
WG3660252-1 MB								
Conductivity			<3.0		umhos/cm		3	17-NOV-21
Batch R5654708								
WG3660254-4 DUP		**WG3660254-3**						
Conductivity		660	656		umhos/cm	0.6	25	17-NOV-21
WG3660254-2 LCS								
Conductivity			99.3		%		70-130	17-NOV-21
WG3660254-1 MB								
Conductivity			<3.0		umhos/cm		3	17-NOV-21
F-DW-IC-WT	Water							

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-DW-IC-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Fluoride (F)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3660094-17 LCS								
Fluoride (F)			101.8		%		90-110	17-NOV-21
WG3660094-16 MB								
Fluoride (F)			<0.10		mg/L		0.1	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Fluoride (F)			99.6		%		75-125	17-NOV-21
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-4 DUP		**WG3661383-3**						
Aluminum (Al)		30	28		ug/L	6.8	25	19-NOV-21
Antimony (Sb)		<0.60	<0.60	RPD-NA	ug/L	N/A	25	19-NOV-21
Arsenic (As)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Barium (Ba)		21	21		ug/L	0.7	25	19-NOV-21
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	19-NOV-21
Bismuth (Bi)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Boron (B)		<50	<50	RPD-NA	ug/L	N/A	25	19-NOV-21
Cadmium (Cd)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	19-NOV-21
Calcium (Ca)		32.9	32.7		mg/L	0.8	25	19-NOV-21
Cesium (Cs)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	19-NOV-21
Chromium (Cr)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Cobalt (Co)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	19-NOV-21
Copper (Cu)		3.9	3.8		ug/L	3.9	25	19-NOV-21
Iron (Fe)		<50	<50	RPD-NA	ug/L	N/A	25	19-NOV-21
Lead (Pb)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Lithium (Li)		<100	<100	RPD-NA	ug/L	N/A	25	19-NOV-21
Magnesium (Mg)		9.29	8.68		mg/L	6.8	25	19-NOV-21
Manganese (Mn)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Molybdenum (Mo)		1.17	1.16		ug/L	1.1	25	19-NOV-21
Nickel (Ni)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Phosphorus (P)		0.583	0.537		mg/L	8.3	25	19-NOV-21
Potassium (K)		1.6	1.5		mg/L	4.7	25	19-NOV-21
Rubidium (Rb)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-4 DUP		**WG3661383-3**						
Silicon (Si)		<1000	<1000	RPD-NA	ug/L	N/A	25	19-NOV-21
Silver (Ag)		<0.050	<0.050	RPD-NA	ug/L	N/A	25	19-NOV-21
Sodium (Na)		13.5	13.2		mg/L	2.9	25	19-NOV-21
Strontium (Sr)		175	176		ug/L	0.1	25	19-NOV-21
Sulfur (S)		7870	7700		ug/L	2.1	25	19-NOV-21
Tellurium (Te)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Thallium (Tl)		<0.060	<0.060	RPD-NA	ug/L	N/A	25	19-NOV-21
Thorium (Th)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Tin (Sn)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Titanium (Ti)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Tungsten (W)		<6.0	<6.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Uranium (U)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Vanadium (V)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	19-NOV-21
Zinc (Zn)		<3.0	<3.0	RPD-NA	ug/L	N/A	25	19-NOV-21
Zirconium (Zr)		<0.80	<0.80	RPD-NA	ug/L	N/A	25	19-NOV-21
WG3661383-2 LCS								
Aluminum (Al)			98.4		%		70-130	19-NOV-21
Antimony (Sb)			101.2		%		70-130	19-NOV-21
Arsenic (As)			99.97		%		70-130	19-NOV-21
Barium (Ba)			96.9		%		70-130	19-NOV-21
Beryllium (Be)			103.3		%		70-130	19-NOV-21
Bismuth (Bi)			99.5		%		70-130	19-NOV-21
Boron (B)			99.6		%		70-130	19-NOV-21
Cadmium (Cd)			101.4		%		70-130	19-NOV-21
Calcium (Ca)			105.1		%		70-130	19-NOV-21
Cesium (Cs)			101.2		%		70-130	19-NOV-21
Chromium (Cr)			97.0		%		70-130	19-NOV-21
Cobalt (Co)			98.3		%		70-130	19-NOV-21
Copper (Cu)			96.7		%		70-130	19-NOV-21
Iron (Fe)			98.4		%		70-130	19-NOV-21
Lead (Pb)			100.2		%		70-130	19-NOV-21
Lithium (Li)			100.8		%		70-130	19-NOV-21
Magnesium (Mg)			101.7		%		70-130	19-NOV-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-2 LCS								
Manganese (Mn)			96.8		%		70-130	19-NOV-21
Molybdenum (Mo)			103.7		%		70-130	19-NOV-21
Nickel (Ni)			96.7		%		70-130	19-NOV-21
Phosphorus (P)			102.1		%		70-130	19-NOV-21
Potassium (K)			95.5		%		70-130	19-NOV-21
Rubidium (Rb)			99.0		%		70-130	19-NOV-21
Selenium (Se)			100.9		%		70-130	19-NOV-21
Silicon (Si)			98.9		%		70-130	19-NOV-21
Silver (Ag)			101.7		%		70-130	19-NOV-21
Sodium (Na)			97.9		%		70-130	19-NOV-21
Strontium (Sr)			102.8		%		70-130	19-NOV-21
Sulfur (S)			98.1		%		70-130	19-NOV-21
Tellurium (Te)			92.9		%		70-130	19-NOV-21
Thallium (Tl)			103.4		%		70-130	19-NOV-21
Thorium (Th)			97.1		%		70-130	19-NOV-21
Tin (Sn)			101.3		%		70-130	19-NOV-21
Titanium (Ti)			95.6		%		70-130	19-NOV-21
Tungsten (W)			98.6		%		70-130	19-NOV-21
Uranium (U)			98.5		%		70-130	19-NOV-21
Vanadium (V)			98.6		%		70-130	19-NOV-21
Zinc (Zn)			96.6		%		70-130	19-NOV-21
Zirconium (Zr)			97.2		%		70-130	19-NOV-21
WG3661383-1 MB								
Aluminum (Al)			<10		ug/L		10	19-NOV-21
Antimony (Sb)			<0.60		ug/L		0.6	19-NOV-21
Arsenic (As)			<1.0		ug/L		1	19-NOV-21
Barium (Ba)			<10		ug/L		10	19-NOV-21
Beryllium (Be)			<0.50		ug/L		0.5	19-NOV-21
Bismuth (Bi)			<1.0		ug/L		1	19-NOV-21
Boron (B)			<50		ug/L		50	19-NOV-21
Cadmium (Cd)			<0.10		ug/L		0.1	19-NOV-21
Calcium (Ca)			<0.50		mg/L		0.5	19-NOV-21
Cesium (Cs)			<0.10		ug/L		0.1	19-NOV-21
Chromium (Cr)			<1.0		ug/L		1	19-NOV-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9

Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-1 MB								
Cobalt (Co)			<0.50		ug/L		0.5	19-NOV-21
Copper (Cu)			<1.0		ug/L		1	19-NOV-21
Iron (Fe)			<50		ug/L		50	19-NOV-21
Lead (Pb)			<1.0		ug/L		1	19-NOV-21
Lithium (Li)			<100		ug/L		100	19-NOV-21
Magnesium (Mg)			<0.50		mg/L		0.5	19-NOV-21
Manganese (Mn)			<1.0		ug/L		1	19-NOV-21
Molybdenum (Mo)			<0.50		ug/L		0.5	19-NOV-21
Nickel (Ni)			<1.0		ug/L		1	19-NOV-21
Phosphorus (P)			<0.050		mg/L		0.05	19-NOV-21
Potassium (K)			<1.0		mg/L		1	19-NOV-21
Rubidium (Rb)			<2.0		ug/L		2	19-NOV-21
Selenium (Se)			<1.0		ug/L		1	19-NOV-21
Silicon (Si)			<1000		ug/L		1000	19-NOV-21
Silver (Ag)			<0.050		ug/L		0.05	19-NOV-21
Sodium (Na)			<0.50		mg/L		0.5	19-NOV-21
Strontium (Sr)			<1.0		ug/L		1	19-NOV-21
Sulfur (S)			<500		ug/L		500	19-NOV-21
Tellurium (Te)			<2.0		ug/L		2	19-NOV-21
Thallium (Tl)			<0.060		ug/L		0.06	19-NOV-21
Thorium (Th)			<1.0		ug/L		1	19-NOV-21
Tin (Sn)			<1.0		ug/L		1	19-NOV-21
Titanium (Ti)			<2.0		ug/L		2	19-NOV-21
Tungsten (W)			<6.0		ug/L		6	19-NOV-21
Uranium (U)			<2.0		ug/L		2	19-NOV-21
Vanadium (V)			<0.50		ug/L		0.5	19-NOV-21
Zinc (Zn)			<3.0		ug/L		3	19-NOV-21
Zirconium (Zr)			<0.80		ug/L		0.8	19-NOV-21
WG3661383-5 MS		**WG3661383-3**						
Aluminum (Al)			96.9		%		70-130	19-NOV-21
Antimony (Sb)			97.5		%		70-130	19-NOV-21
Arsenic (As)			105.3		%		70-130	19-NOV-21
Barium (Ba)			N/A	MS-B	%		-	19-NOV-21
Beryllium (Be)			99.6		%		70-130	19-NOV-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-5 MS		**WG3661383-3**						
Bismuth (Bi)			94.6		%		70-130	19-NOV-21
Boron (B)			89.4		%		70-130	19-NOV-21
Cadmium (Cd)			103.0		%		70-130	19-NOV-21
Calcium (Ca)			N/A	MS-B	%		-	19-NOV-21
Cesium (Cs)			97.7		%		70-130	19-NOV-21
Chromium (Cr)			99.0		%		70-130	19-NOV-21
Cobalt (Co)			98.9		%		70-130	19-NOV-21
Copper (Cu)			95.5		%		70-130	19-NOV-21
Iron (Fe)			98.0		%		70-130	19-NOV-21
Lead (Pb)			94.4		%		70-130	19-NOV-21
Lithium (Li)			94.3		%		70-130	19-NOV-21
Magnesium (Mg)			N/A	MS-B	%		-	19-NOV-21
Manganese (Mn)			97.9		%		70-130	19-NOV-21
Molybdenum (Mo)			98.8		%		70-130	19-NOV-21
Nickel (Ni)			97.1		%		70-130	19-NOV-21
Phosphorus (P)			N/A	MS-B	%		-	19-NOV-21
Potassium (K)			95.1		%		70-130	19-NOV-21
Rubidium (Rb)			102.1		%		70-130	19-NOV-21
Selenium (Se)			111.7		%		70-130	19-NOV-21
Silicon (Si)			N/A	MS-B	%		-	19-NOV-21
Silver (Ag)			97.3		%		70-130	19-NOV-21
Sodium (Na)			N/A	MS-B	%		-	19-NOV-21
Strontium (Sr)			N/A	MS-B	%		-	19-NOV-21
Sulfur (S)			N/A	MS-B	%		-	19-NOV-21
Tellurium (Te)			100.5		%		70-130	19-NOV-21
Thallium (Tl)			98.0		%		70-130	19-NOV-21
Thorium (Th)			93.3		%		70-130	19-NOV-21
Tin (Sn)			98.9		%		70-130	19-NOV-21
Titanium (Ti)			96.7		%		70-130	19-NOV-21
Tungsten (W)			95.8		%		70-130	19-NOV-21
Uranium (U)			N/A	MS-B	%		-	19-NOV-21
Vanadium (V)			101.5		%		70-130	19-NOV-21
Zinc (Zn)			97.6		%		70-130	19-NOV-21

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	Water							
Batch R5654212								
WG3661383-5 MS		**WG3661383-3**						
Zirconium (Zr)			94.4		%		70-130	19-NOV-21
NH3-F-ONT-DW-WT	Water							
Batch R5653276								
WG3659624-3 DUP		**WG3659624-5**						
Ammonia, Total (as N)		0.044	0.043		mg/L	2.1	20	17-NOV-21
WG3659624-2 LCS								
Ammonia, Total (as N)			99.3		%		85-115	17-NOV-21
WG3659624-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	17-NOV-21
WG3659624-4 MS		**WG3659624-5**						
Ammonia, Total (as N)			98.1		%		75-125	17-NOV-21
Batch R5655018								
WG3660384-3 DUP		**WG3660384-5**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-NOV-21
WG3660384-2 LCS								
Ammonia, Total (as N)			96.2		%		85-115	18-NOV-21
WG3660384-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-NOV-21
WG3660384-4 MS		**WG3660384-5**						
Ammonia, Total (as N)			103.7		%		75-125	18-NOV-21
NO2-DW-IC-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3660094-17 LCS								
Nitrite (as N)			99.1		%		90-110	17-NOV-21
WG3660094-16 MB								
Nitrite (as N)			<0.010		mg/L		0.01	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Nitrite (as N)			101.1		%		75-125	17-NOV-21
NO3-DW-IC-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Nitrate (as N)		7.29	7.34		mg/L	0.6	20	17-NOV-21
WG3660094-17 LCS								

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-DW-IC-WT	Water							
Batch R5653597								
WG3660094-17 LCS								
Nitrate (as N)			99.0		%		90-110	17-NOV-21
WG3660094-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Nitrate (as N)			N/A	MS-B	%		-	17-NOV-21
PH-ONT-DW-WT	Water							
Batch R5654704								
WG3660252-4 DUP		**WG3660252-3**						
pH		8.05	8.06	J	pH units	0.01	0.2	17-NOV-21
WG3660252-2 LCS								
pH			7.02		pH units		6.9-7.1	17-NOV-21
Batch R5654708								
WG3660254-4 DUP		**WG3660254-3**						
pH		8.08	8.07	J	pH units	0.01	0.2	17-NOV-21
WG3660254-2 LCS								
pH			7.02		pH units		6.9-7.1	17-NOV-21
PO4-DO-COL-DW-WT	Water							
Batch R5652117								
WG3659769-13 DUP		**WG3659769-15**						
Orthophosphate-Dissolved (as P)		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3659769-18 DUP		**L2663301-2**						
Orthophosphate-Dissolved (as P)		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	17-NOV-21
WG3659769-12 LCS								
Orthophosphate-Dissolved (as P)			98.9		%		80-120	17-NOV-21
WG3659769-17 LCS								
Orthophosphate-Dissolved (as P)			98.1		%		80-120	17-NOV-21
WG3659769-11 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	17-NOV-21
WG3659769-16 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	17-NOV-21
WG3659769-14 MS		**WG3659769-15**						
Orthophosphate-Dissolved (as P)			100.8		%		70-130	17-NOV-21
WG3659769-19 MS		**L2663301-2**						
Orthophosphate-Dissolved (as P)			96.1		%		70-130	17-NOV-21
SO4-IC-N-ONT-DW-WT	Water							

Quality Control Report

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ONT-DW-WT	Water							
Batch R5653597								
WG3660094-19 DUP		**WG3660094-18**						
Sulfate (SO4)		16.0	16.1		mg/L	0.6	20	17-NOV-21
WG3660094-17 LCS								
Sulfate (SO4)			100.2		%		90-110	17-NOV-21
WG3660094-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	17-NOV-21
WG3660094-20 MS		**WG3660094-18**						
Sulfate (SO4)			103.4		%		75-125	17-NOV-21
SOLIDS-TDS-ONT-DW-WT	Water							
Batch R5653918								
WG3660049-3 DUP		**L2661760-1**						
Total Dissolved Solids		169	159		mg/L	6.4	25	17-NOV-21
WG3660049-2 LCS								
Total Dissolved Solids			100.9		%		70-130	17-NOV-21
WG3660049-1 MB								
Total Dissolved Solids			<10		mg/L		10	17-NOV-21
TC-MF-DW-WT	Water							
Batch R5653449								
WG3659937-1 MB								
Total Coliforms			0		CFU/100mL		1	17-NOV-21
TCB-MF-DW-WT	Water							
Batch R5653449								
WG3659937-1 MB								
Total Coliform Background			0		CFU/100mL		1	17-NOV-21
TURBIDITY-ONT-DW-WT	Water							
Batch R5654802								
WG3659778-2 LCS								
Turbidity			94.5		%		85-115	17-NOV-21
WG3659778-1 MB								
Turbidity			<0.10		NTU		0.1	17-NOV-21
Batch R5654803								
WG3659781-2 LCS								
Turbidity			94.0		%		85-115	17-NOV-21
WG3659781-1 MB								
Turbidity			<0.10		NTU		0.1	17-NOV-21

Quality Control Report

Workorder: L2663301 Report Date: 23-NOV-21

Client: MTE CONSULTANTS INC. (Kitchener)
520 BINGEMANS CENTRE DRIVE
KITCHENER ON N2B 3X9
Contact: FRASER CUMMINGS

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

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

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

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

Appendix G

Macro Drainage Analysis

G.1 Introduction

This Technical Appendix (**Appendix G**) forms part of the Maximum Water Table Elevation Report used to support the above-water-table application for the proposed Edworthy West Pit and presents details on the development and results of the water balance model used. This Technical Appendix relies on information presented in and should be read in conjunction with the Maximum Water Table Elevation Report.

The purpose of this micro drainage analysis is to to identify potential hydrologic impacts from the proposed Edworthy West Pit on nearby features. The pit location is shown on **Figure 1** of Maximum Water Table Elevation Report.

G.2 Pre-Extraction (Existing) Conditions

The catchment area in which the Site contributes to was estimated using the Ontario Flow Assessment tool (Ministry of Natural Resources and Forestry, 2021). Based on the catchment area defined by the Ontario Flow Assessment tool (**Figure G1**) the majority (~96%) of the proposed licensed area contributes to Cedar Creek; a tributary to the Nith River and ultimately the Grand River. The remainder of the licensed area contributes to the Grand River – Central South sub catchment. As such, the analysis completed below will address the changes to the Cedar Creek sub catchment.

To analyze precipitation data on an annual basis, historical information from the Roseville weather station was accessed from Environment Canada Climate Normals (1981-2010). The average annual precipitation at this station totals 918.7 mm/yr. A water balance analysis, indicating how precipitation (P) is distributed into evapotranspiration (ET), surface runoff (R), and infiltration (I) within the catchment, was completed for existing conditions in order to establish current annual runoff and infiltration rates (mm/yr). Hydrologic component values were derived from physical attributes such as land-use (derived for the Southern Ontario Land Resource Information System (SOLRIS) 3.0), soil composition and slope (derived from the Ontario Ministry of Agriculture, Food and Rural Affairs Soil Survey Complex).

The water balance example in Table 3.1 of the MOE *Stormwater Management Planning and Design Manual* (March 2003), provided a basis for the factors used. Monthly ET calculations were performed for the Site using the Thornthwaite and Mather Method considering average monthly temperatures, and sunlight hours at the Site latitude. The annual value calculated was considered maximum potential. This value was matched with the highest ET value in Table 3.1 in the MOE 2003 SWMP Design Manual. Values for the remaining land cover/soil distinctions were scaled according to those published in Table 3.1.

In order to account for the differences between soil types in soil complex survey data, land use in the SOLRIS data and soil types and land-uses presented in the MOE 2003 SWMP Design Manual the following assumptions were made:

- Land use categorized as forest, coniferous forest, mixed forest, deciduous forest, treed swamp, thicket swamp and marsh were considered “mature forest”;
- Land use categorized as plantations, tilled and undifferentiated were considered “moderately rooted crops”;
- Land use categorized as hedge rows was considered “pasture/shrubs”;
- Land use categorized as transportation, residential or industrials areas were considered “built-up impervious;

- Land use categorized as built-up pervious was considered “urban lawns”;
- Soils classified as gravelly sandy loam, sandy loam or loamy sand were considered “fine sandy loam”;
- Soils classified as loam, silt loam or organic were considered “silt loam”; and
- Those areas, which did not have associated land-use or soil type data were excluded from this analysis with the exception of areas categorized as open water.

The total pre-development evapotranspiration, runoff and infiltration volumes for the Cedar Creek sub catchment is summarized below:

Total Area (ha)	Evapotranspiration (m^3/year)	Runoff (m^3/year)	Infiltration (m^3/year)	Total (m^3/year)
1,112	6,376,727	1,636,797	2,124,982	10,138,506

A detailed breakdown of the land-use, soil type and slope within each catchment can be found in **Table G1** and shown on (**Figure G2**).

As there is no land use typical of a graveled area (land-use = extraction) in the SMPDM Table 3.1, lower evapotranspiration values than presented in the water balance tables were used to represent the lack of transpiration in an active pit (541 mm/yr). Furthermore, the infiltration factor for gravel was calculated as 0.15 (0.1 topography factor, 0.05 soil factor).

G.3 Post-Extraction (Entire Pit Excavated Condition)

Post-extraction land use changes will result in a re-distribution of evapotranspiration, runoff and infiltration. Under post-extraction conditions, the following assumptions have been made:

- The area between the extraction area and licensed boundary was assumed to have the same properties (land use, soil type and slope) as the extraction area.

A detailed breakdown of the land-use, soil type and slope within each catchment post extraction can be found in **Table G1** and shown on **Figure G3**.

The post-extraction water balance calculations estimate the following (all land cover types):

Area (ha)	Evapotranspiration (m^3/year)	Runoff (m^3/year)	Infiltration (m^3/year)	Total (m^3/year)
1,112	6,362,841	1,558,009	2,217,657	10,138,506

The water balance calculations indicate that following extraction both ET and infiltration are estimated to decrease by 13,887 m^3/year (~0.2 % decrease) and 41,690 m^3/year (~2.0 % decrease). Runoff is estimated to increase by 55,576 m^3/year (3.4 % increase). Although post extraction runoff is estimated to increase while infiltration decreases; there is no direct surface water outlet on-Site. As a result, for the purposes of this calculation any change in runoff within the licensed area should be considered infiltration. Therefore, runoff will decrease by 78,788 m^3/year (4.8%) while infiltration will increase by 92,674 m^3/year (4.4%).

As there are not direct surface water features on-Site the reduction in runoff will not adversely affect surrounding features.

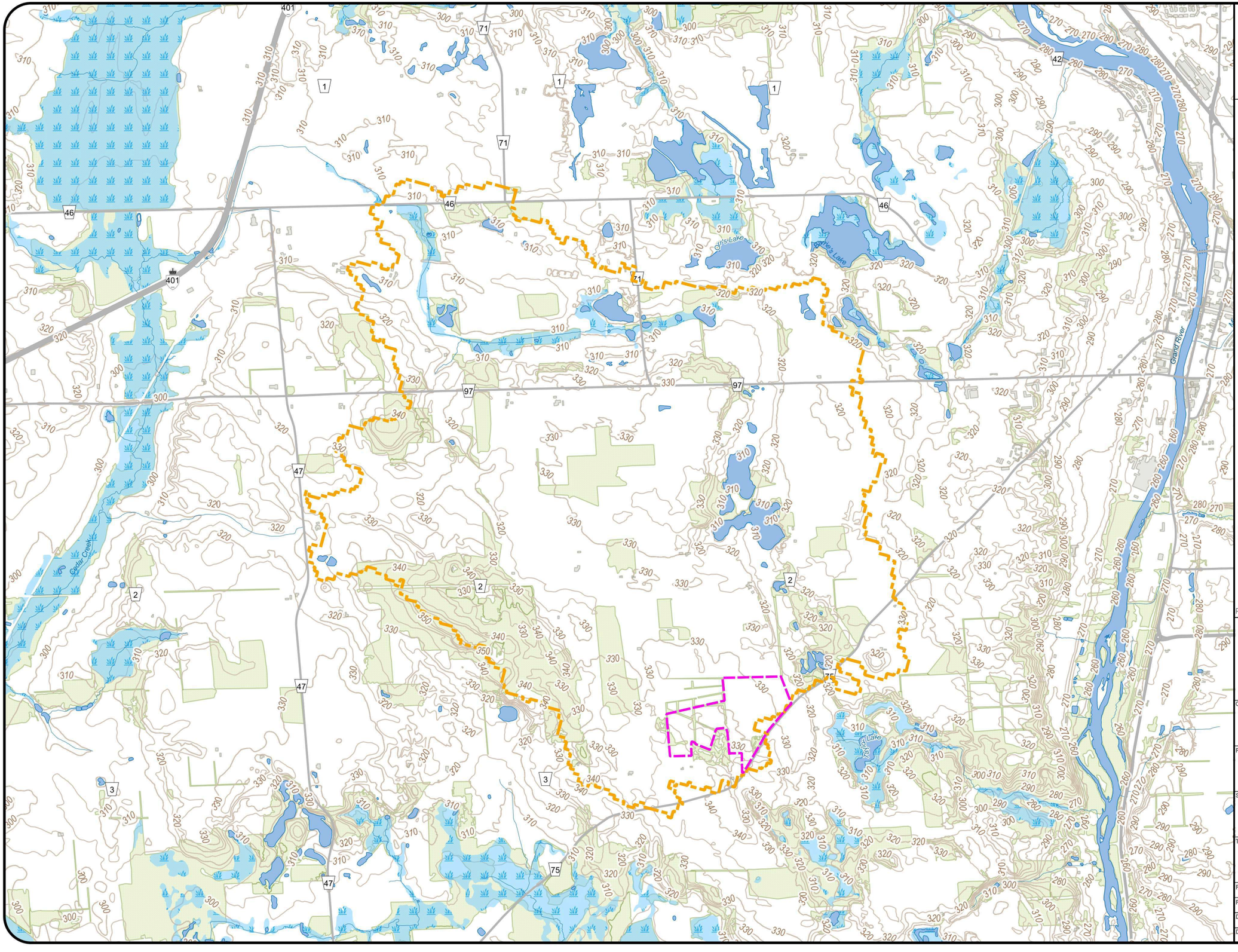
G.4 Conclusion

Based on the micro drainage analysis detailed above cumulative impacts related to above water table extraction at the Edworthy West Pit will have negligible impacts to surrounding features.

Project No: 46639-100 P:\P46639\100\46638-100-AR1.qgz

ARE1.1

June 30, 2022 - 11:51 - Plotted By: FCummings



N
NORTH

N
PROJECT NORTH

Legend

Boundaries
- License Boundary

Surface Water
- Watercourse
- Waterbody
- Cedar Creek Catchment

Wetlands
- Provincally Significant Wetland

Data Sources:

Ministry of Natural Resources and Forestry. (2021). ONTARIO FLOW ASSESSMENT TOOL

0 200 400 600 800 1000 m

Scale (11x17): 1:30000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

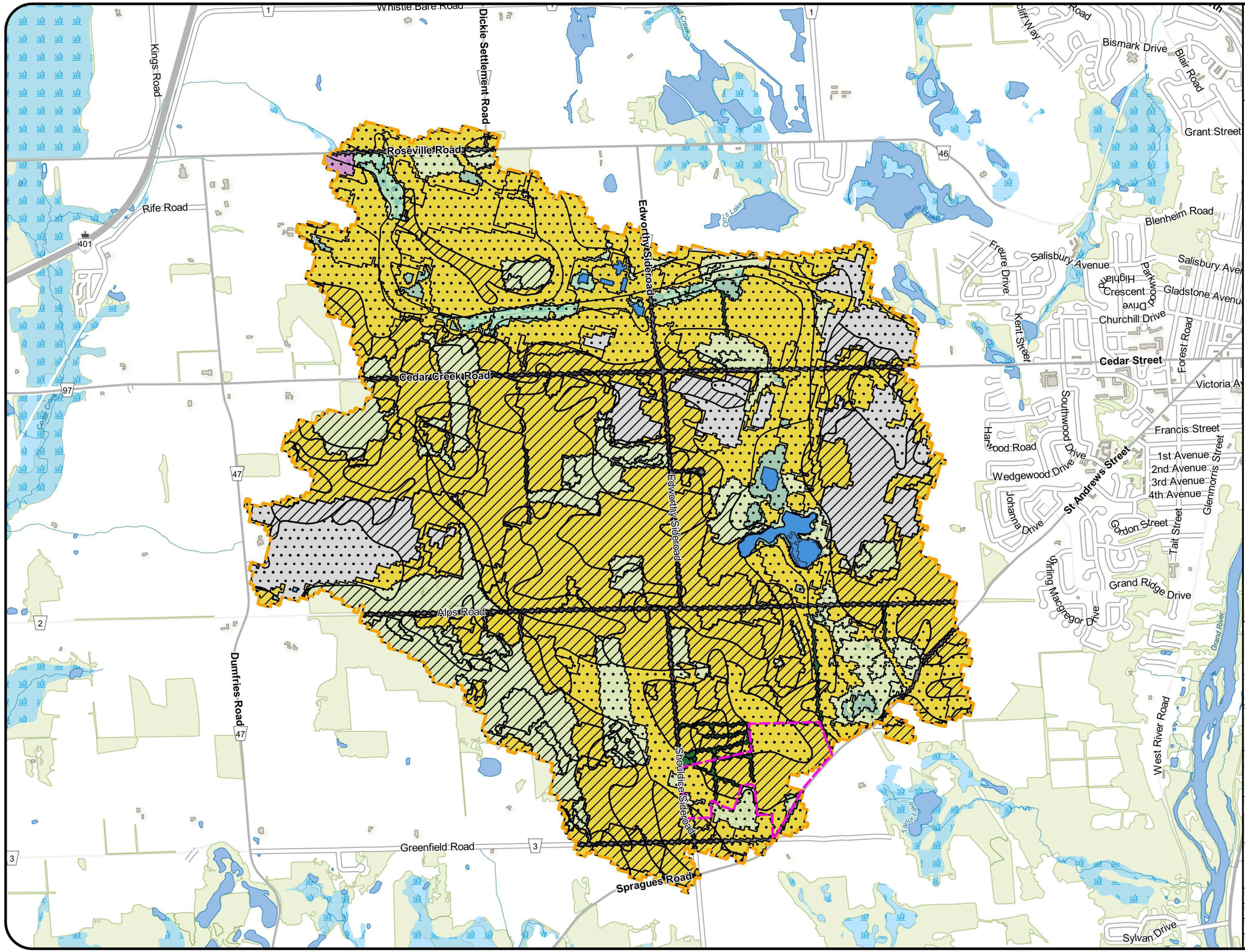
Title: **Cedar Creek Catchment Area**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	G1
Date	June 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

ARE1.2

June 30, 2022 - 13:18 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries
- License Boundary

Surface Water
- Watercourse
- Waterbody
- Cedar Creek Catchment

Wetlands
- Provincally Significant Wetland

Land-use
- Agriculture/Undifferentiated
- Extraction
- Mature Forests
- Open Water
- Built-Up Impervious
- Pasture/Shrubs
- Built-Up Pervious

Soil Type
- No soil type
- Fine Sandy Loam
- Silt Loam

Data Sources:
Ministry of Natural Resources and Forestry. (2021). ONTARIO FLOW ASSESSMENT TOOL
Ministry of Natural Resources and Forestry Science and Research Branch April 2019

0 200 400 600 800 1000 m

Scale (11x17): 1:25000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

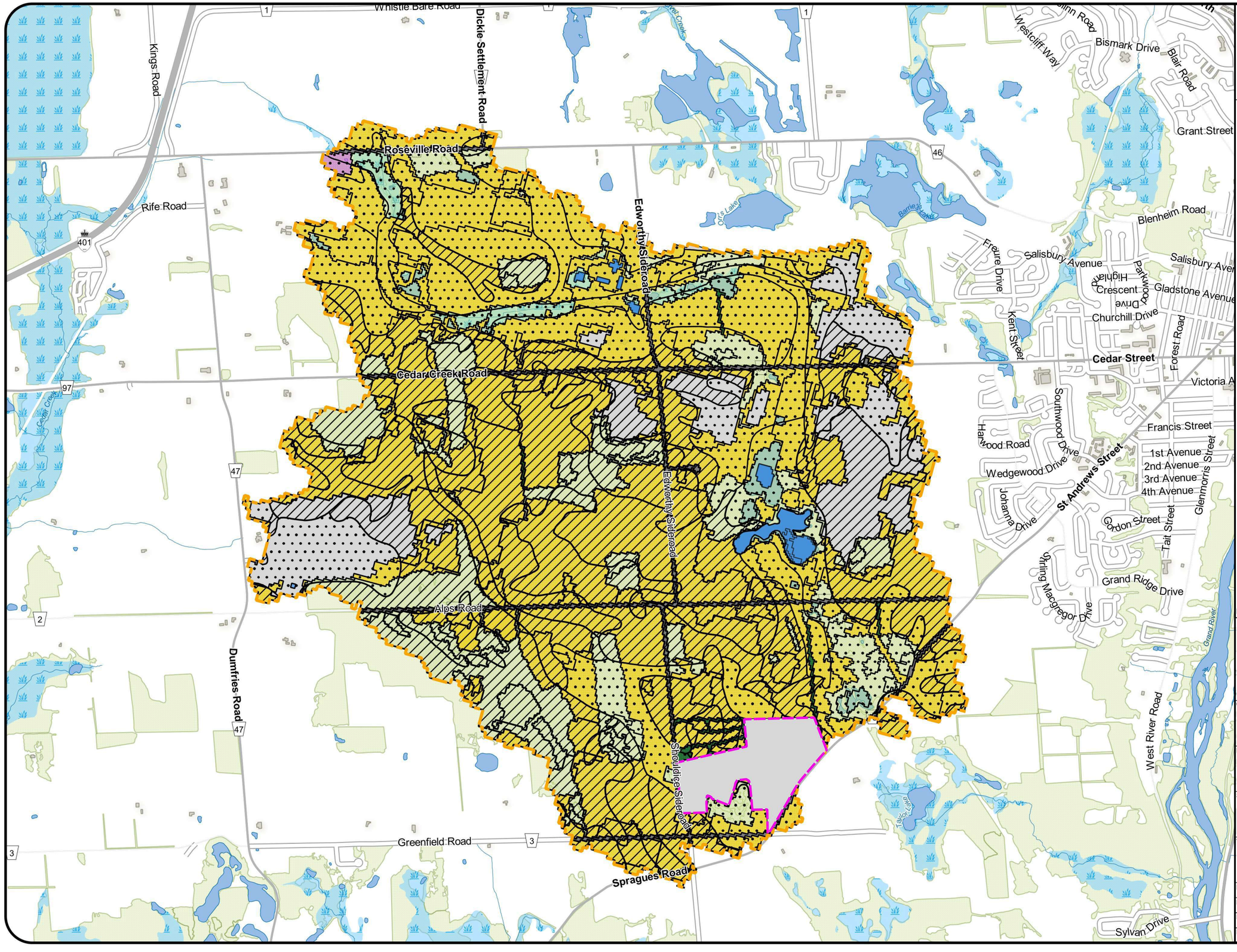
Title: **Land-use & Soil Type - Pre-Extraction**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	G2
Date	June 2022		

Project No: 46639-100 P:\P46638\100\46638-100-AR1.qgz

ARE1.3

June 30, 2022 - 13:40 - Plotted By: FCummings



NORTH

PROJECT NORTH

Legend

Boundaries
- License Boundary

Surface Water
- Watercourse
- Waterbody
- Ceder Creek Catchment

Wetlands
- Provincally Significant Wetland

Land-use
- Agriculture/Undifferentiated
- Extraction
- Mature Forests
- Open Water
- Built-Up Impervious
- Pasture/Shrubs
- Built-Up Pervious

Soil Type
- no soil type
- Fine Sandy Loam
- Silt Loam

Data Sources:

Ministry of Natural Resources and Forestry. (2021). ONTARIO FLOW ASSESSMENT TOOL
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0 200 400 600 800 1000 m

Scale (11x17): 1:25000

Project CRS: NAD83 / UTM zone 17N

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Cambridge Aggregates

Project: Proposed West Edworthy Pit

Site: Township of North Dumfries

Title: **Land-use & Soil Type - Post-Extraction**

Reviewed By	PAG		
Prepared By	TFC	Project No	46639-100
Drawn By	TFC	Figure No	G3
Date	June 2022		

Table G1: Micro Drainage Analysis
West Edworthy Pit

Project: 46639-100
Date: 13/12/2021
By: TFC
File: Q:\46639\100\analysis\micro_drainage_analysis\46639_100_Micro Drainage Analysis.xlsx

Pre-Extraction

Slope	Landuse	Soil Type	Area (m^2)	Precipitaion (m^3/year)	Evapotranspiration (m^3/year)	Runoff (m^3/year)	Infiltration (m^3/year)
flat	built-up impervious	silt loam	22,413	20,431	2,914	17,518	0
flat	extraction	silt loam	6	5	3	2	0
flat	mature forests	silt loam	2,541,419	2,316,758	1,500,960	244,739	571,058
flat	moderately rooted crops	silt loam	311,379	283,853	181,560	40,917	61,376
hilly	built-up impervious	fine sandy loam	129,696	118,231	16,861	101,371	0
hilly	extraction	fine sandy loam	124,545	113,535	67,254	39,339	6,942
hilly	mature forests	fine sandy loam	2,803,832	2,555,973	1,649,919	362,422	543,632
hilly	moderately rooted crops	fine sandy loam	2,879,212	2,624,689	1,666,451	479,119	479,119
hilly	pasture/shrubs	fine sandy loam	132,328	120,631	76,590	19,818	24,222
hilly	urban lawns	fine sandy loam	45,976	41,912	25,919	8,796	7,197
rolling	built-up impervious	fine sandy loam	124,655	113,635	16,205	97,430	0
rolling	extraction	fine sandy loam	4	4	2	1	0
rolling	mature forests	fine sandy loam	1,156,877	1,054,609	680,766	112,153	261,690
rolling	moderately rooted crops	fine sandy loam	815,358	743,281	471,919	108,545	162,817
rolling	pasture/shrubs	fine sandy loam	17,204	15,683	9,957	2,004	3,722
rolling	urban lawns	fine sandy loam	16,756	15,275	9,446	2,623	3,206
Total			**11,121,661**	**10,138,506**	**6,376,727**	**1,636,797**	**2,124,982**
			1,112.17				

Post-Extraction

Slope	Landuse	Soil Type	Area (m^2)	Precipitaion (m^3/year)	Evapotranspiration (m^3/year)	Runoff (m^3/year)	Infiltration (m^3/year)
flat	built-up impervious	silt loam	22,413	20,431	2,914	17,518	0
flat	extraction	silt loam	6	5	3	2	0
flat	mature forests	silt loam	2,541,419	2,316,758	1,500,960	244,739	571,058
flat	moderately rooted crops	silt loam	311,379	283,853	181,560	40,917	61,376
hilly	built-up impervious	fine sandy loam	127,823	116,524	16,617	99,907	0
hilly	extraction	fine sandy loam	29,752	27,122	16,066	9,398	1,658
hilly	mature forests	fine sandy loam	2,606,793	2,376,353	1,533,972	336,952	505,429
hilly	moderately rooted crops	fine sandy loam	2,747,526	2,504,644	1,590,233	457,206	457,206
hilly	pasture/shrubs	fine sandy loam	132,328	120,631	76,590	19,818	24,222
hilly	urban lawns	fine sandy loam	45,976	41,912	25,919	8,796	7,197
rolling	built-up impervious	fine sandy loam	124,655	113,635	16,205	97,430	0
rolling	extraction	fine sandy loam	4	4	2	1	0
rolling	mature forests	fine sandy loam	1,156,877	1,054,609	680,766	112,153	261,690
rolling	moderately rooted crops	fine sandy loam	815,358	743,281	471,919	108,545	162,817
rolling	pasture/shrubs	fine sandy loam	17,204	15,683	9,957	2,004	3,722
rolling	urban lawns	fine sandy loam	16,756	15,275	9,446	2,623	3,206
flat	extraction added	fine sand	425,391	387,786	229,711	0	158,075
Total			**11,121,661**	**10,138,506**	**6,362,841**	**1,558,009**	**2,217,657**

Pre-Extraction vs. Post-Extraction	**-13,887**	**-78,788**	**92,674**
Pre-Extraction vs. Post-Extraction %	**-0.2%**	**-4.8%**	**4.4%**

Note: As there is no direct surface water outlet on-Site for the purposes of this calculation any runoff within the licensed area is considered infiltration.

Appendix H

Cambridge Aggregates – Spill Contingency Plan

SPILL RESPONSE PLAN

Prepared for:

CAMBRIDGE AGGREGATE INC. – EDWORTHY WEST PIT

Introduction

Cambridge Aggregate Inc. is a subsidiary of Lehigh Hanson Materials Limited (LHML) is committed to the prevention of incidents that may cause harm to the environment or danger to human life or health. The nature of our business does not require storage of large volumes of toxic chemicals; however, there is a potential for environmental damage from the accidental spillage of petroleum products. Our priority is to be prepared and act in a diligent manner to restore the contaminated site to its previous state following an accidental spill.

To minimize the possible adverse effects on the environment from such a spill, this plan has been developed to deal with various levels of possible emergency situations. The purpose of

this plan is to be able to initiate an immediate response with minimal impact to the natural environment (land or water) in the immediate and surrounding area. The plan includes site-specific information about the storage of petroleum products, guidelines for the assessment and reporting of a spill, assigned responsibilities and training requirements for employees responding to the spill, and containment and restoration procedures for possible spill scenarios.

In this plan, spills are divided into 3 levels based on the volume of spilled material, the potential risks, and the level of assistance required.

❶ **LEVEL 1**

- Small, contained spill
- Low fire / explosion risk
- No outside assistance required

❷ **LEVEL 2**

- Larger, contained spill
- Low fire / explosion risk
- Outside assistance is required

❸ **LEVEL 3**

- Large, uncontained spill
- Possible fire / explosion risk
- Considerable outside assistance is required

Notification & Communication

Timely and accurate reporting of an accidental spill can help to ensure quick and efficient response. Once notified internally, LHML management (or designate) will initiate notification of the appropriate personnel and authorities as determined by the initial assessment. If there is any doubt, LHML management (or designate) will contact the Provincial Emergency Program (PEP) as a precautionary measure to provide a preliminary report of a potential concern. Once under control, LHML management (or designate) will update PEP with the details of the outcome.

Internal Notification:

CONTACT	PHONE NUMBER	PURPOSE
Site Manager-John Holmes	(519) 221-3120	For immediate reporting of all safety/environmental incidents.
Alternate-Edmund Tucker	(905)730-2971	For immediate reporting of all safety/environmental incidents.
Environment Manager-Louis Paul	(613) 864-2255	For immediate reporting of all environmental incidents.
Safety Manager-Louis Paul	(613) 864-2255	For immediate reporting of all safety incidents.
LHML Media Spokesperson	1-972-653-6011	For all inquiries from Media.

External Notification:

CONTACT	PHONE NUMBER	PURPOSE
Fire/Ambulance/RMCP	911	Emergency assistance.
PROVINCIAL AGENCIES		
Provincial Emergency Program (PEP)	1-800-268-6060	Spills to land >100L. All spills to, or threatening water.
BC MOE (LMR – Surrey Office)	(604) 584-8822	Spills to land >100L. All spills to, or threatening water.
FEDERAL AGENCIES		
Env. Canada Spills Action Line	1-866-694-5454.	All spills into watercourses.
Marine Communications & Traffic Services (MCTS)	(604) 666-6011	All spills into the Fraser River and its tributaries. **Marine spills must be reported within 1 hour.**
Canadian Coast Guard (CCG)	1-800-889-8852 (24 hrs)	All spills into watercourses requiring clean-up assistance. **Marine spills must be reported within 1 hour.**
CONTACT	**PHONE NUMBER**	**PURPOSE**
Environment Canada (EPS)	(604) 666-6100 (24 hrs)	Spills to land >100L. All spills to, or threatening water.

SPILL REPORTING CRITERIA (If in Doubt…….Report the Spill)

- ☑ All spills that are equal to or greater than the Provincial Emergency Program (PEP) reportable level must be reported to PEP as soon as possible and within 24hrs.
- ☑ Any spills of deleterious substance to a watercourse must be reported to PEP as soon as possible and within 24hrs.
- ☑ All spills that are equal to or greater than the LHML reportable level must be reported to the Environmental Manager as soon as possible and within 24hrs.

Table 1: Reportable Levels of Hazardous Materials Spills

Hazardous Material	PEP Reportable Level (1)	LHML Reportable Level (2)
Antifreeze	5 kilograms (5 liters)	5 litres
Diesel fuel	100 litres	25 litres
Gasoline (clear & marked)	100 litres	25 litres
Greases	100 litres	25 litres
Hydraulic Oil	100 litres	25 litres
Lubricating Oils	100 litres	25 litres
Paints & Paint Thinners	100 litres	25 litres
Solvents	100 litres	25 litres
Pesticides	1 kilogram	1 kilogram
Waste Oils	100 litres	25 litres

(1) *as required by the BC Spill Reporting Regulation*

(2) *or a spill of ANY quantity that enters a surface water body (e.g.: running ditch, stream, lake)*

Initial Spill Assessment

SPILL OBSERVER

- Identify product spilled and its flammability.
- Determine emergency level and initiate action.

LEVEL 1

- Small, contained spill
- Low fire/explosion risk
- No outside assistance is required

LEVEL 2

- Larger, contained spill
- Low fire/explosion risk
- Outside assistance is required

LEVEL 3

- Large, uncontained spill
- Possible fire/explosion risk
- Considerable outside assistance is required

ASSESS THE SITUATION & GATHER DATA

1. **Secure and isolate the spill area to ensure the safety of others.**
2. **Stop the flow of spilled material if safe to do so (ie. seal off drains, put container upright, plug leak, shut off valve, etc.).**
3. **Gather information about the spill, including:**

REPORT ALL SPILLS
To Your Supervisor
Regardless of Size or Product Immediately

CONTAINMENT & RECOVERY

- ☑ **Use absorbent pads/socks to recover spilled material working from outside into the center.**
- ☑ **Place contaminated waste material into a leak-proof container or bag, label as hazardous waste and dispose of properly using a hazardous waste disposal contractor.**
- ☑ **Complete Environmental Incident Report with all responders & identify corrective / preventative actions to be implemented.**
- ☑ **Replace used equipment and re-stock spill kits.**

Site Information

Business Name: **Cambridge Aggregates Inc.**

Site Address: 1440 Sprague Rd. Cambridge, ON

Phone #: 519-221-3120

Site Emergency Contacts:

Contact	Name	Cell #	Email
Site Manager	John Holmes	519-221-3120	john.holmes@lehighhanson.com
Alternate	Edmund Tucker	905-730-2971	Edmund.Tucker@lehighhanson.com
Environmental Manager	Louis Paul	613-864-2255	Louis.Paul@lehighhanson.com
Safety Manager	Louis Paul	613-864-2255	Louis.Paul@lehighhanson.com

Petroleum Products Stored On-Site: THIS SECTION IS A PLACE HOLDER FOR

FURTURE USE NO PRODUCTS ARE ON SITE AT THIS TIME

PRODUCT		Diesel	Used Oil	Used Oil 2
TANK CAPACITY (L)		90,000	4,500	4,500
TANK ID #		**EC-00002350**	**EC-00003412**	**EC-00038899**
PRIMARY HAZARDS		Flash Point = 52°C Autoignition = 257°C Combustible liquid and vapor	Flash Point = >93°C	Flash Point = >93°C
VAPOR MONITORING		LEL = 0.6%	N/A	N/A
RESPONSE MODE		Eliminate ignition sources, contain using non-combustible absorbent materials & ground equipment.	Contain and Recover	Contain and Recover
TANK LOCATION & SITE CHARACTERISTICS		– Aboveground horizontal tank (2008) – Double walled – Fueling occurs on concrete pad sloped to oil-water separator – OWS discharges to surface drainage ditch and flows to settling pond	– Aboveground horizontal tank (1996) – Double walled – Inside concrete berm under cover which drains to OWS – OWS discharges to ground	– Aboveground horizontal tank (1996) – Double walled – Inside concrete berm under cover which drains to OWS – OWS discharges to ground
LOCATION OF EMERGENCY SHUT-OFF VALVE		East of fuel tank, inside electrical shed	N/A	N/A

Petroleum Products Stored On-Site:

PRODUCT		SAE 30 Drivetrain	10W Hydraulic	Engine Oil
TANK CAPACITY (L)		1,250	1,250	1,250
TANK ID #		**EC-00038897**	**EC-00038895**	**EC-00038885**
PRIMARY HAZARDS		Flash Point = 190°C Autoignition = N/A	Flash Point = <-45°C Autoignition = N/A	Flash Point = 204°C
VAPOR MONITORING		N/A	N/A	N/A
RESPONSE MODE		Contain and Recover	Contain and Recover	Contain and Recover
TANK LOCATION & SITE CHARACTERISTICS		– Aboveground tank (2007) – Double walled – Fueling occurs on concrete pad sloped to oil-water separator – OWS discharges to surface drainage ditch	– Aboveground tank (2007) – Double walled – Fueling occurs on concrete pad sloped to oil-water separator – OWS discharges to surface drainage ditch	– Aboveground tank (2007) – Double walled – Fueling occurs on concrete pad sloped to oil-water separator – OWS discharges to surface drainage ditch

		and flows to settling pond	and flows to settling pond	and flows to settling pond
LOCATION OF EMERGENCY SHUT-OFF VALVE		East of tank, inside electrical shed	East of tank, inside electrical shed	East of tank, inside electrical shed

Location of Resources:

ADDITIONAL COPIES OF THIS PLAN	❑ Site Trailer ❑ Fuel Island
SPILL KITS	❑ Fuel Island
MSDS SHEETS	❑ Main Office ❑ Site Trailer
FIRE EXTINGUISHERS	❑ All mobile equipment ❑ All buildings
PPE & ADDITIONAL EQUIPMENT	❑ Site Trailer

Containment and Recovery

Lehigh Hanson Materials Limited (LHML) understands the importance of reducing further potential impacts to the surrounding environment from a spill. An intense and quick response is essential to minimize the spreading of the material beyond the property particularly into, or near watercourses.

Where safety allows, every effort should be made to stop and contain the spill:

- ☑ Obtain appropriate personal protective equipment (PPE)
- ☑ Use proper safety procedures
- ☑ Stop flow of spilled material at source (activate E-stop, stop pumps, close valves, plug leak, put container upright)
- ☑ Isolate the area

SPILLS TO LAND

- Seal off floor drains, storm drains and drainage ditches with drain covers/absorbent pads and berms to prevent the spread to watercourses.
- Dig recovery ditches around the perimeter of the spill and within the spill area to contain the spill and limit the saturation of the material deep into the soils.
- Use sorbent pads and pumps to recover the free liquid product.
    - Remember **MORE IS NOT BETTER** – take the time to place the spill pads out individually (not in a stack) over the spilled area and let them absorb the material.
- Excavate the contaminated soil for later disposal.
- Sample the soil to determine the extent of the contamination and ensure that all the affected soil has been removed.

SPILLS TO WATER

- To effectively contain a spill into a ditch or stream, the initial response should be to immediately stop the spread of the spilled material downstream using absorbent booms, pads or plastic sheeting to create an underflow system.
- In open water, use sorbent booms to corral the spilled product into a corner for recovery. Use sorbent pads and/or mechanical skimmers (suction pumps) to recover the spilled product from the containment area within the boom.
- Remove oil-soaked pads safely using poles, etc and place into plastic bags to avoid secondary contamination. Bags should be sealed and then placed in lined bins for proper disposal.

Waste Disposal & Site Restoration

Waste Disposal

All waste materials collected from a spill should be sorted and stored in separate containers or piles that are clearly marked indicating the type of waste they contain.

The most common types of waste likely to be generated from a spill at a LHML site are:

Contaminated Liquids	• Mixture of oil and water recovered from the surface of the water usually by a skimmer or suction pump
Contaminated Debris	• Twigs, leaves, vegetation/seaweed, miscellaneous debris
Contaminated Sediment	• Sand or gravel removed from the shoreline or spill site
Clean-up Materials	• Oily/contaminated rags, oiled sorbents, oily PPE and clothing worn by response team personnel

Waste materials generated by spill of petroleum products are classified as Hazardous Wastes under the Hazardous Waste Regulation of the Ontario Environmental Management Act. Failure to comply with the requirements of this Regulation constitutes a criminal offense under the Act and could result in severe penalties being imposed on the company.

Once a decision has been made to transport Hazardous Waste from the site for final disposal, LHML, as the Consignor or generator of the waste, is responsible for:

- Ensuring that the transport company has a ON License to Transport Hazardous Waste
- Ensuring that the waste is taken to an approved Hazardous Waste disposal/storage site
- Completing all the necessary documentation (eg. transport manifest) and retaining records for the required period of time.

Site Restoration

Every effort will be made to restore the contaminated site to its previous state following an accidental spill.

1. Documented notes and photos will be taken to capture the details of the spill incident, response and clean-up.
2. An Environmental Incident Report will be completed to identify all corrective/preventative actions for follow-up which will be reviewed and approved by the appropriate management personnel and the Environment Manager.
3. A debriefing with all involved personnel will be conducted and include the following:
    a. Was the response equipment useful or not useful?
    b. Was there sufficient equipment?
    c. Could the incident have been avoided?
    d. How could the response have been improved?

Emergency Response – Equipment, Training & Scenarios

EMERGENCY RESPONSE EQUIPMENT

All LHML sites are equipped with the appropriate emergency response equipment given the location and proximity to water, the volume of material that could potentially spill, and any site-specific challenges that require specialized equipment.

The type and location of equipment that would be used at this facility include:

Equipment	Location	Contents
Large Spill Kit	Next to tank	Pads, socks, bags, PPE, etc.
Small Spill Kit	On each truck	Pads, socks, bags, PPE, etc.
Fire Extinguishers	– Next to tank, – In equipment/machinery,	Various types as appropriate for potential fire hazard.

– Various locations around site

Additional resources available in the event of an emergency include:

- Front- end Loader
- Water Truck

EMERGENCY RESPONSE TEAM & TRAINING

All LHML personnel are trained to participate in environmental emergency response and recovery at this facility and when they are en-route, or at, a job site. Training frequency is identified for each course and training records are kept on-site.

POSITION/RESPONSIBILITY	COURSE NAME	COURSE OVERVIEW
All LHML Employees	**Environmental Awareness & Initial Spill Response**	Initial spill response training and awareness of the Spill Response Plan outlining employees' responsibility to take appropriate actions to minimize environmental impact.
Mobile Equipment Operators	**Fuel Handling & Spill Response**	Fuelling procedures and importance of immediate and correct response to spills of hydraulic/engine oil on the job.
Supervisors, Managers, Front-Line Personnel	**Emergency Preparedness & Response**	Comprehension and awareness of environmental emergency preparedness and response, notification and reporting, and clean-up specifically related to their particular operation(s).

EMERGENCY SCENARIOS

Lehigh Hanson Materials Limited (LHML) has identified possible emergency scenarios that may occur at our facilities and the measures and actions that we will take to prevent, prepare for, respond to, and recover from each emergency. Potential threats to human health or environmental damage from petroleum products at our sites include:

- Fuel delivery truck tank leak
- Fire or explosion of tank

Scenario #1 – Fuel Delivery Truck Tank Leak

PREVENTION	• LHML personnel are trained on proper fuelling procedures. • Fuel trucks are not to be left unattended during fuelling. • All equipment is inspected on a regular basis to ensure it is in good working order (ie. oil water separators)
PREPARATION	• Employees are trained in basic spill response procedures. • Fuel delivery truck drivers have received training by their employers.
RESPONSE	1. Call 911, PEP, and other required authorities in accordance with Spill Response Plan – Notification section. 2. STOP flow of material at source (if possible). 3. Notify supervisor and isolate area. 4. Seal off access points to waterway (if safe to do so). 5. Take action within your ability and resources available to minimize the spread and impact of the spill until additional resources and expertise arrive.
RECOVERY	➤ Contain material and clean-up under the direction of Environmental Manager or regulatory official. ➤ Recover and dispose of spilled material in accordance with the Spill Response Plan. ➤ Complete an Incident Report.

Scenario #2 – Fire or explosion of tank

PREVENTION	• Tanks are grounded, contain vents and have collision protection • Signs indicating no ignitions/combustion sources within 7.5m are posted near tanks • Combustible and flammable products are stored in fire-proof cabinet and kept away from fuel station • Electrical connections are explosion proof & foundation is fire resistant • Fuel tank system inspections conducted monthly
PREPARATION	• Fire extinguishers are located nearby in all the buildings and fuel station (2x10lb ABC fire extinguishers) • Employees are trained in basic fire extinguisher use • Employees and contractors are trained in emergency preparedness and spill response and general safe work procedures prior to working on-site.
RESPONSE	1. **CALL 911** 2. STOP operations 3. Notify supervisor and evacuate all personnel in the immediate area 4. Report the fire to appropriate authorities 5. Evaluate level of initial response (if appropriate)
RECOVERY	– Evaluate extent of environmental impact from debris, fire-fighting chemicals, fuel spill. – Take steps to control further environmental impacts. – Contain material and clean-up under the direction of Environmental Manager or fire official. – Complete an Incident Report.

EMERGENCY INFORMATION
FOR RELEASE OR SPILL TO ENVIRONMENT

Business Name: Cambridge Aggregate Inc. – Edworthy West Pit

Site Address: 1440 Sprague Rd. Cambridge, ON

Emergency Response Contacts / Notification:

On-Site Emergency Contact: Name: John Holmes Phone: 519-221-3120

Alternate Contact: Name: Edmund Tucker Phone: 905-730-2971

Fire/Paramedic/Police:	911	For all emergencies.
Provincial Emergency Program (PEP):	1-800-663-3456	For immediate reporting of all environmental incidents.
Company Environment Manager:	(604) 812-6116	For immediate reporting of all environmental incidents.
Company ESH Manager:	(604) 842-6631	For immediate reporting of all safety/environmental incidents.
Ministry of Environment	1-800-268-6060	For a release to the air or a spill that has/could reach surface, ground water or storm drain.
National Response Center for TDG (CANUTEC):	(613) 996-6666	For reporting of major chemical spills
Spill Response / Cleanup Contractor (QUANTUM):	(250) 478-2255 1-877-378-7745	For local assistance with clean-up activities

Resources:

Location of Material Safety Data Sheets: Site Trailer

Spill Control Equipment is Located: Site Trailer and Every Loader

Location of Fire Extinguishers: On site at various locations

SPILL RESPONSE PROCEDURE

NOTIFICATION	
❑	Identify the nature of the emergency (health hazard?), check for casualties, identify the product spille and locate the source, if safe to do so.
❑	Contact Emergency at 911 if there is a fire or medical attention is needed.
❑	Evaluate if you are trained, knowledgeable and equipped to handle the incident before proceeding w Spill Containment & Clean-Up.
❑	For spills >100 L or >200 kg, call **1-800-268-6060** immediately who will notify other agencies (MC DFO, Environment Canada).
❑	Alert manager/owner and Environmental Manager of spill/release. Refer to "Emergency Information Accidental Release or Spill" for contact names and numbers.
❑	Clear the area of non-trained or unauthorized personnel. Notify public downstream and downwind, if necessary.
SPILL CONTAINMENT	
❑	Obtain personal protective equipment (PPE), as appropriate to the hazards. Refer to the Material Safe Data Sheet or other references for information.
❑	Stop flow/ignition sources of spill (put container upright, plug leak, etc).
❑	Isolate the area and start containment of migrating material - seal off storm drains/stormwater conveyances (ditches) with berms or drain covers to stop any spread of the spill.
❑	Protect inside floor drains from spill – absorbent pads and spill socks should be placed around drains, needed.
❑	Use absorbent pads and/or granular sorbent to clean up spilled material – distribute over the entire s area, working from the outside, circling to the inside. This reduces the chance of splash or spread of t spilled chemical.
❑	Let pads sit on spill to absorb spilled material. [REMEMBER MORE IS NOT BETTER – take the time to place them individually as they do not work as well when in a stack.]
❑	For dry spills, sweep or shovel-up material and dispose of in a separate labeled drum for proper dispo Never hose down or put into the garbage bin.
CLEAN UP MATERIAL DISPOSAL	
❑	When spilled materials have been absorbed, place pads and sorbent materials in a leak-proof contain such as a polyethylene bag or bucket. Label those containers as appropriate.
❑	Dispose of waste materials properly. Spill cleanup materials containing hazardous waste is also considered hazardous waste and should be picked up by a hazardous waste disposal contractor.
❑	Call a spill cleanup contractor for assistance with clean-up activities and proper disposal of waste.

INCIDENT TERMINATION & FOLLOW-UP	
❑	Complete Environmental Incident Report with all responders to identify corrective/preventative actio for implementation/completion. Send completed Report to Environment Manager.
❑	Replace used equipment and re-stock spill kits. Restore area to normal.

Appendix I

Curriculum Vitaes

Fraser has seven years of field experience in sampling techniques including groundwater, surface water, soil and sediment sampling as well as knowledge of site characterization and hydrogeological modelling. Fraser is also familiar with provincial guidelines and regulations, in particular the Ontario Water Resources Act and Environmental Protection Act.

Fraser Cummings, M.Sc., P.Geo.

Title: Manager, Environmental Practices

Professional Experience

Education

Masters of Science | Earth Science | University of Waterloo | 2014

Honours Bachelor of Science | Earth Science, Environmental Specialization | University of Waterloo | 2012

Professional Designations

Professional Geoscientist (P.Geo.) | Professional Geoscientists of Ontario (PGO)

Tenure with MTE

Since 2014

Professional Development

CPR and Emergency First Aid Certified

WHMIS

Work History

Manager, Environmental Practices, Hydrogeologist, Environmental Scientist | MTE Consultants | 2014-Present

Educational Tutor | Webster Educational Services | 2012-2014

City of Kitchener
Battler Road Snow Storage Facility
Hydrogeological Assessment
Role: Environmental Scientist

Fraser provided hydrogeological services for a new snow storage facility. During the site selection process the hydrogeological conditions were assessed, including evaluating the site in the local and regional hydrogeological framework, along with considering proposed risks to groundwater and surface water quality as a result of chloride impacts from melting snow.

City of Guelph
Former Guelph Coal Gasification Plant
Environmental Investigations
Role: Environmental Scientist

MTE was retained by the City to complete a Phase I and II ESA, and a Geophysical Survey of the City's former coal gasification plant. The Phase II ESA involved installing multiple well nests into soil and bedrock to characterize the nature and extent of impacts. Fraser provided onsite hydrogeology services and analysis for this assignment.

City of Waterloo
RIM Park Recreational Facility
Structural & Geotechnical Assessment
Role: Environmental Scientist

Since construction in 2001, this 30,000-m^2 (320,000-ft^2) recreational facility has experienced issues suspected to be related to the groundwater, such as heaving floors, cracking of non-structural members, and water seepage into interior spaces. As a result the City engaged the services of MTE to undertake and manage subconsultants to complete a structural and geotechnical analysis of the facility. The complex includes three ice rinks, a figure skating facility, an indoor field house and gymnasium. As a member of the project team, Fraser provided onsite hydrogeology services and analysis for this assignment.

Carson Reid Homes
Elora Meadows
Hydrogeological Investigation
Role: Environmental Scientist

This project involved an impact assessment of a groundwater collection system on groundwater and surface water resources. The system was designed to protect the basements of residential dwellings from flood risks associated with high water table conditions. It also included annual monitoring and compliance reporting as per the Permit to Take Water related to dewatering activities for the installation of a culvert crossing. As the Environmental Scientist on the project, Fraser conducts monitoring activities on an ongoing basis.

Chicopee Ski and Summer Resort, Kitchener
Snow Making Investigation
Role: Environmental Scientist

This project involved an investigation to examine Chicopee's water supply and evaluate their options for expanding snow production. Fraser was involved with the drilling of a hole to assess soil conditions, collection of soil samples and equipping the hole with a permanent monitoring well to preform hydraulic testing. Long-term pumping tests are currently being conducted to evaluate aquifer conditions.

Galibier Materials
Galibier Lewis Pit, Vespra
Hydrogeological investigation
Role: Environmental Scientist

This project required the completion of a Hydrogeological Investigation to support an application for a Permit to Take Water for a wash plant. This project included drilling and installation of eight onsite monitoring wells and one pumping well. Fraser was responsible for overseeing onsite drilling, a seven-day pumping test and writing the technical report required for the assessment of potential impacts to surface water and groundwater resources from pumping activities as required to obtain a Permit to Take Water.

Ferma Aggregates
Carden Quarry, Kirkfield
Surface & Groundwater Monitoring
Role: Environmental Scientist

This project includes the monitoring of groundwater levels, surface water flow and surface water quality monitoring to comply with the aggregate license and the Environmental Compliance Approval needed to discharge water back into the natural environment.

Fowler Construction Company
Rosewarne Quarry , Washago
Surface & Groundwater Monitoring
Role: Environmental Scientist

This project includes the monitoring of groundwater levels, surface water flow and surface water quality monitoring to comply with the Permit to Take Water needed to discharge water back into the natural environment. Annual compliance reports are submitted to the Ministry to demonstrate the impact of the quarry on surface and groundwater resources.

Harold Sutherland Construction
Keppel Quarry
Hydrogeological Investigation
Role: Environmental Scientist

Fraser was responsible for managing water level data an ensuring that the quarry operator follows the Adaptive Management Plan developed for strategic decision making with respect to quarry operations so that potential impacts to the natural environment can be fully assessed and mitigated prior to any adverse impact.

Aecon Construction and Materials
Oliver Pit
Hydrogeological Investigation
Role: Environmental Scientist

This Hydrogeological Investigation was completed to support an application for a Permit To Take Water (PTTW) for a proposed wash plant. The annual groundwater monitoring and compliance reporting was completed as per the PTTW and extraction license. MTE implemented a monitoring program that included annual reporting on water levels and water quality for the gravel pit. Fraser collected data for the annual report which considered the effects of the gravel pit on groundwater and surface water resources. He assisted with fieldwork which involved seven monitoring wells, two surface water staff gauges in a provincially significant wetland, and two private wells.

Conn Pit, Gibraltar
Hydrogeological Investigation
Role: Environmental Scientist

This project required the completion of a Hydrogeological Investigation to support an application for a pit below the water table. This project included drilling and installation of six onsite monitoring wells and. Fraser was responsible for overseeing the onsite drilling and writing the technical report that was required for the assessment of potential impacts to surface water and groundwater resources from pit activities.

Aecon Construction and Materials
Marmora Mine
Preliminary Dewatering Impact Assessment
Role: Environmental Scientist

This assessment was completed to investigate the feasibility of dewatering an open pit mine so that it can be used for a pumped storage hydro power project. The mine has been filling with water (i.e. precipitation, runoff, and groundwater) since 1978 when extraction ceased. The mine is currently a lake and approximately 90 per cent of the water would need to be discharged into a nearby Provincially Significant Wetland (PSW). As part of this investigation, the quality and quantity of the water in the mine was determined, baseline habitats studies were completed, and the risk of flooding as well as the ability of the PSW to assimilate the water assessed. The information collected was used to make recommendations for managing the water so that a final dewatering strategy could be developed.

Peter is a Vice President and Senior Hydrogeologist for MTE. He has more than 30 years of experience on various types of projects ranging from international to domestic assignments, including groundwater, surface water, soil and contaminant investigations, to the exploration / development and protection of municipal groundwater and surface water supplies. He has been responsible for the design, construction, supervision and testing of municipal wells and assessing the impacts of various contaminants on groundwater and surface water resources. He is experienced with scoping, managing and reporting on large-scale groundwater developments, site assessment and contamination investigations. Peter has also completed risk communication training to assist in the transfer of sensitive and detailed technical knowledge to audiences including clients, peers, legal counsel and the general public including lay persons.

Peter A. Gray, P.Geo., QP_{ESA}

Title: Vice President, Environmental
Senior Hydrogeologist
Licensed Well Contractor #C-7302
Instructor, Continuing Education, Fleming College

Professional Experience

Education

Bachelor of Science (Honours, Co-op), Earth Sciences | University of Waterloo | 1987

Professional Designations

Professional Geoscientist (P.Geo.) | Association of Professional Geoscientists of Ontario

Qualified Person for Environmental Site Assessment (QP_{ESA})| O. Reg. 153/04 | Ministry of the Environment

Licensed Well Contractor | Ministry of the Environment, Conservation and Parks

Tenure with MTE

Since 1995

Professional Development

Advanced Wilderness First Aid | Stonehearth Open Learning Opportunities (SOLO)

Training for Property Entry per Section 88 of Clean Water Act | Ministry of the Environment

Assessment Report Technical Training-Drinking Water Source Protection | Ministry of the Environment

Memberships

Ontario Ground Water Association

Ontario Stone, Sand and Gravel Association

Canadian Council of Professional Geoscientists (CCPG)

National Ground Water Association

Association of Groundwater Scientists and Engineers

American Association of Petroleum Geologists (AAPG), Division of Environmental Geosciences

International Association of Hydrogeologists

Peter is one of the founding directors and is the volunteer president of the Children's Water Education Council (CWEC). This is a registered, non-profit charitable organization that in 1994 initiated the first Children's Groundwater Festival, since which more than 850,000 children have become educated about a wide variety of water-based issues and concepts. Each year, water festivals will be held in upwards of 30 communities across Ontario, educating more than 60,000 children annually. Peter has worked across Canada and the United States, and has also assessed groundwater and surface water resources in Malawi, Bangladesh and Southeast Asia. He was the co-team leader in 2005 for a Canadian-led team conducting Community Based Environmental Assessments for the Southeast Asia Tsunami Response Team on behalf of World Vision Canada and the Canadian International Development Agency (CIDA) in the countries of Indonesia, Sri Lanka, Thailand and India.

Community Involvement

Rotary Club of Kitchener | Environment Committee Chair | 2010-Present

Coldwater Canada | Youth Leadership Development, Advisory Council | 2011-Present

Children's Water Education Council | Past President | 2001-2016

University of Waterloo | Environmental Studies Faculty | Dean's Council | 2002-2010

University of Waterloo | Earth Sciences Museum | Board of Directors | 2006-Present

Grand River Conservation Authority | Water Forum Committee | 2000-2010

University of Waterloo | Environmental Studies Faculty | Advisory Council | 2000-2010

Waterloo Wellington Children's Groundwater Festival | Co-Founder / Honorary Chair | 1996-Present

Work History

Vice President, Senior Hydrogeologist | MTE Consultants | 2007-Present

Managing Partner, Senior Hydrogeologist | Frontline Environmental Management | 1995-2007 (Acquired by MTE Consultants)

President, Senior Hydrogeologist | Wavefront Environmental Technologies | 2000-2002

Senior Hydrogeologist, Manager-Kitchener Office | ADAMAS Environmental | 1995

Hydrogeologist; Project Manager, Co-Manager-Cambridge Office | Dames & Moore | 1992-1995

Project Geologist / Hydrogeologist | Trow Dames & Moore | 1987-1992

Senior Geological Assistant | Ontario Geological Survey | Quaternary Division | 1986

Geologist | Petro-Canada | International Exploration Division | 1986

Hydrogeological Assistant | Ontario Ministry of the Environment | Technical Support Section | 1985

Field Geologist | Ontario Geological Survey | Quaternary Division | 1984

Awards

Ontario Volunteer Service Award, 25 Years | Ministry of Heritage, Sport, Tourism and Culture Industries | 2020

Paul Harris Fellow | The Rotary Foundation of Rotary International | 2019

Award of Merit | Association of Professional Geoscientists of Ontario (APGO) | 2018

15-Year Service Ontario Volunteer Award | For Waterloo-Wellington Science & Engineering Fair | Ontario Ministry of Citizenship and Immigration, Ontario Volunteer Awards | 2018

Latornell Leadership Award | Latornell Conservation Symposium | 2016

Nominee | Volunteer of the Year | Cambridge Chamber of Commerce | 2015

June Callwood Outstanding Achievement Award for Volunteerism in Ontario | Ontario Ministry of Citizenship, Immigration and International Trade | 2015

20-Year Service Ontario Volunteer Award | For Waterloo Wellington Children's Groundwater Festival Chair | Ontario Ministry of Citizenship, Immigration and International Trade, Ontario Volunteer Service Awards | 2015

Volunteer Impact Award, Shining Stars: Planning Action Award | Volunteer Action Centre of Kitchener-Waterloo and Area | 2013

Heritage Community Recognition Award for Lifetime Achievement | Ontario Heritage Trust | 2012

American Association of Petroleum Geologists (AAPG): Division of Environmental Geosciences Public Outreach Award | Houston, TX | 2011

15-Year Service Ontario Volunteer Award | For Waterloo Wellington Children's Groundwater Festival Chair | Ontario Ministry of Citizenship and Immigration, Ontario Volunteer Awards | 2011

Faculty of Science, Alumni Award of Honour | University of Waterloo 50th Anniversary Awards | 2007

25th Anniversary Provincial Award | For "Just Add Water", Children's Water Education Council (CWEC) President | Ontario Trillium Foundation | 2007

10-Year Service Ontario Volunteer Award | For Waterloo Wellington Children's Groundwater Festival Chair | Ontario Ministry of Citizenship and Immigration, Ontario Volunteer Awards | 2006

2005 Environmental Education Award | For "Just Add Water", a combined Ontario Water Works Association (OWWA) / Children's Water Education Council (CWEC) program sponsored by The Ontario Trillium Foundation, CWEC President | AWWA /OWWA | 2005

Community Recognition Program -Environmental Sector | For Outstanding Contribution to the Community as Chair of the Waterloo Wellington Children's Groundwater Festival | Ontario Heritage Foundation | 2005

Michael R. Follett Community Leader Award Nominee | Greater Kitchener Waterloo Chamber of Commerce Business Excellence Awards | 2005

Grand River Watershed Conservation Award | Waterloo Wellington Children's Groundwater Festival, Chair | Grand River Conservation Authority | 2004

The Outstanding Achievement Award for Voluntarism in Ontario | Waterloo Wellington Children's Groundwater Festival, Chair | Ministry of Culture and Tourism | 2002

Environmental Education Award | Waterloo Wellington Children's Groundwater Festival, Chair | Regional Municipality of Waterloo | 1999

Environmental Sustainability Award in Education | For Waterloo Wellington Children's Groundwater Festival, Chair | Waterloo Region Chamber of Commerce | 1999

Award for Education | For Children's Groundwater Institute, Director | Financial Post | 1996

Ministry of Environment, Conservation and Parks (MECP) Risk Assessments
Various locations, Ontario
Role: Senior Hydrogeologist
2005-Present

Peter has been a member of MECP Vendor of Record (VOR) Review teams assisting in the review of Pre-Submission Forms and Risk Assessments submitted to the MECP Standards Development Branch to identify regulatory compliance under O. Reg. 153/04. Peter is a member of the core review team for hydrogeology and soil sciences under continuous VOR agreements.

Environmental Investigations Phase I / One and II / Two Environmental Site Assessment
Various locations, Ontario
Role: Senior Hydrogeologist
1995-Present

Since 1995 Peter has served in the capacity of Senior Hydrogeologist for Frontline / MTE. He has undertaken, internally reviewed and peer reviewed hundreds of Phase I / One and II / Two ESAs, along with Remedial Action Plans, Environmental Compliance Audits and Environmental Site Restoration Plans. Peter has served as QPESA for a number of Ontario Ministry of Environment, Conservation and Parks (MECP) orders issued to clients, and has served as QPESA as a Vendor Of Record with the current MOE Consulting Services for Expert Multi-Disciplinary Scientific Reviews of Brownfield Sites.

Canadian General Tower Vinyl Manufacturing Facility, Cambridge
Environmental Investigations & Remediation
Role: Senior Hydrogeologist
1994-Present

Peter is responsible for the review and reporting on data collection, data analysis, environmental characterization, statistical and computer modelling, and report preparation, presentations at public meetings and coordination of regulatory approvals. Additional services includes drilling supervision, packer testing, design and monitoring well installation in dolostone bedrock formations and overburden environments, geologic core logging, review / analysis of packer test results, geophysical log / borehole video log response to assist in interpretation of bedrock geologic / hydrogeological environment. Further, design, construction and testing of groundwater control / free-product contamination recovery wells and municipal production wells, design, coordination and supervision of pumping tests, supervision of staff / sub-contractor adherence to health and safety protocols.

City of Kitchener
Bramm Street Works Yard
Environmental Investigations & Remediation
Role: Senior Hydrogeologist
2005-2010

Peter was the Senior Hydrogeologist for a comprehensive Phase II ESA for an investigation of past land uses of the property as a landfill. The workplan included the installation of 11 boreholes and 15 monitoring wells to investigate potential areas of concern and to develop a remedial action plan. Contaminates of concern included PAHs, petroleum hydrocarbons, VOCs, lead, arsenic, sodium adsorption ratio, electrical conductivity, and antimony in cinders, ash, native soil and groundwater. The remediation plan identified volumes of impacted soil and recommended a scoped Site-Specific Risk Assessment and partial intrusive remediation of the site in designated areas of environmental impacts.

City of Kitchener
Joseph & Gaukel Streets, Former Coal Gasification Plant
Environmental Remediation
Role: Senior Hydrogeologist
2007-2011

Peter was the Senior Hydrogeologist during the $29-million coal tar remediation as part of a municipal road reconstruction project. The site is the location of a historic coal gasification plant and resulted in extensive coal tar impacts to soil and groundwater. He was responsible for the completion of Phase I and II Environmental Site Assessments, remediation and Risk Assessment.

City of Hamilton
Hamilton Police Services Storage Building
Environmental Investigations
Role: Senor Hydrogeologist
2015-2018

MTE was retained by the City to provide a Supplemental Phase II ESA and a Designated Substance and Hazardous Material Assessment of the Hamilton Police Services Storage Building. This involved a review of previous environmental site assessment and remediation reports, conducting additional soil and groundwater sampling and managing the completion of a geotechnical investigation. Peter oversaw the construction dewatering assessment and analysis completed for the site.

Region of Waterloo
Maple Grove Road & Fountain Street, Cambridge
Groundwater Resource Evaluation
Role: Project Hydrogeologist
2010-2015

Peter evaluated the groundwater resources for a Class C Environmental Assessment for a water supply system. The objective of this project was to determine the maximum sustained pumping rate at a newly constructed 305-mm water well and existing production well sites designed by MTE. A number of monitoring wells were installed throughout the study area to determine the most suitable location for a new test production well. To aid in the prediction of the long-term effects of pumping MTE used the predictive FEFLOW model. The model also provided an understanding of the existing geological setting and hydrogeological properties of the study area. MTE completed a long-term pumping test (40 days) at a rate of 80 L/sec from two production wells to assess the potential for groundwater interference with existing groundwater users. Water levels from 40 private domestic water supplies and surface water features were monitored using electronic pressure transducers along with the collection and assessment of surface water flow data from a nearby creek and precipitation data. Groundwater quality and quantity were assessed using water samples obtained during the pumping test to monitor the impacts on local surface water courses.

City of Kitchener
Battler Snow Storage Facility
Hydrogeological Investigation
Role: Senior Hydrogeologist
2013-2018

Peter was the Project Hydrogeologist for a new snow storage facility in the City of Kitchener. During the site selection process the hydrogeological conditions were assessed, including evaluating the site in the local and regional hydrogeological framework, along with considering proposed risks to groundwater and surface water quality as a result of chloride impacts from melting snow. During development, Pete is providing oversight for the hydrogeological study and groundwater monitoring program.

Region of Waterloo
St. Agatha Municipal Wells
Groundwater Assessment
Role: Project Manager & Hydrogeologist
2008-2011

Peter served as Project Manager and Project Hydrogeologist for a groundwater exploration program to assess the potential to develop a new municipal groundwater supply to service, and potentially replace the existing nitrate impacted municipal wells in the Hamlet of St. Agatha. The project included the drilling and construction of monitoring wells, executing private property access agreements, and drilling, construction, design and hydraulic testing of one test production well.

Municipality of North Huron
Wingham & Blyth
Hydrogeological Study
Role: Hydrogeologist
2003-2005

MTE was retained to conduct a hydrogeological study for the determination of Groundwater Under the Direct Influence of Surface Water (GUDI). This project included coordination of field activities, selection of water quality testing methods, isotopic analysis, bacteriological analysis, review of pumping test results and determination of the influence of surface water on groundwater resources. Specific project tasks included hydrogeological setting assessment, conducting a door-to-door survey to identify water quality concerns and to establish monitoring points for use during pumping tests, installation of piezometers, well inspections, pumping tests, and water quality sampling, data compilation and interpretation, groundwater modelling, and hydrogeological reporting for the determination of the need for filtration for the municipal wells.

Municipality of South Huron
Exeter
Groundwater Management Study
Role: Hydrogeologist
2003-2006

MTE conducted a Groundwater Management Study under the Ontario Government's "Provincial Water Protection Fund" program. The study focused on Exeter's existing groundwater supplies and covered an area of approximately 140 square kilometres in southern Huron County. MTE also assisted in completing a GUDI assessment of the water supplies and undertook the hydrogeological component of a Class EA Study for Long-Term Water Supply.

Region of Waterloo
River Well Assessment, Kitchener
Role: Project Manager &
Hydrogeologist
1998-2000

Peter served as Project Manager and Project Hydrogeologist, in association with EarthFx, to assess the hydrogeology of the River Wells, a series of nine wells located along the Grand River east of Kitchener (including the Forwell, Pompeii and Woolner well fields). The assignment included the construction and calibration of a 3D groundwater flow model, with both forward and backward in time particle tracking to understand the flow regime in which the wells were constructed. The project also included a study of potential adverse impacts to the wells from gravel extraction activities and future land use plans.

Region of Waterloo
Peaking Wells K90 - K93
Well Oversight & Testing
Role: Hydrogeologist
1990-1993

Peter served as Project Hydrogeologist for a groundwater development project that included the test drilling, design, construction oversight, hydraulic testing and permitting for municipal wells K90, K91, K92 and K93. The intention of the wells was to assist in meeting peak water supply demands for the Region.

Region of Waterloo
Guidelines for Privately Serviced
Developments
Hydrogeological Consulting
Role: Hydrogeologist
1992

Peter served on a team of consultants that drafted the terms of reference for hydrogeological studies to be undertaken for proposed rural developments on private services. The investigations, which have been updated over time, included assessing water supply demands from a quality and quantity perspective, as well as waste water requirements, including sewage disposal systems.

Region of Waterloo
Well Interference Complaints
Role: Hydrogeologist
1989-1993

Peter investigated well interference complaints on behalf of the Region through the Well Interference Complaint Committee. These complaints had been registered by rural landowners across the Region, alleging that their private water supply had been affected by the pumping of a nearby municipal well. The investigations included meeting with the landowners, collection and review of background data, well inspection, summary report preparation and presentation of findings and recommendations to the Committee.

City of Cornwall
Landfill Assessments
Role: Senior Hydrogeologist
2010-2014

Peter was the Senior Hydrogeologist for various Landfill Assessments for both open and closed landfills in Cornwall.

Ferma Aggregates
Carden Quarry, Kirkfield
Hydrogeological Investigation
Role: Senior Hydrogeologist
2011-Present

This project involved an exploration well installation (cored holes) for the purpose of aggregate quality testing. The results of the cored holes were used in a geological evaluation for the purpose of assessing bedrock quality and quantity at the quarry. This project also included groundwater level and quality monitoring to comply with the aggregate license and the Environmental Compliance Approval needed to discharge water back into the natural environment. Annual compliance reports are submitted to the Ministry of Natural Resources and Ministry of Environment to demonstrate the impact of the quarry on surface and groundwater resources.

Severn Aggregates
Cumberland Quarry
Hydrogeological Investigation
Role: Senior Hydrogeologist
2007-Present

MTE conducted a regional-scale groundwater assessment in support of an application for a quarry below the water table. This project included a drainage basin analysis for the purpose of identifying groundwater and surface water interactions. This analysis involved the assessment of baseflow condition of onsite creeks, and completion of water budget calculations. Groundwater levels and quality monitoring as well as hydrological monitoring (stream flow) is being done to track long-term fluctuation over time. This information is being inputted into a database used for the development of a numerical groundwater model using FEFLOW 6.0. The purpose of the model will be to assess the potential impacts of the quarry on surface water and groundwater resources and their uses as the quarry develops.

Fowler Construction Company
Fleming Quarry, Washago
Surface & Groundwater Studies
Role: Senior Hydrogeologist
2010-2015

This project required the completion of a Hydrogeological Investigation to support an application for a quarry below the water table. This project included drilling and installation of eight onsite bedrock water wells and two wetland monitoring stations. Peter was responsible for overseeing the technical reports that were required for the assessment of potential impacts to surface water and groundwater resources from quarrying activities as required to obtain a Permit to Take Water and a Certificate of Approval for quarry dewatering.

Harold Sutherland Construction
Keppel Quarry
Hydrogeological Investigation
Role: Senior Hydrogeologist
2006-2019

Level 1 and Level 2 Hydrogeological Investigations were completed to support an application for a quarry expansion and assessed the risk to groundwater and surface water resources. First Nations consultation began during the Stage 1 investigation, and continued through the Stage 2 investigation up to and including the Ontario Municipal Board and Environmental Review Tribunal hearings. An Adaptive Management Plan was also developed allowing for strategic decision-making so that potential impacts to the natural environment could assessed and mitigated prior to any adverse impact. Before the plan was developed, MTE's Hydrogeological Investigation was peer reviewed by several Hydrogeologist at the Ministry of Natural Resources, MOE, and the Niagara Escarpment Commission.

First Nations Consultation
Role: Qualified Professional
1995-Present

Peter has extensive experience working with First Nations through the Duty to Consult – Constitution Act, 1982, as it relates to work performed on various gravel pit and bedrock quarry sites that Peter has been involved as a QP across Ontario. Peter has attended and provided expert witness testimony at the Ontario Environment Review Tribunal on matters concerning First Nations consultation, and has worked for individual bands on a project by project basis, including the Chippewa's of the Thames, Ojibwe Nation near London, ON, the Dokis Nation, near Lake Nipissing, ON, and the Cree Nation near Mistissini, QC.

Community Based Environmental Assessments on Rehabilitation Projects, Southeast Asia
Role: Co-Team Leader
2004-2006

Peter was the Co-Team Leader for Community-Based Environmental Assessment Reports for Indonesia, Thailand, Sri-Lanka – CIDA and non-CIDA, and India – CIDA and non-CIDA funded projects, on behalf of World Vision Canada / CIDA SE Asia Tsunami Response Team, following the December 26, 2004 Southeast Asia Tsunami.

Canadian International Development Agency
Save the Buriganga Program, Bangladesh
Role: Project Director
2000-2003

Peter was the Project Director for the "Save the Buriganga Program;" a river clean-up project sponsored by the Canadian International Development Agency (CIDA), in association with the Ministry of Environment and Forest; and Department of Environment, Government of the People's Republic of Bangladesh.

Vinyl Manufacturing Facility, Toledo, Ohio
Contaminant Hydrogeological Assessment
Role: Project Manager
1995-1997

Peter was the Project Manager for a stormwater and surface water assessment at a vinyl manufacturing facility.

Groundwater Supply Development Zomba, Malawi
Role: Senior Hydrogeologist
1995-1996

Peter was the Senior Hydrogeologist for the development of a groundwater supply for the Naming'azi Farm Training Centre, an elementary school and a youth hostel and local villages located near the City of Zomba, Malawi in Southeast Africa. This work was completed through the Presbyterian World Service and Development (PWS&D) in association with the Church of Central Africa Presbyterian (CCAP).

Publications & Presentations

Gray, P.A. (2020). Bon Park Podcast. April, 2020

Gray, P.A. (2020). "Estimating the Yield of a Domestic Well", Ground Water Canada Magazine. April, 2020.

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