COUNTY OF OXFORD

2023 DUE DILIGENCE MONITORING PROGRAMS

OXFORD COUNTY CLOSED LANDFILL SITES

FEBRUARY 23, 2024

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PROJECT NO.: 191-06761-03
DATE: FEBRUARY 23, 2024

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February 23, 2024

COUNTY OF OXFORD
Supervisor of Waste Management
Oxford County
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Attention: Pamela Antonio, MPA, BES

Dear Ms. Antonio,

Subject: 2023 Due Diligence Monitoring Programs, Oxford County

We are pleased to forward our report documenting the results of the 2023 Due Diligence Monitoring Programs for seven (7) closed landfill sites in Oxford County.

The report provides a summary of the drilling and monitoring programs completed as part of the 2023 due diligence monitoring at the Otterville and Tillsonburg Closed Landfill Sites, as well as a summary of the 2023 due diligence monitoring programs completed at the Lakeside, Embro, Thamesford, Blandford-Blenheim and Gunn's Hill Closed Landfill Sites. The report includes all details of the work programs completed; presentation and discussion of the results of the monitoring completed; and conclusions and recommendations. Technical data are appended.

We trust that this information is sufficient for your current needs. If you have any questions or require further information, please contact us.

Yours sincerely,

Albert Siertsema, P.Eng., PMP
Project Engineer

WSP ref.: 191-06761-03

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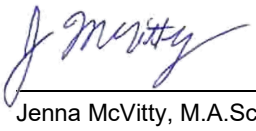

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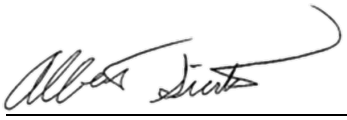

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This limitations statement is considered an integral part of this report.

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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Oxford County to conduct an inventory of seven closed municipal landfill sites located throughout Oxford County. It is our understanding that this undertaking was initiated by the County for due diligence purposes.

The main project objectives were as follows:

- Review and catalogue the historical records and reports, search for and collect data from pertinent government agencies (e.g. Ministry of Environment, Conservation and Parks Freedom of Information Requests) and conduct site visits at the seven closed landfills owned by Oxford County;
- Report on the condition of the closed landfills' records, identify data gaps and potential for risk for each of the seven closed landfills; and
- Compile all findings and recommendations in a single report.

A single report, submitted to Oxford County in November 2019, was prepared based on all the information obtained during the records review and site visits. The report endeavoured to develop an understanding of the potential risks at each closed landfill site and the possible need for additional works, investigations and/or monitoring.

Based upon the report, Oxford County chose to proceed with recommended medium and high priority action items at the Lakeside, Embro, and Thamesford closed landfills in 2021; followed by the Blandford-Blenheim and Gunn's Hill closed landfills in 2022; and then the Otterville and Tillsonburg closed landfills in 2023.

Proposals to complete the 2023 due diligence monitoring programs were submitted to Oxford County on August 11, 2022. This report provides a summary of the drilling and monitoring programs completed as part of the 2023 due diligence monitoring at the Otterville and Tillsonburg Closed Landfill Sites, as well as a summary of the 2023 due diligence monitoring programs completed at the Lakeside, Embro, Thamesford, Blandford-Blenheim and Gunn's Hill Closed Landfill Sites. The report includes all details of the work programs completed; presentation and discussion of the results of the monitoring completed; and conclusions and recommendations.

The locations of the closed landfill sites are provided on Figure 1.

2 LAKESIDE LANDFILL

The original work program at the Lakeside Landfill Site consisted of the following medium and high priority items identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Landfill Gas: Installation of a shallow gas probe at the property limit adjacent to the closest residential property (medium priority); and
- Shallow Groundwater / Surface Water: Initiate a surface water sampling program at the site including an upgradient and downgradient station. (medium priority).

The exposed refuse observed on the north end of the waste fill area, and maintaining the fencing and signage were identified as high priority tasks. These tasks were to be completed by Oxford County staff.

As documented in the 2021 Due Diligence Monitoring Program Report (WSP, 2022), gas probe LS-GP1 was installed for the purpose of assessing any landfill gas migration from the refuse. This monitor was installed within the unsaturated zone east of the refuse and west of the residential property located on 25th Line, as shown on Figure 2-1.

2.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Lakeside Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Gas monitoring of probe LS-GP1 on February 8, April 3, July 4 and December 4, 2023;
- Water level monitoring within gas probe LS-GP1 during gas monitoring events; and
- Surface water monitoring at LS-SW1, LS-SW2, and LS-SW3 on April 3, 2023.

The location of the landfill gas monitoring probe is shown on Figure 2-1. The gas monitoring was completed using an Elkins Earthworks Envision Landfill Gas Monitor. The groundwater level was collected immediately following the gas measurement within the gas probe.

Surface water sampling was completed during the spring at three surface water locations, as shown in Figure 2-1. The samples were obtained directly from the surface water source at each monitoring location and submitted to SGS Canada Inc., located in Lakefield, Ontario.

2.1.1 SURFACE WATER

SURFACE WATER FLOW

During the sampling events at the Site, there was no apparent surface water flow at the designated monitoring stations. Surface drainage from the refuse mound appears to collect along the toe of the landfill (LS-SW2) and drains north/west towards a provincially significant wetland, exiting the Site in the vicinity of station LS-SW3. Station LS-SW1 is located 300 m east of the refuse and represents an upgradient location.

SURFACE WATER QUALITY

Project quality assurance and control (QA/QC) was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

The surface water samples were analyzed for parameters that are typically associated with municipal landfills, as listed in Schedule 5, Column 3 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 3. Historic surface water chemistry results are presented in Table B-2. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Concentrations of typical landfill related parameters were compared between downgradient surface water quality at LS-SW2 and LS-SW3, to upgradient surface water quality at LS-SW1. Parameter concentrations were generally

higher at upgradient LS-SW1 in April 2023 compared to downgradient results, indicating that the landfill is likely not influencing surface water quality. These results are consistent with previous surface water monitoring events in 2021. Concentrations of alkalinity, total phosphorus, cadmium, and iron exceeded their respective Provisional Water Quality Objective (PWQO) criteria at a downgradient location at least once in 2023, but were notably less than the corresponding upgradient concentrations, with the exception of slightly elevated iron concentrations. The iron concentrations increased from upgradient station LS-SW1 to downstream stations LS-SW2 and LS-SW3 (located at the property boundary) during the April monitoring event.

Due to elevated concentrations of total phosphorus and cadmium in background above the PWQO, it likely that the parameters are elevated due to natural or non-landfill related activities (existing agriculture). Iron concentrations were previously noted to be elevated above the PWQO at the background station LS-SW1 in 2021 and therefore may also be impacted by natural or non-landfill related activities. Elevated concentrations of iron at the surface water stations could also be a result of their location within a stagnant/wetland setting.

Given these results, further surface water monitoring is not recommended.

2.1.2 LANDFILL GAS

As identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019, monitoring for combustible gas was completed at various times (at least once each season) for the year. Monitoring occurred during the winter (February 8, 2023), spring (April 3, 2023), summer (July 4, 2023) and fall (December 4, 2023). Monitoring occurred in February 2023 to correspond to frozen ground conditions, as landfill gas preferentially migrates horizontally when the ground is frozen and cannot escape vertically in the vicinity of the waste. The combustible gas monitoring results are presented in Table 5.

Groundwater elevations were completed to ensure that the screen of LS-GP1 remained unsaturated, to allow the gas to accumulate in the gas probe. The monitor's well screen was not submerged (dry) for all monitoring events.

During both frozen and unfrozen ground conditions, combustible gas was not detected at monitor LS-GP1 during the monitoring period. These results indicate that landfill gas does not appear to be present or migrating towards the residential property. Given the age and size of the landfill, it is unlikely that landfill gas will pose a risk to neighbouring properties. As such, further landfill gas monitoring is not recommended.

3 EMBRO LANDFILL

The work program at the Embro Landfill Site consisted of the following priority items identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Landfill Gas: Installation of shallow gas probes at the property limits adjacent to the closest residential properties (medium priority); and
- Contact the neighbouring properties to the south and east to determine information regarding their water use (well type, depth etc.). Depending on the neighbour's water use, consideration should be given to sampling their water source (medium priority).

The repair of a small gap in the perimeter fence, as well as maintenance of the fencing and signage, were identified as high priority tasks. These tasks were to be completed by Oxford County staff.

As documented in the 2021 Due Diligence Monitoring Program Report (WSP, 2022), gas probes EB-GP1, EB-GP2 and EB-GP3 were installed for the purpose of assessing landfill gas migration from the refuse. These monitors were installed within the unsaturated zone towards the southwest, northwest, and northwest corners of the property boundary, adjacent to the closest residential properties, as shown on Figure 3-1.

3.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Embro Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Gas monitoring of probes EB-GP1, EB-GP2, and EB-GP3 on February 8, April 6, July 4 and December 4, 2023;
- Water level monitoring within the gas probes during gas monitoring events; and
- Private well monitoring at three residential properties located on 33rd Line including property numbers 335358 (P4), 335367 (P2) and 335384 (P3).

The locations of the landfill gas monitoring probes are shown on Figure 3-1. The gas monitoring was completed using an Elkins Earthworks Envision Landfill Gas Monitor. Groundwater levels were collected immediately following the gas measurements within the gas probes.

It is noted that the private well owners were either unable or did not want to provide information regarding their water use (well type, depth etc.), but were willing to provide access to sample each well. The private well sampling was completed during the spring at the three residential properties east, southeast and south of the landfill property, as shown on Figure 3-2. The samples were obtained from the residences prior to any water treatment systems (e.g. UV treatment, filters, softeners, etc.).

3.1.1 PRIVATE WELLS

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4°C and delivered or couriered to the laboratory at the end of the day.

The three private well groundwater samples were analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

A review of the groundwater quality results indicates that all the parameters analyzed were within the Ontario Drinking Water Quality Standards (ODWQS) (MECP, revised June 2006).

Concentrations of volatile organic compounds were not detected in the groundwater samples.

The remaining parameter concentrations at P2, P3 and P4 in April 2023 were relatively similar and below the ODWQS. In summary, groundwater quality within the private wells tested did not show evidence of a leachate influence. Given these results, further groundwater monitoring is not recommended.

3.1.2 LANDFILL GAS

As identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019, monitoring for combustible gas was completed at various times (at least once each season) for the year. Monitoring occurred during the winter (February 8, 2023), spring (April 3, 2023), summer (July 4, 2023) and fall (December 4, 2023). Monitoring occurred in February 2023 to correspond to frozen ground conditions, as landfill gas preferentially migrates horizontally when the ground is frozen and cannot escape vertically in the vicinity of the waste. The combustible gas monitoring results are presented in Table 5.

Groundwater elevations were completed to ensure that the screens of the three probes remained unsaturated to allow the gas to accumulate in the gas probes. The monitor well screens were not submerged during the monitoring events, with the exception of EB-GP2 in February, April and December 2023.

During both frozen and unfrozen ground conditions, combustible gas was not detected at monitors EB-GP1, EB-GP2 or EB-GP3 during the monitoring period. These results indicate that landfill gas does not appear to be present or migrating towards the residential properties. Given the age and size of the landfill, it is unlikely that landfill gas will pose a risk to neighbouring properties. As such, further landfill gas monitoring is not recommended.

4 THAMESFORD LANDFILL

The work program at the Thamesford Landfill Site consisted of the following priority items identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Landfill Gas: Installation of a shallow gas probe at the property limit adjacent to the closest residential properties (medium priority);
- Groundwater: Installation of monitoring wells at locations around the perimeter of the property to assess the shallow groundwater quality and flow direction (medium priority); and
- Surface Water: Investigate the source and water quality of the surface water in the drainage swale (medium priority).

The exposed refuse observed on the south end of the waste fill area, and maintaining the fencing and signage were identified as high priority tasks. These tasks were to be completed by Oxford County staff.

As documented in the 2021 Due Diligence Monitoring Program Report (WSP, 2022), gas probe TF-GP2 was installed for the purpose of assessing landfill gas migration from the refuse. This monitor was installed within the unsaturated zone west of the refuse, adjacent to the closest receptors. Groundwater monitoring wells TF-MW1, TF-MW2 and TF-MW3 were installed to assess the shallow groundwater quality and flow direction. The shallow groundwater monitors were installed the northwest corner, southern limit and center/eastern boundary of the Site, as shown on Figure 4-1.

4.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Thamesford Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Gas monitoring of probe TF-GP2 and monitoring wells TF-MW1, TF-MW2, and TF-MW3 on February 8, April 4, July 4 and December 4, 2023;
- Groundwater sampling at TF-MW1, TF-MW2, and TF-MW3 on April 5, 2023;
- Groundwater level monitoring at all installed monitors during each monitoring event; and
- Surface water monitoring at TF-SW1 and TF-SW2 on March 23, 2023.

The location of the landfill gas monitoring probe is illustrated on Figure 4-1. The gas monitoring was completed using an Elkins Earthworks Envision Landfill Gas Monitor. Groundwater levels were collected immediately following the gas measurements within the gas probe.

Groundwater monitoring and sampling was completed during the spring at the three groundwater monitoring wells, located at the northwest corner, southern limit and center/eastern boundary of the Site, as shown in Figure 4-1. The samples were submitted to SGS Canada Inc. located in Lakefield, Ontario.

Surface water monitoring and sampling was also completed during the spring at the upgradient surface water sampling station (TF-SW2) and downgradient station (TF-SW1), as shown in Figure 4-1. The samples were obtained directly from the surface water source at each monitoring location and submitted to SGS Canada Inc., located in Lakefield, Ontario.

4.1.1 GROUNDWATER

GROUNDWATER FLOW

According to the local Source Water Protection assessments, groundwater flow in the vicinity of the of the Site is towards the south to south-east. Based on the groundwater elevation measurements completed, the groundwater flow direction of the shallow overburden is similar to the Source Water Protection assessment, moving towards the south-east to east. The groundwater table elevations measured in April 2023 and the interpreted shallow groundwater table contours are presented on Figure 4-2.

As per the inferred groundwater flow direction, the groundwater quality observed at monitoring well TF-MW1 is considered representative of background/upgradient groundwater conditions, while the remaining monitoring wells are considered downgradient of the Site.

GROUNDWATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

Analytical results for the field QA/QC sampling completed during the groundwater sampling program were evaluated for the relative percent difference (RPD) of parameter concentrations. For concentrations greater than five times the reported detection limit (RDL), a concentration difference of less than or equal to 20% was deemed acceptable. For concentrations less than or equal to five times the RDL, a concentration difference of equal to or less than twice the RDL was deemed acceptable.

Laboratory reports were reviewed as part of the laboratory QA/QC program. The groundwater duplicate sample results are provided in Table 2. The RPDs between the blind duplicates and original samples collected on April 5, 2023 were acceptable for the tested constituents, with the exception of copper (41% RPD). The laboratory was consulted to validate the original and duplicate results for the samples noted above. The laboratory's response indicated that these concentrations were within acceptable laboratory QA/QC ranges and the chemical results stand.

The groundwater samples were analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Parameter concentrations in the samples collected were relatively similar. There were no exceedances of the ODWQS during the April 2023 monitoring event. Chloride concentrations were low in 2023 compared to the elevated concentrations noted in background monitor TF-MW1 in 2021.

Concentrations of volatile organic compounds were not detected within the groundwater.

ONTARIO DRINKING WATER QUALITY STANDARDS

A review of the groundwater quality results indicates that all the parameters analyzed were within the ODWQS.

GUIDELINE B-7 COMPLIANCE ASSESSMENT

Guideline B-7 (GB-7) was established by the MECP as a mechanism to assess the acceptable level of leachate impacts on the groundwater system. Guideline B-7 is applied to groundwater quality at the property boundary, and is intended to protect both existing and potential reasonable uses of the groundwater on adjacent properties. The Guideline states that, for non-health related parameters, the impact from the landfill should not raise the concentration by more than half the difference between the background concentration and the ODWQS. For health related parameters, the impact from the landfill should not raise the concentration by more than quarter the difference between the background concentration and the ODWQS.

GB-7 criteria were calculated for parameters that have ODWQS. The groundwater chemistry results from background monitor TF-MW1 were used as reference concentrations for the calculations.

Table 6 provides a comparison of the calculated Guideline B-7 criteria and downgradient wells on Site.

In summary, concentrations at the landfill property boundary complied with the GB-7 criteria, with the exception of alkalinity at monitor TF-MW2. It is noted that alkalinity has an objective related to the operational treatment of the water, and is not health related. The alkalinity concentration at monitor TF-MW2 was also less than the ODWQS.

Based on the groundwater quality results, there does not appear to be a landfill impact to the shallow groundwater at this time. Given these results, further groundwater monitoring is not recommended.

4.1.2 SURFACE WATER

SURFACE WATER FLOW

Surface water at the Thamesford Landfill discharges through a drainage swale that bisects the site, and ultimately drains through the wet area (part of field) to the east, into the Middle Thames River. During the monitoring event, there was no measurable surface water flow at downstream station TF-SW1, but sheet flow was observed at the station, located along the eastern property boundary. Flow was able to be measured at a rate of 39 L/s at upstream station TF-SW2 during the monitoring event.

SURFACE WATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

The surface water samples were analyzed for parameters that are typically associated with municipal landfills, as listed in Schedule 5, Column 3 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 3. Historic surface water chemistry results are presented in Table B-2. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Concentrations of typical landfill related parameters were compared between downgradient surface water quality at TF-SW1 to upgradient surface water quality at TF-SW2. Parameter concentrations were generally higher at upgradient TF-SW2 compared to downgradient results, indicating that the landfill is likely not influencing surface water quality.

Concentrations of total phosphorus, copper and iron exceeded their respective PWQO criteria at both the upgradient (TF-SW2) and downgradient (TF-SW1) locations in March 2023. In addition, concentrations of phenols, lead and zinc also exceeded their respective PWQO at background station TF-SW2. As such, these exceedances can be considered elevated due to background conditions.

Considering the minimal surface water flow rate, which was unmeasurable at the downstream location (sheet flow) in 2023, very little impact is anticipated from any surface water runoff from the site. The surface water stations are normally dry, and the flow in 2023 was only able to be sampled after a significant precipitation event. As noted earlier, elevated concentrations at the downstream location are largely attributable to natural or non-landfill related activities (adjacent quarry and agriculture).

Given these results, further surface water monitoring is not recommended.

4.1.3 LANDFILL GAS

As identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019, monitoring for combustible gas was completed at various times (at least once each season) for the year. Monitoring occurred during the winter (February 8, 2023), spring (April 4, 2023), summer (July 4, 2023) and fall (December 4, 2023). Monitoring occurred in February 2023 to correspond to frozen ground conditions, as landfill gas

preferentially migrates horizontally when the ground is frozen and cannot escape vertically in the vicinity of the waste. The combustible gas monitoring results are presented in Table 5.

Groundwater elevations were completed to ensure that the screen of gas probe TF-GP2 remained unsaturated, to allow the gas to accumulate in the gas probe. The monitor's well screen was not submerged for each of the 2023 monitoring events. Landfill gas monitoring and groundwater elevations were also collected within monitoring wells TF-MW1, TF-MW2 and TF-MW3, although these monitors' well screens were submerged for most monitoring events in 2023.

During both frozen and unfrozen ground conditions, combustible gas was not detected at any of the monitors during the monitoring period. These results indicate that landfill gas does not appear to be present or migrating away from the property boundary, particularly toward any residential property to the west. Given the age and size of the landfill, it is unlikely that landfill gas will pose a risk to neighbouring properties. As such, further landfill gas monitoring is not recommended.

5 BLANDFORD-BLENHEIM LANDFILL

The work program at the Blandford-Blenheim Landfill Site consisted of the following medium and high priority items identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Landfill Gas: Installation of a shallow gas probe at the property limit adjacent to the closest residential property (medium priority);
- Surface Water: Initiate a surface water sampling program at locations in the wetland/swampy areas around the Site, including an upgradient station off-site to the northwest and a downgradient station within the ponded area in the southeastern corner of the property (medium priority);
- Surface Water: Inspection of the southeastern corner of the property for the existence of a culvert connecting the landfill property with the adjoining property (medium priority);
- Groundwater: Drilling and monitoring well installation program at locations around the perimeter of the property to determine the shallow soil characteristics and to assess the shallow ground water quality and flow direction. Investigate the existing monitoring well observed on site for inclusion into the sampling program (medium priority); and
- Contact the neighbouring property to the west to determine information regarding their water use (well type, depth, etc.). Depending on the neighbour's water use, consideration should be given to sampling their water source (high priority).

As documented in the 2022 Due Diligence Monitoring Program Report (WSP, 2023), gas probe BB-GP1 was installed for the purpose of assessing landfill gas migration from the refuse. This monitor was installed within the unsaturated zone northwest of the refuse and east of the adjacent residential property. Groundwater monitoring wells BB-MW1, BB-MW2 and BB-MW3 were installed to assess the shallow groundwater quality and flow direction. The shallow groundwater monitors were installed near the northwest, southwest and eastern boundaries of the Site, as shown on Figure 5-1.

5.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Blandford-Blenheim Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Gas monitoring of probe BB-GP1 and monitoring wells BB-MW1, BB-MW2, BB-MW3, BB-BH1-1 and BB-BH1-2 on February 8, April 4, July 4 and December 4, 2023;
- Surface water monitoring at BB-SW1, BB-SW2 and BB-SW3 on March 24, 2023;
- Groundwater sampling at BB-MW1, BB-MW2, BB-MW3, BB-BH1-1 and BB-BH1-2 on April 4, 2023;
- Groundwater level monitoring at all on-site monitors during each monitoring event; and
- Private well monitoring at a residential property located at 846635 Township Road 9 (BB-P1) on April 4, 2023.

The location of the landfill gas monitoring probe is shown on Figure 5-1. The gas monitoring was completed using an Elkins Earthworks Envision Landfill Gas Monitor. A groundwater level measurement was collected immediately following the gas measurement within the gas probe.

Surface water sampling was completed during the spring at three surface water locations, as shown on Figures 5-1 and 5-2. It is noted that the each of the locations were not flowing (stagnant) or dry at the time of the sampling events. The samples were obtained directly from the surface water source at each monitoring location and submitted to SGS Canada Inc., located in Lakefield, Ontario.

Groundwater monitoring and sampling was completed during the spring at the five groundwater monitoring wells, as shown on Figures 5-1 and 5-2. The samples were submitted to SGS Canada Inc. located in Lakefield, Ontario.

The private well sampling was completed during the spring at the residential property to the northwest of the landfill property, as shown on Figure 5-1. In discussions with the private well owner, the well was reported to be a dug well with a depth of approximately 40 foot (12.2 m). The presumed water well record was located and obtained from the MECP well record database, which is a database providing information from well contractors as prescribed by O.Reg. 903 and stored in the Water Well Information System (WWIS). The presumed water well record for the private well is provided in Appendix A-4. The sample was obtained from a tap located outside of the corner of the garage, prior to any water treatment systems (e.g. UV treatment, filters, softeners, etc.).

5.1.1 LANDFILL GAS

As identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019, monitoring for combustible gas was completed at various times (at least once each season) for the year. Monitoring occurred during the winter (February 8, 2023), spring (April 4, 2023), summer (July 4, 2023) and fall (December 4, 2023). Monitoring occurred in February 2023 to correspond to frozen ground conditions, as landfill gas preferentially migrates horizontally when the ground is frozen and cannot escape vertically in the vicinity of the waste. The combustible gas monitoring results are presented in Table 5.

Groundwater elevations were completed to ensure that the screen of gas probe BB-GP1 remained unsaturated, to allow the gas to accumulate in the gas probe. The monitor's well screen was not submerged for any of the monitoring events. Landfill gas monitoring and groundwater elevations were also collected within monitoring wells BB-MW1, BB-MW2 and BB-MW3, although these monitors' well screens were submerged for each of the

monitoring events in 2023. Landfill gas monitoring and groundwater elevations were also collected within historic monitoring wells BB-BH1-1 and BB-BH1-2, but as the monitoring well details are unknown for these wells, it cannot be confirmed if the monitors' well screens were submerged or not.

During both frozen and unfrozen ground conditions, combustible gas was not detected at any of the monitors during the monitoring period. These results indicate that landfill gas does not appear to be present or migrating away from the property boundary, including toward the residential property to the northwest. Given the age and size of the landfill, it is unlikely that landfill gas will pose a risk to neighbouring properties. As such, further landfill gas monitoring is not recommended.

5.1.2 SURFACE WATER

SURFACE WATER FLOW

During the March 2023 sampling event at the Site, there was no apparent surface water flow (stagnant) at the designated monitoring stations.

Some surface drainage from the refuse mound appears to collect in the wetland/swampy area in the southeastern corner of the Site (BB-SW2), which is assumed to drain to the adjoining swampland to the east (BB-SW3). An inspection of the southeastern corner of the property was also completed, to attempt to find the culvert that is presumed to connect the landfill property with the adjoining property. This culvert was unable to be found.

Station BB-SW1 is located within a wetland/swampy area to west of the Site and represents an upgradient location. There was also no surface water flow at this upgradient location in 2023.

SURFACE WATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

The surface water samples were analyzed for parameters that are typically associated with municipal landfills, as listed in Schedule 5, Column 3 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 3. Historic surface water chemistry results are presented in Table B-2. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Concentrations of typical landfill related parameters were compared between downgradient surface water quality at BB-SW2 and BB-SW3 to upgradient surface water quality at BB-SW1. In the spring of 2023, the majority of parameter concentrations increased in concentration moving from BB-SW1 to BB-SW2, with several exceptions including chloride, nitrate, total phosphorus and several metals which decreased in concentration. Moving from BB-SW2 to BB-SW3, concentrations increased for some parameters and decreased for others. These results indicate that the landfill may be influencing surface water quality, however there is no clear correlation moving downstream. Concentrations of boron at BB-SW2, copper and iron at BB-SW3, and total phosphorus at all three stations exceeded their respective PWQO in March 2023. It is noted that further downstream at BB-SW3 (located on the adjoining swampland to the east) the boron concentration no longer exceeded the PWQO.

Although several parameters exceeded the PWQO at the downstream surface water locations, it is plausible that these exceedances were the result of the stagnant wetland conditions at these locations. The general increase of parameter concentrations from the upstream to downstream locations does suggest that the landfill may be partially influencing surface water quality. Nonetheless, as the surface water stations are normally ephemeral (dry in the fall), the downstream impact appears to be minimal. Continued surface water monitoring is recommended to corroborate these ephemeral conditions, and to determine whether the landfill is impacting downstream surface water quality.

5.1.3 GROUNDWATER

GROUNDWATER FLOW

According to the local Source Water Protection assessments, groundwater flow in the vicinity of the Site is inferred to flow towards the east to southeast. Based on the groundwater elevation measurements completed, the groundwater flow direction of the shallow overburden matches the Source Water Protection assessment. The groundwater table elevations measured in April 2023 and the interpreted shallow groundwater table contours are presented on Figure 5-3.

As per the inferred groundwater flow direction, the groundwater quality observed at monitoring well BB-MW3 is considered representative of background/upgradient groundwater conditions, while the remaining monitoring wells are considered downgradient of the Site.

GROUNDWATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

Analytical results for the field QA/QC sampling completed during the groundwater sampling program were evaluated for the RPD of parameter concentrations. For concentrations greater than five times the RDL, a concentration difference of less than or equal to 20% was deemed acceptable. For concentrations less than or equal to five times the RDL, a concentration difference of equal to or less than twice the RDL was deemed acceptable.

Laboratory reports were reviewed as part of the laboratory QA/QC program. The groundwater duplicate sample results are provided in Table 2. The RPDs between the blind duplicate and original sample collected on April 4, 2023 were acceptable for the tested constituents.

The groundwater samples were analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Parameter concentrations in the groundwater samples collected were generally highest at monitor BB-BH1-2 located within the landfill footprint, followed by concentrations at monitor BB-MW1 located downstream in the east corner of the Site. Concentrations at monitors BB-BH1-1 and BB-MW2 were also generally elevated compared to background concentrations at monitor BB-MW3, but less elevated than at monitors BB-BH1-2 and BB-MW1.

Manganese concentrations at BB-BH1-1 were greater than BB-BH1-2 in April 2023. These results correspond to those noted in 2022.

Concentrations of volatile organic compounds (VOCs) were detected within the groundwater at monitor BB-BH1-2 for benzene, toluene and 1,4-dichlorobenzene during the 2023 monitoring event, which also occurred in 2022. VOCs were not detected in any of the other groundwater monitors.

It is noted that nested monitors BB-BH1-1 and BB-BH1-2 were existing monitoring wells within the landfill footprint, that were identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019). Well details were not available for these monitoring wells, but dedicated sampling equipment was installed by WSP in the spring of 2022 and the wells were developed to promote hydraulic connection to ensure that the adjacent groundwater was representative of natural conditions. Well depths were recorded after development of these wells. It is apparent that monitor BB-BH1-2 is a shallow monitoring well, likely installed within the refuse, and is representative of the leachate quality at the Site. Monitor BB-BH1-1 is a deeper monitoring well, assumed to be installed below the refuse. Therefore, the elevated parameter concentrations at monitor BB-BH1-2 can be considered representative of leachate at the Site.

ONTARIO DRINKING WATER QUALITY STANDARDS

A review of the groundwater quality results indicates that all the parameters analyzed were within the ODWQS during 2023, with the exception of:

- Total dissolved solids (TDS), dissolved organic carbon (DOC) and alkalinity at monitors BB-MW1 and BB-BH1-2;
- Iron and manganese at monitors BB-MW1, BB-BH1-1 and BB-BH1-2; and
- Benzene and 1-4-dichlorobenzene at BB-BH1-2.

As discussed above, BB-BH1-2 is likely installed within the refuse and is representative of the leachate quality at the Site.

TDS, DOC, iron, manganese and 1,4-dichlorobenzene have objectives or guidelines related to the aesthetic quality of the water and are not health related. Alkalinity is an operational guideline and is also not health related.

GUIDELINE B-7 COMPLIANCE ASSESSMENT

Guideline B-7 (GB-7) was established by the MECP as a mechanism to assess the acceptable level of leachate impacts on the groundwater system. Guideline B-7 is applied to groundwater quality at the property boundary, and is intended to protect both existing and potential reasonable uses of the groundwater on adjacent properties. The Guideline states that, for non-health related parameters, the impact from the landfill should not raise the concentration by more than half the difference between the background concentration and the ODWQS. For health related parameters, the impact from the landfill should not raise the concentration by more than quarter the difference between the background concentration and the ODWQS.

GB-7 criteria were calculated for parameters that have ODWQS. The groundwater chemistry results from background monitor BB-MW3 were used as reference concentrations for the calculations.

Table 6 provides a comparison of the calculated Guideline B-7 criteria and downgradient shallow wells on Site.

In summary, concentrations at the landfill property boundary complied with the GB-7 criteria in 2023, with the exception of:

- TDS and iron at monitors BB-MW1 and BB-MW2; and
- DOC, alkalinity, barium and manganese at monitor BB-MW1.

It is noted that most of these parameters have objectives or guidelines related to the aesthetic quality (TDS, DOC, iron and manganese) or operational treatment (alkalinity) of the water, and are not health related. Barium, which is a health related criterion, exceeded the GB-7 criteria at BB-MW1. The concentration of barium detected at BB-MW1, however, was below the ODWQS criteria.

Based on the groundwater quality results, there is evidence of landfill impact to the shallow groundwater at the Site, particularly at eastern boundary well BB-MW1. This shallow groundwater may also influence the surface quality within the wetland areas to the east of the Site. It is noted that the adjacent property directly to the east of the Site was confirmed to be owned by Oxford County (WSP, 2019), and could be considered a buffer for landfill impacts to the east. If further lands to the east/southeast become available, the County may want to consider purchasing them for additional buffer and natural attenuation of shallow groundwater and surface water. Continued groundwater monitoring of the wells on-site may be prudent, to monitor for any changing parameter concentration trends.

5.1.4 PRIVATE WELL

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

The private well groundwater sample was analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

A review of the groundwater quality results indicates that all the parameters analyzed were within the ODWQS. Concentrations of volatile organic compounds were not detected in the groundwater sample.

In summary, groundwater quality within the private well tested did not show evidence of a leachate influence. Given these results, further groundwater monitoring of the private water well is not recommended.

6 GUNN'S HILL LANDFILL

The work program at the Gunn's Hill Landfill Site consisted of the following priority items identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Landfill Gas: Installation of shallow gas probes at the property limits adjacent to the residential properties to the west and east (medium priority);

- Shallow Groundwater / Surface Water: Inspection of the south/southwest slope of the landfill for leachate seeps during periods of high ground saturation, such as late winter, early spring and late fall. If leachate seeps are observed, initiate a sampling program that includes sampling the seeps and the upstream and downstream wetland areas, to the south and west, respectively (high priority); and
- Contact the neighbouring properties to the west and east to determine information regarding their water use (well type, depth etc.). Depending on the neighbour's water use, consideration should be given to sampling their water source (medium priority).

As documented in the 2022 Due Diligence Monitoring Program Report (WSP, 2023), gas probes GH-GP1 and GH-GP2 were installed for the purpose of assessing landfill gas migration from the refuse. These monitors were installed on the property boundary within the unsaturated zone on the east and west sides of the refuse mound, adjacent to the closest residential properties, as shown on Figure 6-1.

6.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Gunn's Hill Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Gas monitoring of probes GH-GP1 and GH-GP2 on February 8, April 6, July 4 and December 4, 2023;
- Water level monitoring within the gas probes during gas monitoring events;
- Inspection of the south/southwest slopes of the landfill for seeps on April 6, April 17 and July 4, 2023; and
- Private well monitoring at three residential properties located on Gunn's Hill Road, at property numbers 445300 (GH-P1), 445297 (GH-P2) and 445262 (GH-P3A and GH-P3B).

The locations of the landfill gas monitoring probes are shown on Figure 6-1. The gas monitoring was completed using an Elkins Earthworks Envision Landfill Gas Monitor. Groundwater levels were collected immediately following the gas measurements within the gas probes.

The private well sampling was completed during the spring at the residential properties adjacent to the landfill property, as shown on Figure 6-2. In discussions with the private well owners, well construction details (well type, depth, etc.) were not readily available or known. The presumed water well records were located and obtained from the MECP well record database by WSP. The presumed water well records for the private wells are provided in Appendix A-5. Each well owner was willing to provide access to sample each well in 2023, with the exception of location GH-P2, where the well owner was unavailable during multiple attempts to contact. As a result, a sample was unable to be collected from GH-P2 in 2023.

The samples were obtained from the residences prior to any water treatment systems (e.g. UV treatment, filters, softeners, etc.).

6.1.1 LANDFILL GAS

As identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019, monitoring for combustible gas was completed at various times (at least once each season) for the year. Monitoring occurred during the winter (February 8, 2023), spring (April 6, 2023), summer (July 4, 2023) and fall (December 4,

2023). Monitoring occurred in February 2023 to correspond to frozen ground conditions, as landfill gas preferentially migrates horizontally when the ground is frozen and cannot escape vertically in the vicinity of the waste. The combustible gas monitoring results are presented in Table 5.

Groundwater elevations were completed to ensure that the screens of the two probes remained unsaturated to allow the gas to accumulate in the gas probes. The monitor well screens were generally not submerged during the monitoring events, although the well screen at GH-GP1 was submerged during the February 8 and April 6, 2023 monitoring events.

During both frozen and unfrozen ground conditions, combustible gas was not detected at monitors GH-GP1 or GH-GP2 during the monitoring period. These results indicate that landfill gas does not appear to be present or migrating towards the residential properties. Given the age and size of the landfill, it is unlikely that landfill gas will pose a risk to neighbouring properties. As such, further landfill gas monitoring is not recommended.

6.1.2 SEEP INSPECTION / SURFACE WATER

As noted earlier, inspection of the south/southwest slopes of the landfill for seeps occurred on April 6, April 17 and July 4, 2023. Attempts were made to attend the inspections on dates of high ground saturation (particularly in the spring), to maximize the chances of witnessing any seeps.

During each of these inspections, no seeps were discovered. As such, the surface water quality monitoring program was not initiated. It is noted that any surface water flow through the proposed surface water stations (both upstream and downstream) appears to be very ephemeral. During the inspection of the Site for seeps, no downstream surface water flow was visible from the Site.

Considering the ephemeral surface water flow, very little impact is anticipated from any surface water runoff from the site. Given these results, further surface water monitoring is not recommended.

6.1.3 PRIVATE WELLS

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4^{o}C and delivered or couriered to the laboratory at the end of the day.

The three private well groundwater samples were analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

A review of the groundwater quality results indicates that all the parameters analyzed were within the ODWQS, with the exception of the iron concentration at GH-P1 and the manganese concentration at GH-P3B. Iron is a naturally occurring parameter in groundwater and commonly exceeds the ODWQS; exceeding at each of the private well locations in 2022. It is apparent that iron-rich water is prevalent within the background water quality in the area. The ODWQS for this parameter relates to an aesthetic objective for water quality; therefore, it does not represent a health concern. The manganese concentration at GH-P3B (0.0519 mg/L) was only marginally above the

ODWQS of 0.05 mg/L, and also relates to an aesthetic objective for water quality; therefore, it does not represent a health concern.

Concentrations of volatile organic compounds were not detected in the groundwater samples.

The remaining parameter concentrations at GH-P1, GH-3A and GH-3B in April 2023 were relatively similar and below the ODWQS. In summary, groundwater quality within the private wells tested did not show evidence of a leachate influence. Given these results, further groundwater monitoring is not recommended.

7 OTTERVILLE LANDFILL

The work program at the Otterville Landfill Site consisted of the following medium priority item identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Groundwater: Installation of monitoring wells at locations around the perimeter of the property to determine the shallow soil characteristics and to assess assess the shallow groundwater quality and flow direction (medium priority).

7.1 MONITORING WELL INSTALLATION PROGRAM

The drilling program was completed on February 21 and 22, 2023 by Direct Environmental Drilling using a track-mounted Diedrich D-50 equipped with 108 mm (4 ¼ inch) inside diameter, 215 (8 ½ inch) outside diameter hollow stem augers. Drill cuttings were contained on-site in the vicinity of the borehole location. WSP field staff were on-site to oversee the drilling and monitoring well installation activities. Borehole logs are provided in Appendix A-6.

Three boreholes were advanced through the overburden to depths ranging from 8.75 to 10.69 meters using 108 mm (4¼ inch) inside diameter hollow stem augers and a 51 mm (2 inch) diameter split spoon sampler. Soil samples from the borehole drilling were logged in the field and then returned to the office for detailed logging and review by senior staff.

The groundwater monitoring wells were constructed of 51 mm (2 inch) diameter PVC riser pipe and slotted 1.52 m (5 foot) screens, with 0.15 m (6 inch) slotted cone tips (sumps). The borehole annulus around the each well screen was filled with No. 2 clean silica sand to at least 0.61 m above the well screen, to provide a filter pack. The remainder of each borehole annulus was sealed with bentonite to surface. Lockable protective steel casings were installed at the surface, for each monitoring well.

Monitor construction details for the gas probes are summarized in the following table:

Monitor Designation	Monitor Diameter	Ground Surface	Screened Interval	Filter Pack	Seal
	mm	mASL	mbgs	mbgs	mbgs
OT-MW1	51	250.67	7.23 – 9.00	6.87 – 9.00	0.00 – 6.87
OT-MW2	51	250.93	7.08 – 8.75	6.62 – 8.75	0.00 – 6.62
OT-MW3	51	254.83	9.02 – 10.69	8.56 – 10.69	0.00 – 8.56

Notes: mASL – metres above sea level.
mbgs – metres below ground surface

The monitors were installed for the purpose of determining the shallow soil characteristics and to assess the shallow groundwater quality and flow direction. The shallow groundwater monitors were installed near the northeast corner, northwestern corner/limit and the south/southeast boundary of the Site, as shown on Figure 7-1.

MECP well tags were affixed to the monitor installations and well records were submitted to the MECP in accordance with O.Reg. 903. A survey of the reference elevations for the new monitors was completed by Oxford County.

Following completion of the new monitoring wells, dedicated sampling equipment was installed. The wells were developed to promote hydraulic connection to the geologic formations, to remove fine-grained material from the area of the well screen, and to ensure that the adjacent groundwater was representative of natural conditions.

7.2 MONITORING PROGRAM AND RESULTS

The monitoring program for the Otterville Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Groundwater sampling at OT-MW1, OT-MW2, and OT-MW3 on April 4 and October 17, 2023; and
- Groundwater level monitoring at all installed monitors during each monitoring event.

Groundwater monitoring and sampling was completed during the spring and fall at the three groundwater monitoring wells, as shown in Figure 7-1. The samples were submitted to SGS Canada Inc. located in Lakefield, Ontario.

In addition to the groundwater monitoring and sampling, complimentary gas monitoring was also conducted on April 4 and October 17, 2023 at each of the groundwater monitors, as a supplemental measure. Combustible gas was not detected the monitors during the monitoring period, although the well screens were submerged for each event (with the exception of OT-MW3 in October 2023). These results generally indicate that landfill gas does not appear to be present or migrating from the property.

7.2.1 GROUNDWATER

GROUNDWATER FLOW

According to the local Source Water Protection assessments, groundwater flow in the vicinity of the of the Site is towards the west. Based on the groundwater elevation measurements completed, the groundwater flow direction of the shallow overburden is towards the northwest, which generally matches the Source Water Protection assessment. The groundwater table elevations measured in April 2023 and the interpreted shallow groundwater table contours are presented on Figure 7-2.

As per the inferred groundwater flow direction, the groundwater quality observed at monitoring well OT-MW3 is considered representative of background/upgradient groundwater conditions, while the remaining monitoring wells are considered downgradient of the Site.

GROUNDWATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

Analytical results for the field QA/QC sampling completed during the groundwater sampling program were evaluated for the RPD of parameter concentrations. For concentrations greater than five times the RDL, a concentration difference of less than or equal to 20% was deemed acceptable. For concentrations less than or equal to five times the RDL, a concentration difference of equal to or less than twice the RDL was deemed acceptable.

Laboratory reports were reviewed as part of the laboratory QA/QC program. The groundwater duplicate sample results are provided in Table 2. The RPDs between the blind duplicates and original samples collected on October 17, 2023 were acceptable for the tested constituents, with the exception of DOC (73% RPD), ammonia (42 % RPD), boron (97% RPD) and total suspended solids (40% RPD). The laboratory was consulted to validate the original and duplicate results for the samples noted above. The laboratory's response indicated that these concentrations were within acceptable laboratory QA/QC ranges and the chemical results stand.

The groundwater samples were analyzed for parameters that are typically associated with municipal landfills as listed in Schedule 5, Column 1 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 1. Historic groundwater chemistry results are presented in Table B-1. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Parameter concentrations in the samples collected were generally highest at background monitor OT-MW3 compared to OT-MW1 and OT-MW2 during both the April and October 2023 monitoring events, with few exceptions. The nitrate concentration at OT-MW1 was elevated in comparison to concentrations at other monitoring wells during both 2023 monitoring events. Given the agricultural practices that occur on the neighbouring properties, it is unlikely that the nitrate concentration detected at OT-MW1 is landfill related.

Concentrations of volatile organic compounds were not detected within the groundwater.

ONTARIO DRINKING WATER QUALITY STANDARDS

A review of the groundwater quality results indicates that all the parameters analyzed were within the ODWQS, with the exception of the following parameters at monitor OT-MW3:

- Chloride in April 2023;
- DOC in October 2023, and
- TDS and manganese in April and October 2023;

It is noted that monitor OT-MW3 is considered to be representative of background/upgradient groundwater conditions, and concentrations that exceed the ODWQS at this location would likely be the result of off-site or background effects. In addition, chloride, DOC, TDS and manganese have objectives or guidelines related to the aesthetic quality of the water and are not health related.

GUIDELINE B-7 COMPLIANCE ASSESSMENT

Guideline B-7 (GB-7) was established by the MECP as a mechanism to assess the acceptable level of leachate impacts on the groundwater system. Guideline B-7 is applied to groundwater quality at the property boundary, and is intended to protect both existing and potential reasonable uses of the groundwater on adjacent properties. The Guideline states that, for non-health related parameters, the impact from the landfill should not raise the concentration by more than half the difference between the background concentration and the ODWQS. For health related parameters, the impact from the landfill should not raise the concentration by more than quarter the difference between the background concentration and the ODWQS.

GB-7 criteria were calculated for parameters that have ODWQS. The groundwater chemistry results from background monitor OT-MW3 were used as reference concentrations for the calculations.

Table 6 provides a comparison of the calculated Guideline B-7 criteria and downgradient wells on Site.

In summary, concentrations at the landfill property boundary complied with the GB-7 criteria, with the exception of:

- Nitrate at monitor OT-MW1 in April and October 2023.

Although nitrate, which is a health related criterion, exceeded the GB-7 criteria at OT-MW1, the concentrations were below the ODWQS criteria in 2023. Given the agricultural practices that occur on the neighbouring properties, it is unlikely that the nitrate concentrations detected at OT-MW1 are landfill related.

Based on the groundwater quality results, there does not appear to be a landfill impact to the shallow groundwater at this time. Given these results, further groundwater monitoring is not recommended.

8 TILLSONBURG LANDFILL

The original work program at the Tillsonburg Landfill Site consisted of the following high priority item identified during the inventory of the closed municipal landfills in Oxford County (WSP, 2019):

- Surface Water: Begin inspecting the ravine walls for leachate seeps during periods of high ground saturation, such as late winter, early spring and late fall. If leachate seeps are observed, initiate a sampling program that includes sampling the seeps, the small streams within the ravines to the south, and upstream/downstream stations in Big Otter Creek. (high priority).

Installation of a gate at the northern property of the south parcel was completed by Oxford County staff, with fencing and signage maintained to prohibit access to the Site. These high priority tasks were completed by Oxford County staff.

8.1 MONITORING PROGRAM AND RESULTS

The monitoring program for the Tillsonburg Landfill was based upon the recommendations that were provided in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019. These tasks included the following monitoring events in 2023:

- Surface water monitoring at TB-SW1, TB-SW2, TB-SW3, TB-SW4 and TB-SW5 on March 20 and October 17, 2023;

During each of the surface water monitoring events (completed during periods of high ground saturation), inspection of the ravine walls was completed for leachate seeps. No leachate seeps were discovered during the 2023 surface water monitoring events, and as such, no leachate seeps were able to be sampled. Surface water sampling was completed during the spring and fall at five surface water locations, as shown in Figure 8-1. The samples were obtained directly from the surface water source at each monitoring location and submitted to SGS Canada Inc., located in Lakefield, Ontario. A sixth proposed surface water sampling location, TB-SW6, was noted to be dry during each sampling event and as such, was unable to be sampled.

8.1.1 SURFACE WATER

SURFACE WATER FLOW

During the March and October 2023 sampling events at the Site, there was significant flow (>10,000 L/s) within Big Otter Creek, both upstream (TB-SW1) and downstream (TB-SW2) of the Site. The remaining surface water sampling locations had flows of 20 L/s or less during the spring event and 3 L/s or less during the fall event.

Surface water at the Site flows through Big Otter Creek from upstream station TB-SW1 to downstream station TB-SW2. Additional downstream surface water monitoring locations include TB-SW3, TB-SW4 and TB-SW5, all located within ravines that flow through steep terrain to Big Otter Creek, between upgradient TB-SW1 and downgradient TB-SW2.

As noted earlier, each of the surface water monitoring events was completed during periods of high ground saturation, and inspections of the ravine walls were completed for leachate seeps. No leachate seeps were discovered during the 2023 surface water monitoring events, and as such, no leachate seeps were able to be sampled.

SURFACE WATER QUALITY

Project QA/QC was performed through each stage of sampling and analysis. QA/QC during data collection was ensured through the use of standard monitoring protocols and procedures. Field equipment was calibrated regularly. Water samples collected in the field were placed in coolers with ice to maintain a constant temperature of about 4ºC and delivered or couriered to the laboratory at the end of the day.

Analytical results for the field QA/QC sampling completed during the surface water sampling program were evaluated for the RPD of parameter concentrations. For concentrations greater than five times the RDL, a concentration difference of less than or equal to 20% was deemed acceptable. For concentrations less than or equal to five times the RDL, a concentration difference of equal to or less than twice the RDL was deemed acceptable.

Laboratory reports were reviewed as part of the laboratory QA/QC program. The surface water duplicate sample results are provided in Table 4. The RPDs between the blind duplicates and original samples collected on March 20, 2023, were acceptable for the tested constituents, with the exception of copper (>2RDL RPD) at station TB-SW1. The RPDs between the blind duplicates and original samples collected on October 17, 2023, were acceptable for the tested constituents.

The laboratory was consulted to validate the original and duplicate results for the samples noted above. The laboratory's response indicated that these concentrations were within acceptable laboratory QA/QC ranges and the chemical results stand.

The surface water samples were analyzed for parameters that are typically associated with municipal landfills, as listed in Schedule 5, Column 3 of the Landfill Standards guideline (MECP, 2012). Summarized field and laboratory results for 2023 are presented in Table 3. Historic surface water chemistry results are presented in Table B-2. Copies of the 2023 laboratory certificates of analysis are provided in Appendix C.

Concentrations of typical landfill related parameters were compared between upgradient surface water quality at TB-SW1 to downgradient surface water quality at TB-SW2, within Big Otter Creek. Parameter concentrations at downstream station TB-SW2 were very similar to slightly lower than concentrations at upstream station TB-SW1.

Parameter concentrations were generally elevated at stations TB-SW3 and TB-SW4 (located within ravines downstream to the southeast of the landfilled area), when compared to the background concentrations at TB-SW1. This indicates that the landfill may be influencing surface water quality, although with the minimal rates of surface water flow within the ravines (1 to 2 L/s in 2023), there appears to be no influence to Big Otter Creek. Parameter concentrations at TB-SW3 and TB-SW4 were generally the highest of the sampled locations. However, it is noted that chloride and nitrate concentrations were comparable or lower at these stations, compared to background station TB-SW1.

Surface water quality concentrations at station TB-SW5 (located within a ravine to the east of the landfilled area) were generally comparable or lower than the background concentrations at TB-SW1 within Big Otter Creek.

A review of the surface water quality results indicates that all the parameters analyzed were within the PWQO during 2023, with the exception of:

- Total phosphorus at all sampled stations during both events, with the exception of TB-SW3 and TB-SW4 in October;
- Cadmium, lead and zinc at TB-SW3 in April and phenols at TB-SW3 in October;

- Arsenic at TB-SW4 in April;
- Boron at TB-SW4 in April and October, and at TB-SW5 in April;
- Copper at TB-SW1 and TB-SW3 in April; and
- Iron at TB-SW1, TB-SW2 and TB-SW3 in April, and TB-SW4 and TB-SW5 in April and October.

Due to elevated concentrations of total phosphorus, copper and iron in the background surface water quality, above the PWQO, there is a potential that these parameters are elevated due to natural or non-landfill related activities. The elevated parameter concentrations from surface water station locations TB-SW3 and TB-SW4, when compared to upstream location TB-SW1, suggest that the landfill has the potential to influence surface water quality. However, with the minimal rates of surface water flow within the ravines leading from the landfill, there does not appear to be an impact to the surface water quality of Big Otter Creek.

Continued surface water monitoring may be prudent, to corroborate these minimal flow conditions and surface water quality concentrations, and to confirm that the downstream surface water quality of Big Otter Creek is unaffected by the landfill.

9 CONCLUSIONS AND RECOMMENDATIONS

This report provides a summary of the drilling and monitoring programs completed as part of the 2023 due diligence monitoring at the Lakeside, Embro, Thamesford, Blandford-Blenheim, Gunn's Hill, Otterville and Tillsonburg Closed Landfill Sites.

The program was based upon the medium and high potential risks identified in the Inventory of Closed Municipal Landfill Sites Report, completed by WSP in November 2019.

LAKESIDE LANDFILL

Potential risks identified for the Lakeside Landfill included:

- Landfill Gas (medium priority); and
- Shallow Groundwater / Surface Water (medium priority).

Based on the monitoring program completed at the Lakeside Landfill, the monitoring results do not appear to indicate landfill impacts via landfill gas movement or shallow groundwater/surface water. Given the results presented within this report, further monitoring is not recommended at this time.

EMBRO LANDFILL

Potential risks identified for the Embro Landfill included:

- Landfill Gas (medium priority); and
- Private Wells / Domestic Groundwater (medium priority).

Based on the monitoring program completed at the Embro Landfill, the monitoring results do not appear to indicate landfill impacts via landfill gas movement or to domestic well groundwater quality. Given the results presented within this report, further monitoring is not recommended at this time.

THAMESFORD LANDFILL

Potential risks identified for the Thamesford Landfill included:

- Landfill Gas (medium priority);
- Groundwater (medium priority); and
- Surface Water (medium priority).

Based on the monitoring program completed at the Thamesford Landfill, the monitoring results do not appear to indicate landfill impacts via landfill gas movement, or via shallow groundwater and surface water. Given the results presented within this report, further monitoring is not recommended at this time.

BLANDFORD-BLENHEIM LANDFILL

Potential risks identified for the Blandford-Blenheim Landfill included:

- Landfill Gas (medium priority);
- Surface Water (medium priority);
- Groundwater (medium priority); and
- Private Wells / Domestic Groundwater (high priority).

Based on the monitoring program completed at the Blandford-Blenheim Landfill, the monitoring results do not appear to indicate landfill impacts via landfill gas movement, however continued monitoring is recommended to observe parameter concentration trends of potential historic landfill impacts to the surface water and shallow groundwater to the east of the Site.

GUNN'S HILL LANDFILL

Potential risks identified for the Gunn's Hill Landfill included:

- Landfill Gas (medium priority);
- Shallow Groundwater / Surface Water (high priority); and
- Private Wells / Domestic Groundwater (medium priority).

Based on the monitoring program completed at the Gunn's Hill Landfill, the monitoring results do not appear to indicate landfill impacts via landfill gas movement, leachate seeps (shallow groundwater/surface water) or to domestic well groundwater quality. Given the results presented within this report, further monitoring is not recommended at this time.

OTTERVILLE LANDFILL

Potential risks identified for the Otterville Landfill included:

— Groundwater (medium priority).

Based on the monitoring program completed at the Otterville Landfill, the monitoring results do not appear to indicate landfill impacts via groundwater. Given the results presented within this report, further monitoring is not recommended at this time.

TILLSONBURG LANDFILL

Potential risks identified for the Tillsonburg Landfill included:

— Surface Water (high priority).

Based on the monitoring program completed at the Tillsonburg Landfill, the monitoring results do not appear to indicate landfill impacts to the downstream station in Big Otter Creek via surface water, however continued monitoring is recommended to observe parameter concentration and flow rate trends at surface water monitoring locations to the east/southeast of the Site.

10 REFERENCES

Ministry of the Environment, 1994. *Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy*; July 1994. Reprinted February 1999.

Ministry of the Environment, 2004. *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines*. Revised June 2006.

Ministry of the Environment, 2012. *Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites.* January 2012.

WSP Canada Inc., 2019. *Oxford County: Inventory of Closed Municipal Landfill Sites.* November 2019.

WSP Canada Inc., 2022. *2021 Due Diligence Monitoring Programs.* January 2022.

WSP Canada Inc., 2023. *2022 Due Diligence Monitoring Programs.* January 2023.

TABLES

Table 1: 2023 Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Embro Landfill		
		EB-P2	EB-P3	EB-P4
		6-Apr-23	6-Apr-23	6-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	7.44	7.71	7.38
Conductivity (field - µS/cm)		539	635	596
Temperature (field - °C)	15 AO	11.4	13.6	12.0
pH (lab - pH units)	6.5 - 8.5 OG	8.24	8.30	8.21
Conductivity (lab - µS/cm)		514	597	549
Total Dissolved Solids	500 AO	283	343	320
Chemical Oxygen Demand		26	<8	<8
Dissolved Organic Carbon	5 AO	1	1	2
Alkalinity	30 - 500 OG	271	273	258
Chloride	250 AO	10	12	13
Sulphate	500 AO	29	36	33
Calcium		70.8	2.76	81.6
Magnesium		24.4	0.905	24.5
Sodium	200 AO	11.1	134	6.34
Potassium		1.13	0.789	1.86
Total Kjehldahl Nitrogen		0.08	0.13	<0.05
Ammonia		0.15	0.08	<0.04
Nitrate	10.0 MAC	<0.06	<0.06	0.64
Nitrite	1.0 MAC	<0.03	<0.03	<0.03
Total Phosphorus		<0.03	<0.03	<0.03
Phenols		<0.002	<0.002	<0.002
Arsenic	0.01 MAC	0.0002	0.0010	0.0002
Barium	1.0 MAC	0.178	0.007	0.187
Boron	5.0 IMAC	0.031	0.031	0.021
Cadmium	0.005 MAC	0.000006	0.000005	0.000011
Chromium	0.05 MAC	0.00008	0.00010	0.00009
Copper	1 AO	0.0203	0.0130	0.0301
Iron	0.3 AO	0.090	0.060	0.016
Lead	0.010 MAC	<0.00009	0.00033	<0.00009
Manganese	0.05 AO	0.0377	0.00163	0.0122
Mercury	0.001 MAC	0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.067	0.022	0.046
Total Suspended Solids		2	<2	2
Biological Oxygen Demand		<4	<4	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- ºC - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 1: 2023 Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Thamesford Landfill		
		TF-MW1	TF-MW2	TF-MW3
		5-Apr-23	5-Apr-23	5-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	7.56	7.36	7.41
Conductivity (field - µS/cm)		495	797	834
Temperature (field - °C)	15 AO	6.5	6.2	7.7
pH (lab - pH units)	6.5 - 8.5 OG	8.07	7.94	7.99
Conductivity (lab - µS/cm)		472	746	757
Total Dissolved Solids	500 AO	289	469	451
Chemical Oxygen Demand		<8	9	<8
Dissolved Organic Carbon	5 AO	2	2	1
Alkalinity	30 - 500 OG	231	348	296
Chloride	250 AO	16	29	38
Sulphate	500 AO	24	67	82
Calcium		68.8	110	99.3
Magnesium		9.16	30.4	31.1
Sodium	200 AO	22.9	10.8	26.4
Potassium		0.579	1.44	1.68
Total Kjehldahl Nitrogen		0.15	0.19	<0.05
Ammonia		0.04	0.04	<0.04
Nitrate	10.0 MAC	<0.06	<0.06	0.09
Nitrite	1.0 MAC	<0.03	<0.03	<0.03
Total Phosphorus		0.60	0.95	<0.03
Phenols		0.002	0.002	<0.002
Arsenic	0.01 MAC	<0.0002	0.0004	0.0004
Barium	1.0 MAC	0.0280	0.0842	0.0977
Boron	5.0 IMAC	0.011	0.029	0.024
Cadmium	0.005 MAC	<0.000003	0.000004	<0.000003
Chromium	0.05 MAC	0.00020	<0.00008	0.00013
Copper	1 AO	0.0080	0.0031	0.0041
Iron	0.3 AO	<0.007	<0.007	<0.007
Lead	0.010 MAC	<0.00009	<0.00009	<0.00009
Manganese	0.05 AO	0.00020	0.0201	0.00924
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	<0.002	0.002	<0.002
Total Suspended Solids		1240	1580	14300
Biological Oxygen Demand		<4	<4	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
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- Bold values indicate exceedance of ODWQS
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- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 1: 2023 Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Blandford-Blenheim Landfill					
		BB-MW1	BB-MW2	BB-MW3	BB-BH1-1	BB-BH1-2	BB-P1
		4-Apr-23	4-Apr-23	4-Apr-23	4-Apr-23	4-Apr-23	4-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	7.00	7.19	7.51	7.48	6.54	7.53
Conductivity (field - µS/cm)		1110	684	472	745	2360	599
Temperature (field - °C)	15 AO	9.41	9.88	9.92	11.0	11.8	7.89
pH (lab - pH units)	6.5 - 8.5 OG	7.80	8.03	8.04	7.85	7.39	8.09
Conductivity (lab - µS/cm)		1120	638	437	687	2110	564
Total Dissolved Solids	500 AO	**614**	411	260	400	**851**	320
Chemical Oxygen Demand		29	9	<8	<8	117	<8
Dissolved Organic Carbon	5 AO	**7**	2	2	2	**24**	1
Alkalinity	30 - 500 OG	**503**	234	216	345	**1080**	284
Chloride	250 AO	58	25	<1	16	36	6
Sulphate	500 AO	32	89	24	11	11	7
Calcium		113	88.7	66.2	108	188	84.6
Magnesium		43.5	29.0	11.9	20.0	43.1	20.9
Sodium	200 AO	37.6	4.75	15.1	4.13	34.9	4.38
Potassium		12.1	1.34	0.922	4.91	63.0	4.45
Total Kjehldahl Nitrogen		19.0	<0.05	<0.05	2.00	112	0.20
Ammonia		18.1	0.08	<0.04	1.81	108	<0.04
Nitrate	10.0 MAC	<0.06	0.44	0.55	1.72	0.18	5.45
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	0.32	<0.3	<0.03
Total Phosphorus		0.10	<0.03	<0.03	0.07	0.54	<0.03
Phenols		0.002	0.002	<0.002	<0.002	0.010	<0.002
Arsenic	0.01 MAC	<0.0002	0.0016	0.0003	0.0008	0.0016	<0.0002
Barium	1.0 MAC	0.458	0.0627	0.0110	0.0533	0.228	0.0301
Boron	5.0 IMAC	0.166	0.015	0.045	0.075	0.787	0.048
Cadmium	0.005 MAC	<0.000003	0.000006	<0.000003	0.000045	0.000011	0.000008
Chromium	0.05 MAC	0.00040	0.00009	0.00043	0.00014	0.00447	0.00064
Copper	1 AO	0.0025	0.0043	0.0037	0.0038	0.0025	0.0070
Iron	0.3 AO	**3.30**	0.293	0.012	**0.528**	**64.6**	<0.007
Lead	0.010 MAC	<0.00009	<0.00009	<0.00009	0.00012	0.00014	<0.00009
Manganese	0.05 AO	**0.0751**	0.0229	0.00021	**0.826**	**0.547**	0.00026
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	<0.002	<0.002	<0.002	0.010	0.006	0.503
Total Suspended Solids		227	49900	17500	89	239	<2
Biological Oxygen Demand		<4	<4	<4	<4	11.0	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	**4.2**	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	**2.2**	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
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- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 1: 2023 Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Gunn's Hill Landfill			
		GH-P1	GH-P2	GH-P3A	GH-P3B
		17-Apr-23	17-Apr-23	6-Apr-23	6-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	7.15	Homeowner unavailable	7.39	7.50
Conductivity (field - µS/cm)		548		595	581
Temperature (field - °C)	15 AO	13.94		14.79	11.99
pH (lab - pH units)	6.5 - 8.5 OG	7.88		8.04	7.97
Conductivity (lab - µS/cm)		458		534	554
Total Dissolved Solids	500 AO	246		334	334
Chemical Oxygen Demand		11		<8	<8
Dissolved Organic Carbon	5 AO	1.1		2	2
Alkalinity	30 - 500 OG	266		254	249
Chloride	250 AO	5		6	9
Sulphate	500 AO	10		47	53
Calcium		56.9		87.4	90.0
Magnesium		22.8		23.4	23.9
Sodium	200 AO	14.1		4.28	4.32
Potassium		1.19		1.40	2.17
Total Kjehldahl Nitrogen		0.7		<0.05	0.07
Ammonia		0.3		<0.04	<0.04
Nitrate	10.0 MAC	<0.06		0.68	0.62
Nitrite	1.0 MAC	<0.03		<0.03	<0.03
Total Phosphorus		<0.03		<0.03	<0.03
Phenols		<0.002		<0.002	<0.002
Arsenic	0.01 MAC	0.0052		0.0004	0.0004
Barium	1.0 MAC	0.138		0.212	0.210
Boron	5.0 IMAC	0.057		0.019	0.017
Cadmium	0.005 MAC	0.000005		0.000006	0.000016
Chromium	0.05 MAC	0.00033		0.00008	<0.00008
Copper	1 AO	0.0047		0.0090	0.0271
Iron	0.3 AO	**1.88**		0.019	0.115
Lead	0.010 MAC	<0.001		<0.00009	0.00010
Manganese	0.05 AO	0.032		0.0482	**0.0519**
Mercury	0.001 MAC	<0.00001		<0.00001	0.00001
Zinc	5.0 AO	0.003		0.027	0.030
Total Suspended Solids		7		<2	2
Biological Oxygen Demand		4		<4	<4
Benzene (µg/L)	1 MAC	<0.5		<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5		<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5		<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5		<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2		<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
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- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 1: 2023 Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Otterville Landfill					
		OT-MW1		OT-MW2		OT-MW3	
		4-Apr-23	17-Oct-23	4-Apr-23	17-Oct-23	4-Apr-23	17-Oct-23
pH (field - pH units)	6.5 - 8.5 OG	7.37	7.26	7.50	7.33	7.16	7.10
Conductivity (field - µS/cm)		605	358	516	410	1420	1343
Temperature (field - °C)	15 AO	11.2	10.1	10.6	9.6	12.3	11.4
pH (lab - pH units)	6.5 - 8.5 OG	7.91	7.93	8.03	7.97	7.94	8.01
Conductivity (lab - µS/cm)		584	698	479	454	1430	1320
Total Dissolved Solids	500 AO	371	343	274	217	**843**	**726**
Chemical Oxygen Demand		<8	12	<8	8	<8	20
Dissolved Organic Carbon	5 AO	1	1.1	1	1.4	2	**6.7**
Alkalinity	30 - 500 OG	232	293	244	233	303	309
Chloride	250 AO	23	22	14	5	**320**	180
Sulphate	500 AO	35	34	10	6	56	50
Calcium		91.8	130	88.6	86.0	133	116
Magnesium		17.8	20.4	12.6	11.5	43.6	32.5
Sodium	200 AO	3.34	3.56	4.68	3.51	150	57.4
Potassium		1.11	1.01	0.841	0.564	2.42	2.19
Total Kjehldahl Nitrogen		0.86	<0.5	0.36	<0.5	<0.05	2.10
Ammonia		0.05	<0.1	0.04	<0.1	<0.04	1.30
Nitrate	10.0 MAC	8.73	9.24	1.81	0.39	0.60	1.77
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus		0.80	1.52	1.50	0.04	1.96	1.74
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002	0.022
Arsenic	0.01 MAC	0.0004	0.0004	<0.0002	<0.0002	0.0009	0.0013
Barium	1.0 MAC	0.0614	0.0575	0.0237	0.0164	0.397	0.289
Boron	5.0 IMAC	0.037	0.016	0.015	0.021	0.019	0.023
Cadmium	0.005 MAC	0.000012	0.000007	0.000006	0.000004	0.000013	<0.000003
Chromium	0.05 MAC	0.00070	0.00077	0.00054	0.00085	0.00020	0.00020
Copper	1 AO	0.0044	0.0026	0.0114	0.0035	0.0173	0.0008
Iron	0.3 AO	0.008	<0.01	0.018	<0.01	0.021	0.09
Lead	0.010 MAC	<0.00009	<0.001	<0.00009	<0.001	<0.00009	<0.001
Manganese	0.05 AO	0.0149	0.003	0.0030	<0.002	**0.257**	**0.065**
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.002	<0.002	0.002	0.002	<0.002	<0.002
Total Suspended Solids		8760	291000	2640	77600	3300	66700
Biological Oxygen Demand		<4	<4	<4	<4	<4	7.0
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- °C - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 2: 2023 Summary of Groundwater Duplicate Sample Results
Oxford County Closed Landfill Sites

Parameter	Unit	RDL	April 4, 2023			RDL	April 5, 2023			RDL	October 17, 2023		
			Original	Duplicate	RPD		Original	Duplicate	RPD		Original	Duplicate	RPD
			BB-MW1	GWDUP1			TF-MW3	GWDUP2			OT-MW3	GWDUP	
Conductivity (lab)	µS/cm	2	1120	1110	1	2	757	726	4	2	1320	1390	5
Total Dissolved Solids	mg/L	30	614	583	5	30	451	469	4	30	726	763	5
Chemical Oxygen Demand	mg/L	8	29	29	<1	8	<8	<8	<2RDL	8	20	18	11
Dissolved Organic Carbon	mg/L	1	7	8	13	1	1	2	<2RDL	1	6.7	3.1	**73**
Alkalinity	mg/L	2	503	508	1	2	296	288	3	2	309	314	2
Chloride	mg/L	1	58	60	3	1	38	37	3	1	180	200	11
Sulphate	mg/L	2	32	29	10	2	82	80	2	2	50	50	<1
Calcium	mg/L	0.01	113	111	2	0.01	99.3	99.4	<1	0.01	116	116	<1
Magnesium	mg/L	0.001	43.5	41.8	4	0.001	31.1	30.8	1	0.001	32.5	30.8	5
Sodium	mg/L	0.01	37.6	36.1	4	0.01	26.4	26.7	1	0.01	57.4	56.3	2
Potassium	mg/L	0.009	12.1	11.9	2	0.009	1.68	1.65	2	0.009	2.19	2.22	1
Total Kjehldahl Nitrogen	mg/L	0.5	19.0	18.4	3	0.5	<0.05	<0.05	<2RDL	0.5	2.1	2.2	5
Ammonia	mg/L	0.1	18.1	18.5	2	0.1	<0.04	0.04	<2RDL	0.1	1.3	2.0	**42**
Nitrate	mg/L	0.06	<0.06	<0.06	<2RDL	0.06	0.09	0.09	<2RDL	0.06	1.8	1.8	<1
Nitrite	mg/L	0.03	<0.03	<0.03	<2RDL	0.03	<0.03	<0.03	<2RDL	0.03	<0.03	<0.03	<2RDL
Total Phosphorus	mg/L	0.03	0.10	0.11	10	0.03	<0.03	<0.03	<2RDL	0.03	1.74	2.54	**37**
Phenols	mg/L	0.002	0.002	<0.002	<2RDL	0.002	<0.002	<0.002	<2RDL	0.002	0.022	0.022	<1
Arsenic	mg/L	0.0002	<0.0002	0.0002	<2RDL	0.0002	0.0004	0.0003	<2RDL	0.0002	0.0013	0.0012	8
Barium	mg/L	0.00002	0.458	0.452	1	0.00002	0.0977	0.0982	1	0.00002	0.289	0.293	1
Boron	mg/L	0.002	0.166	0.157	6	0.002	0.024	0.028	15	0.002	0.023	0.008	**97**
Cadmium	mg/L	0.000003	<0.000003	<0.000003	<2RDL	0.000003	<0.000003	0.000006	<2RDL	0.000003	<0.000003	<0.000003	<2RDL
Chromium	mg/L	0.00008	0.00040	0.00038	5	0.00008	0.00013	0.00011	17	0.00008	0.00020	0.00023	14
Copper	mg/L	0.0002	0.0025	0.0024	4	0.0002	0.0041	0.0027	**41**	0.0002	0.0008	0.0008	<1
Iron	mg/L	0.007	3.30	3.28	1	0.007	<0.007	<0.007	<2RDL	0.01	0.09	0.09	<1
Lead	mg/L	0.00009	<0.00009	<0.00009	<2RDL	0.00009	<0.00009	<0.00009	<2RDL	0.001	<0.001	<0.001	<2RDL
Manganese	mg/L	0.00001	0.0751	0.0783	4	0.00001	0.0092	0.0086	7	0.00001	0.065	0.066	2
Mercury	mg/L	0.00001	<0.00001	<0.00001	<2RDL	0.00001	<0.00001	<0.00001	<2RDL	0.00001	<0.00001	<0.00001	<2RDL
Zinc	mg/L	0.002	<0.002	<0.002	<2RDL	0.002	<0.002	<0.002	<2RDL	0.002	<0.002	<0.002	<2RDL
Total Suspended Solids	mg/L	2	227	213	6	2	14300	16000	11	2	66700	44600	**40**
Biological Oxygen Demand	mg/L	4	<4	<4	<2RDL	4	<4	<4	<2RDL	4	7	5	<2RDL

Notes:
- RDL - Reported Detection Limit
- RPD - Relative Percent Difference
- Bold indicates RPD >20% (or >2RDL)

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Lakeside Landfill		
		LS-SW1	LS-SW2	LS-SW3
		3-Apr-23	3-Apr-23	3-Apr-23
pH (field - pH units)		6.77	6.84	6.56
Conductivity (field - µS/cm)		215	68	75
Temperature (field - °C)		9.86	1.79	7.11
Dissolved Oxygen (field)	4-7 (temp dependent)	7.85	5.35	5.26
Flow Rate (L/s)		No Flow	No Flow	No Flow
pH (lab - pH units)	6.5 - 8.5	7.12	7.20	6.70
Conductivity (lab - µS/cm)		194	114	73
Total Dissolved Solids		143	57	46
Chemical Oxygen Demand		76	21	38
Biological Oxygen Demand		16	<4	5
Total Suspended Solids		27	41	16
Alkalinity	<75% background	71	**51**	**28**
Chloride		2	3	5
Sulphate		36	4	<2
TKN		1.03	0.56	0.50
Ammonia		0.06	0.11	0.06
Un-ionized Ammonia	0.02	<0.001	<0.001	<0.001
Nitrate		<0.06	0.56	0.10
Nitrite		<0.03	<0.03	<0.03
Total Phosphorus	0.03*	**0.507**	**0.143**	**0.118**
Phenols	0.001	<0.001	<0.001	<0.001
Arsenic	0.005*	0.0010	0.0003	0.0004
Barium		0.0186	0.00839	0.00564
Boron	0.200*	0.058	0.013	0.015
Cadmium	0.0001*	**0.000140**	**0.000104**	0.000035
Chromium	0.0089**	0.00043	0.00039	0.00103
Copper	0.005	**0.0072**	0.0037	0.0040
Iron	0.3	0.246	**0.572**	**0.882**
Lead	0.003*	0.00031	0.00069	0.00019
Mercury	0.0002	0.00002	0.00001	0.00001
Zinc	0.02*	0.019	0.012	0.004
Benzene (µg/L)	100*	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.

  where: f = 1/(10^{pKa-pH})+1)

  pKa=0.09018 + 2729.92/T

  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Thamesford Landfill	
		TF-SW1	TF-SW2
		23-Mar-23	23-Mar-23
pH (field - pH units)		7.72	7.78
Conductivity (field - µS/cm)		445	379
Temperature (field - °C)		5.20	6.65
Dissolved Oxygen (field)	4-7 (temp dependent)	7.51	6.56
Flow Rate (L/s)		sheet flow	39
pH (lab - pH units)	6.5 - 8.5	7.99	7.94
Conductivity (lab - µS/cm)		449	381
Total Dissolved Solids		266	214
Chemical Oxygen Demand		10	<8
Biological Oxygen Demand		<4	<4
Total Suspended Solids		50	151
Alkalinity	<75% background	157	138
Chloride		31	24
Sulphate		18	11
TKN		1.54	0.56
Ammonia		<0.04	<0.04
Un-ionized Ammonia	0.02	<0.001	<0.001
Nitrate		7.24	3.72
Nitrite		<0.03	<0.03
Total Phosphorus	0.03*	**0.305**	**0.529**
Phenols	0.001	<0.001	<0.001
Arsenic	0.005*	0.0010	0.0026
Barium		0.0313	0.0548
Boron	0.200*	0.024	0.025
Cadmium	0.0001*	0.00005	**0.00014**
Chromium	0.0089**	0.00229	0.00808
Copper	0.005	**0.0067**	**0.0138**
Iron	0.3	**2.20**	**7.74**
Lead	0.003*	0.00224	**0.00734**
Mercury	0.0002	<0.00001	0.00002
Zinc	0.02*	0.016	**0.040**
Benzene (µg/L)	100*	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.

  where: f = 1/(10^{pKa-pH})+1)

  pKa=0.09018 + 2729.92/T

  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Blandford-Blenheim Landfill		
		BB-SW1	BB-SW2	BB-SW3
		24-Mar-23	24-Mar-23	24-Mar-23
pH (field - pH units)		7.94	7.52	7.61
Conductivity (field - µS/cm)		353	513	415
Temperature (field - °C)		2.62	1.80	4.03
Dissolved Oxygen (field)	4-7 (temp dependent)	8.37	9.75	10.55
Flow Rate (L/s)		No Flow	No Flow	No Flow
pH (lab - pH units)	6.5 - 8.5	7.79	7.83	7.71
Conductivity (lab - µS/cm)		352	528	447
Total Dissolved Solids		211	320	243
Chemical Oxygen Demand		10	14	22
Biological Oxygen Demand		<4	<4	<4
Total Suspended Solids		27	4	41
Alkalinity	<75% background	99	191	157
Chloride		38	24	43
Sulphate		8	63	36
TKN		0.19	2.46	1.27
Ammonia		<0.04	1.69	0.57
Un-ionized Ammonia	0.02	<0.001	0.005	0.003
Nitrate		4.40	2.41	0.12
Nitrite		<0.03	0.10	<0.03
Total Phosphorus	0.03*	**0.080**	**0.032**	**0.069**
Phenols	0.001	<0.001	<0.001	<0.001
Arsenic	0.005*	0.0006	0.0004	0.0010
Barium		0.0206	0.0345	0.0351
Boron	0.200*	0.009	**0.237**	0.115
Cadmium	0.0001*	0.00002	0.00001	0.00003
Chromium	0.0089**	0.00076	0.00028	0.00026
Copper	0.005	0.0034	0.0034	**0.0068**
Iron	0.3	0.171	0.063	**2.53**
Lead	0.003*	0.00054	0.00017	0.00098
Mercury	0.0002	<0.00001	<0.00001	<0.00001
Zinc	0.02*	0.004	0.004	0.009
Benzene (µg/L)	100*	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.

  where: f = 1/(10^{pKa-pH})+1)

  pKa=0.09018 + 2729.92/T

  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Gunn's Hill Landfill		
		GH-SEEP	GH-SW1	GH-SW2
pH (field - pH units)		No seeps were observed on April 6, April 17, July 4, 2023	-	-
Conductivity (field - µS/cm)			-	-
Temperature (field - °C)			-	-
Dissolved Oxygen (field)	4-7 (temp dependent)		-	-
Flow Rate (L/s)			-	-
pH (lab - pH units)	6.5 - 8.5	-	-	-
Conductivity (lab - µS/cm)		-	-	-
Total Dissolved Solids		-	-	-
Chemical Oxygen Demand		-	-	-
Biological Oxygen Demand		-	-	-
Total Suspended Solids		-	-	-
Alkalinity	<75% background	-	-	-
Chloride		-	-	-
Sulphate		-	-	-
TKN		-	-	-
Ammonia		-	-	-
Un-ionized Ammonia	0.02	-	-	-
Nitrate		-	-	-
Nitrite		-	-	-
Total Phosphorus	0.03*	-	-	-
Phenols	0.001	-	-	-
Arsenic	0.005*	-	-	-
Barium		-	-	-
Boron	0.200*	-	-	-
Cadmium	0.0001*	-	-	-
Chromium	0.0089**	-	-	-
Copper	0.005	-	-	-
Iron	0.3	-	-	-
Lead	0.003*	-	-	-
Mercury	0.0002	-	-	-
Zinc	0.02*	-	-	-
Benzene (µg/L)	100*	-	-	-
1,4 - Dichlorobenzene (µg/L)	4	-	-	-
Dichloromethane (µg/L)	100*	-	-	-
Toluene (µg/L)	0.8*	-	-	-
Vinyl Chloride (µg/L)	600*	-	-	-

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.

  where: f = 1/(10^{pKa-pH})+1)

  pKa=0.09018 + 2729.92/T

  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Tillsonburg Landfill					
		TB-SW1		TB-SW2		TB-SW3	
		20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23
pH (field - pH units)		8.00	7.82	8.18	7.67	8.20	6.82
Conductivity (field - µS/cm)		518	656	529	670	338	784
Temperature (field - °C)		2.91	11.18	3.02	11.26	9.00	11.00
Dissolved Oxygen (field)	4-7 (temp dependent)	10.20	12.30	7.98	11.54	5.31	4.21
Flow Rate (L/s)		>10,000	>10,000	>10,000	>10,000	2	1
pH (lab - pH units)	6.5 - 8.5	8.09	8.13	8.08	8.21	8.17	7.72
Conductivity (lab - µS/cm)		505	695	514	700	566	819
Total Dissolved Solids		377	429	369	394	391	537
Chemical Oxygen Demand		15	<8	12	9	10	12
Biological Oxygen Demand		<4	<4	<4	<4	<4	6
Total Suspended Solids		66	8	59	11	1670	6
Alkalinity	<75% background	167	226	168	224	296	399
Chloride		40	53	38	55	16	18
Sulphate		33	48	36	48	17	15
TKN		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ammonia		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Un-ionized Ammonia	0.02	<0.001	<0.001	<0.002	<0.001	<0.003	<0.001
Nitrate		10.6	4.89	10.0	4.96	2.41	6.94
Nitrite		0.06	<0.03	0.06	<0.03	<0.03	0.22
Total Phosphorus	0.03*	**0.181**	**0.054**	**0.170**	**0.057**	**0.585**	0.015
Phenols	0.001	<0.001	<0.001	<0.001	0.001	<0.001	**0.002**
Arsenic	0.005*	0.001	<0.001	0.0009	<0.001	0.0037	<0.001
Barium		0.0443	0.045	0.0465	0.045	0.084	0.032
Boron	0.200*	0.027	0.037	0.028	0.038	0.021	0.014
Cadmium	0.0001*	<0.0001	<0.0001	<0.0001	<0.0001	**0.0004**	<0.0001
Chromium	0.0089**	<0.003	<0.003	<0.003	<0.003	0.014	<0.003
Copper	0.005	**0.010**	0.003	0.005	0.002	**0.023**	0.002
Iron	0.3	**2.01**	0.18	**1.93**	0.20	**11.0**	0.13
Lead	0.003*	0.001	<0.001	0.001	<0.001	**0.014**	<0.001
Mercury	0.0002	<0.00001	<0.0001	<0.00001	<0.0001	0.0001	<0.0001
Zinc	0.02*	0.013	<0.005	0.012	<0.005	**0.061**	<0.005
Benzene (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 3: 2023 Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Tillsonburg Landfill					
		TB-SW4		TB-SW5		TB-SW6	
		20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23	20-May-23	17-Oct-23
pH (field - pH units)		7.41	7.13	8.18	7.50		
Conductivity (field - µS/cm)		1000	985	738	749		
Temperature (field - °C)		3.93	11.75	4.11	11.45	DRY	DRY
Dissolved Oxygen (field)	4-7 (temp dependent)	6.75	10.32	7.43	9.32		
Flow Rate (L/s)		1	1	20	3		
pH (lab - pH units)	6.5 - 8.5	7.58	8.10	8.17	8.07		
Conductivity (lab - µS/cm)		979	975	743	785		
Total Dissolved Solids		666	620	503	406		
Chemical Oxygen Demand		25	21	9	<8		
Biological Oxygen Demand		<4	<4	<4	<4		
Total Suspended Solids		74	42	11	27		
Alkalinity	<75% background	554	506	322	305		
Chloride		21	19	47	53		
Sulphate		14	8	43	41		
TKN		3.0	2.4	<0.5	0.5		
Ammonia		2.1	2.3	<0.1	<0.1		
Un-ionized Ammonia	0.02	0.006	0.007	<0.002	<0.001		
Nitrate		1.42	3.55	0.17	0.11		
Nitrite		<0.03	0.04	<0.03	<0.03		
Total Phosphorus	0.03*	**0.150**	0.007	**0.042**	**0.037**		
Phenols	0.001	<0.001	<0.001	<0.001	<0.001		
Arsenic	0.005*	**0.0066**	0.002	0.0008	<0.001		
Barium		0.111	0.099	0.115	0.140		
Boron	0.200*	**0.341**	**0.370**	**0.247**	0.177		
Cadmium	0.0001*	<0.0001	<0.0001	<0.0001	<0.0001		
Chromium	0.0089**	<0.003	<0.003	<0.003	<0.003		
Copper	0.005	0.004	0.002	0.002	0.002		
Iron	0.3	**15.0**	**2.10**	**1.00**	**0.89**		
Lead	0.003*	0.001	<0.001	<0.001	<0.001		
Mercury	0.0002	<0.00001	<0.0001	<0.00001	<0.0001		
Zinc	0.02*	0.008	<0.005	0.005	<0.005		
Benzene (µg/L)	100*	<0.5	<0.5	<0.5	<0.5		
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5	<0.5		
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5	<0.5		
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5	<0.5		
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2	<0.2		

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 4: 2023 Summary of Surface Water Duplicate Sample Results
Oxford County Closed Landfill Sites

Parameter	Unit	RDL	March 20, 2023			RDL	October 17, 2023		
			Original TB-SW1	Duplicate TB-SWDUP	RPD		Original TB-SW1	Duplicate TB-SWDUP	RPD
Conductivity (lab)	µS/cm	2	505	508	1	2	695	696	<1
Total Dissolved Solids	mg/L	30	377	354	6	30	429	411	4
Chemical Oxygen Demand	mg/L	8	15	18	18	8	<8	18	<2RDL
Biological Oxygen Demand	mg/L	2	<4	<4	<2RDL	2	<4	<4	<2RDL
Total Suspended Solids	mg/L	2	66	69	4	2	8	8	<2RDL
Alkalinity	mg/L	2	167	158	6	2	226	226	<1
Chloride	mg/L	1	40	38	5	1	53	53	<1
Sulphate	mg/L	2	33	35	6	2	48	47	2
TKN	mg/L	0.5	<0.5	0.8	<2RDL	0.5	<0.5	<0.5	<2RDL
Ammonia	mg/L	0.1	<0.1	<0.1	<2RDL	0.1	<0.1	<0.1	<2RDL
Un-ionized Ammonia	mg/L	0.001	<0.001	<0.001	<2RDL	0.001	<0.001	<0.001	<2RDL
Nitrate	mg/L	0.06	10.6	10.6	<1	0.06	4.89	4.89	<1
Nitrite	mg/L	0.03	0.06	0.06	<2RDL	0.03	<0.03	<0.03	<2RDL
Total Phosphorus	mg/L	0.003	0.181	0.186	3	0.003	0.054	0.051	6
Phenols	mg/L	0.001	<0.001	<0.001	<2RDL	0.001	<0.001	<0.001	<2RDL
Arsenic	mg/L	0.002	0.001	0.001	<2RDL	0.002	<0.001	<0.001	<2RDL
Barium	mg/L	0.002	0.0443	0.0442	<1	0.002	0.045	0.043	5
Boron	mg/L	0.002	0.027	0.029	7	0.002	0.037	0.038	3
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<2RDL	0.0001	<0.0001	<0.0001	<2RDL
Chromium	mg/L	0.003	<0.003	<0.003	<2RDL	0.003	<0.003	<0.003	<2RDL
Copper	mg/L	0.001	0.010	0.005	**>2RDL**	0.001	0.003	0.002	<2RDL
Iron	mg/L	0.01	2.01	1.98	2	0.01	0.18	0.18	<1
Lead	mg/L	0.001	0.001	0.001	<2RDL	0.001	<0.001	<0.001	<2RDL
Mercury	mg/L	0.00001	<0.00001	<0.00001	<2RDL	0.00001	<0.0001	<0.0001	<2RDL
Zinc	mg/L	0.005	0.013	0.011	<2RDL	0.005	<0.005	<0.005	<2RDL

Notes:
- RDL - Reported Detection Limit
- RPD - Relative Percent Difference
- Bold indicates RPD >20% (or >2RDL)

Table 5
2023 Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Lakeside Landfill								
LS-GP1	8-Feb-23	0	0.00	368.45	DRY	<364.55	366.07	No
	3-Apr-23	0	0.00	368.45	DRY	<364.55	366.07	No
	4-Jul-23	0	0.00	368.45	DRY	<364.55	366.07	No
	4-Dec-23	0	0.00	368.45	DRY	<364.55	366.07	No
Embro Landfill								
EB-GP1	8-Feb-23	0	0.00	304.85	3.24	301.61	302.58	No
	6-Apr-23	0	0.00	304.85	2.48	302.37	302.58	No
	4-Jul-23	0	0.00	304.85	3.32	301.53	302.58	No
	4-Dec-23	0	0.00	304.85	3.18	301.67	302.58	No
EB-GP2	8-Feb-23	0	0.00	302.98	2.20	300.78	300.62	Yes
	6-Apr-23	0	0.00	302.98	1.68	301.30	300.62	Yes
	4-Jul-23	0	0.00	302.98	2.44	300.54	300.62	No
	4-Dec-23	0	0.00	302.98	2.29	300.69	300.62	Yes
EB-GP3	8-Feb-23	0	0.00	301.09	3.58	297.51	298.82	No
	6-Apr-23	0	0.00	301.09	3.06	298.03	298.82	No
	4-Jul-23	0	0.00	301.09	3.60	297.49	298.82	No
	4-Dec-23	0	0.00	301.09	3.51	297.58	298.82	No

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table 5
2023 Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Thamesford Landfill								
TF-GP2	8-Feb-23	0	0.00	275.99	3.12	272.87	273.39	No
	4-Apr-23	0	0.00	275.99	2.60	273.39	273.39	No
	4-Jul-23	0	0.00	275.99	3.15	272.84	273.39	No
	4-Dec-23	0	0.00	275.99	2.97	273.02	273.39	No
TF-MW1	8-Feb-23	0	0.00	277.44	1.99	275.45	275.26	Yes
	4-Apr-23	0	0.00	277.44	1.08	276.36	275.26	Yes
	4-Jul-23	0	0.00	277.44	2.49	274.95	275.26	No
	4-Dec-23	0	0.00	277.44	1.98	275.46	275.26	Yes
TF-MW2	8-Feb-23	0	0.00	273.66	1.20	272.46	271.18	Yes
	4-Apr-23	0	0.00	273.66	1.05	272.61	271.18	Yes
	4-Jul-23	0	0.00	273.66	1.35	272.31	271.18	Yes
	4-Dec-23	0	0.00	273.66	1.16	272.50	271.18	Yes
TF-MW3	8-Feb-23	0	0.00	273.49	1.50	271.99	269.77	Yes
	4-Apr-23	0	0.00	273.49	1.26	272.23	269.77	Yes
	4-Jul-23	0	0.00	273.49	1.55	271.94	269.77	Yes
	4-Dec-23	0	0.00	273.49	1.38	272.11	269.77	Yes

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table 5
2023 Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Blandford-Blenheim Landfill								
BB-GP1	8-Feb-23	0	0.00	304.95	4.99	299.96	302.68	No
	4-Apr-23	0	0.00	304.95	4.32	300.63	302.68	No
	4-Jul-23	0	0.00	304.95	4.90	300.05	302.68	No
	4-Dec-23	0	0.00	304.95	4.71	300.24	302.68	No
BB-MW1	8-Feb-23	0	0.00	300.08	2.56	297.52	293.55	Yes
	4-Apr-23	0	0.00	300.08	2.27	297.81	293.55	Yes
	4-Jul-23	0	0.00	300.08	2.48	297.60	293.55	Yes
	4-Dec-23	0	0.00	300.08	2.30	297.78	293.55	Yes
BB-MW2	8-Feb-23	0	0.00	303.88	4.90	298.98	296.52	Yes
	4-Apr-23	0	0.00	303.88	4.26	299.62	296.52	Yes
	4-Jul-23	0	0.00	303.88	4.82	299.06	296.52	Yes
	4-Dec-23	0	0.00	303.88	4.69	299.19	296.52	Yes
BB-MW3	8-Feb-23	0	0.00	305.22	5.34	299.88	298.02	Yes
	4-Apr-23	0	0.00	305.22	4.67	300.55	298.02	Yes
	4-Jul-23	0	0.00	305.22	5.20	300.02	298.02	Yes
	4-Dec-23	0	0.00	305.22	5.00	300.22	298.02	Yes
BB-BH1-1	8-Feb-23	0	0.00	303.52	4.98	298.54	N/A	N/A
	4-Apr-23	0	0.00	303.52	4.99	298.53	N/A	N/A
	4-Jul-23	0	0.00	303.52	4.98	298.54	N/A	N/A
	4-Dec-23	0	0.00	303.52	4.98	298.54	N/A	N/A
BB-BH1-2	8-Feb-23	0	0.00	303.50	4.67	298.83	N/A	N/A
	4-Apr-23	0	0.00	303.50	3.95	299.55	N/A	N/A
	4-Jul-23	0	0.00	303.50	4.56	298.94	N/A	N/A
	4-Dec-23	0	0.00	303.50	4.35	299.15	N/A	N/A

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table 5
2023 Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Gunn's Hill Landfill								
GH-GP1	8-Feb-23	0	0.00	320.51	1.56	318.95	318.67	Yes
	6-Apr-23	0	0.00	320.51	1.03	319.48	318.67	Yes
	4-Jul-23	0	0.00	320.51	2.25	318.26	318.67	No
	4-Dec-23	0	0.00	320.51	2.00	318.51	318.67	No
GH-GP2	8-Feb-23	0	0.00	313.54	DRY	<309.52	311.66	No
	6-Apr-23	0	0.00	313.54	3.75	309.79	311.66	No
	4-Jul-23	0	0.00	313.54	3.73	309.81	311.66	No
	4-Dec-23	0	0.00	313.54	3.55	309.99	311.66	No
Otterville Landfill								
OT-MW1	21-Feb-23	-	-	251.54	7.75	243.79	243.44	Yes
	5-Apr-23	0	0.00	251.54	7.20	244.34	243.44	Yes
	17-Oct-23	0	0.00	251.54	7.44	244.10	243.44	Yes
OT-MW2	21-Feb-23	-	-	251.74	7.08	244.66	243.85	Yes
	5-Apr-23	0	0.00	251.74	6.62	245.12	243.85	Yes
	17-Oct-23	0	0.00	251.74	6.79	244.95	243.85	Yes
OT-MW3	22-Feb-23	-	-	255.64	10.18	245.46	245.81	No
	5-Apr-23	0	0.00	255.64	9.62	246.02	245.81	Yes
	17-Oct-23	0	0.00	255.64	9.99	245.65	245.81	No

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table 6: 2023 Guideline B-7 Compliance
Oxford County Closed Landfill Sites

Parameter	Reference Quality	ODWQS	Guideline B-7	TF-MW2 5-Apr-23	TF-MW3 5-Apr-23
Total Dissolved Solids	427	500 AO	463	**469**	451
Dissolved Organic Carbon	1.8	5 AO	3.4	2	1
Alkalinity	245	30 - 500 OG	373	348	296
Chloride	112	250 AO	181	29	38
Sulphate	19	500 AO	259	67	82
Sodium	22.7	200 AO	111	10.8	26.4
Nitrate	0.25	10.0 MAC	2.69	<0.06	0.09
Nitrite	0.015	1.0 MAC	0.26	<0.03	<0.03
Arsenic	0.0005	0.01 MAC	0.0029	0.0004	0.0004
Barium	0.107	1.0 MAC	0.330	0.0842	0.0977
Boron	0.034	5.0 IMAC	1.28	0.029	0.024
Cadmium	0.00004	0.005 MAC	0.0013	0.000004	<0.000003
Chromium	0.0051	0.05 MAC	0.0163	<0.00008	0.00013
Copper	0.0084	1 AO	0.504	0.0031	0.0041
Iron	0.004	0.3 AO	0.15	<0.007	<0.007
Lead	0.0002	0.010 MAC	0.0026	<0.00009	<0.00009
Manganese	0.048	0.05 AO	0.0488	0.0201	0.00924
Mercury	0.000005	0.001 MAC	0.00025	<0.00001	<0.00001
Zinc	0.001	5.0 AO	2.50	0.002	<0.002
Benzene (µg/L)	0.25	1 MAC	0.44	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	0.25	5 MAC	1.44	<0.5	<0.5
	0.25	1 AO	0.63		
Dichloromethane (µg/L)	0.25	50 MAC	12.7	<0.5	<0.5
Toluene (µg/L)	0.25	60 MAC	15.2	<0.5	<0.5
	0.25	24 AO	12.1		
Vinyl Chloride (µg/L)	0.1	1 MAC	0.33	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- Reference Quality based on groundwater quality measured from background observation well TF-MW1 (2021-2023)
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of GB-7 value
- All units in mg/L unless otherwise noted
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- * When the reference concentration is greater than the ODWQS, the reference value is used as the Guideline B-7 Criterion.
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 6: 2023 Guideline B-7 Compliance
Oxford County Closed Landfill Sites

Parameter	Reference Quality	ODWQS	Guideline B-7	BB-MW1 4-Apr-23	BB-MW2 4-Apr-23
Total Dissolved Solids	233	500 AO	367	**614**	**411**
Dissolved Organic Carbon	1.3	5 AO	3.1	**7**	2
Alkalinity	210	30 - 500 OG	355	**503**	234
Chloride	1	250 AO	126	58	25
Sulphate	12	500 AO	256	32	89
Sodium	10.9	200 AO	105	37.6	4.75
Nitrate	0.40	10.0 MAC	2.80	<0.06	0.44
Nitrite	0.015	1.0 MAC	0.26	<0.03	<0.03
Arsenic	0.0005	0.01 MAC	0.0029	<0.0002	0.0016
Barium	0.010	1.0 MAC	0.257	**0.458**	0.0627
Boron	0.023	5.0 IMAC	1.27	0.166	0.015
Cadmium	0.000005	0.005 MAC	0.0013	<0.000003	0.000006
Chromium	0.0005	0.05 MAC	0.013	0.00040	0.00009
Copper	0.0018	1 AO	0.50	0.0025	0.0043
Iron	0.0063	0.3 AO	0.15	**3.30**	**0.293**
Lead	0.00005	0.010 MAC	0.0025	<0.00009	<0.00009
Manganese	0.0018	0.05 AO	0.026	**0.0751**	0.0229
Mercury	0.000005	0.001 MAC	0.00025	<0.00001	<0.00001
Zinc	0.001	5.0 AO	2.50	<0.002	<0.002
Benzene (µg/L)	0.25	1 MAC	0.44	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	0.25	5 MAC	1.44	<0.5	<0.5
	0.25	1 AO	0.63		
Dichloromethane (µg/L)	0.25	50 MAC	12.7	<0.5	<0.5
Toluene (µg/L)	0.25	60 MAC	15.2	<0.5	<0.5
	0.25	24 AO	12.1		
Vinyl Chloride (µg/L)	0.1	1 MAC	0.33	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- Reference Quality based on groundwater quality measured from background observation well BB-MW3 (2022-2023)
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of GB-7 value
- All units in mg/L unless otherwise noted
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- * When the reference concentration is greater than the ODWQS, the reference value is used as the Guideline B-7 Criterion.
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table 6: 2023 Guideline B-7 Compliance
Oxford County Closed Landfill Sites

Parameter	Reference Quality	ODWQS	Guideline B-7	OT-MW1		OT-MW2	
				4-Apr-23	17-Oct-23	4-Apr-23	17-Oct-23
Total Dissolved Solids	785	500 AO	785*	371	343	274	217
Dissolved Organic Carbon	4.4	5 AO	4.7	1	1.1	1	1.4
Alkalinity	306	30 - 500 OG	403	232	293	244	233
Chloride	250	250 AO	250*	23	22	14	5
Sulphate	53	500 AO	277	35	34	10	6
Sodium	104	200 AO	152	3.34	3.56	4.68	3.51
Nitrate	1.19	10.0 MAC	3.39	**8.73**	**9.24**	1.81	0.39
Nitrite	0.015	1.0 MAC	0.26	<0.03	<0.03	<0.03	<0.03
Arsenic	0.0011	0.01 MAC	0.0033	0.0004	0.0004	<0.0002	<0.0002
Barium	0.343	1.0 MAC	0.507	0.0614	0.0575	0.0237	0.0164
Boron	0.021	5.0 IMAC	1.27	0.037	0.016	0.015	0.021
Cadmium	0.000007	0.005 MAC	0.0013	0.000012	0.000007	0.000006	0.000004
Chromium	0.0002	0.05 MAC	0.013	0.00070	0.00077	0.00054	0.00085
Copper	0.00905	1 AO	0.50	0.0044	0.0026	0.0114	0.0035
Iron	0.0555	0.3 AO	0.18	0.008	<0.01	0.018	<0.01
Lead	0.00027	0.010 MAC	0.0027	<0.00009	<0.001	<0.00009	<0.001
Manganese	0.161	0.05 AO	0.161*	0.0149	0.003	0.0030	<0.002
Mercury	0.000005	0.001 MAC	0.00025	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	0.001	5.0 AO	2.50	0.002	<0.002	0.002	0.002
Benzene (µg/L)	0.25	1 MAC	0.44	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	0.25	5 MAC	1.44	<0.5	<0.5	<0.5	<0.5
	0.25	1 AO	0.63				
Dichloromethane (µg/L)	0.25	50 MAC	12.7	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	0.25	60 MAC	15.2	<0.5	0.5	<0.5	<0.5
	0.25	24 AO	12.1				
Vinyl Chloride (µg/L)	0.1	1 MAC	0.33	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- Reference Quality based on groundwater quality measured from background observation well OT-MW3 (2023)
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of GB-7 value
- All units in mg/L unless otherwise noted
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- * When the reference concentration is greater than the ODWQS, the reference value is used as the Guideline B-7 Criterion.
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

FIGURES

Blandford-Blenheim Landfill

Lakeside Landfill

Embro Landfill

Gunn's Hill Landfill

Thamesford Landfill

Otterville Landfill

Tillsonburg Industrial Landfill

KEY MAP

SCALE 1:2,000,000

LEGEND

CLOSED LANDFILL LOCATION

0 2,000 4,000 6,000 8,000

1:200,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, USGS, NGA, EPA, USDA, NPS, AAFC, NRCAN
WORLD STREET MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, EPA, NPS, USFWS, NRCAN, PARKS CANADA
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
SITE LOCATION MAP

CONSULTANT

wsp

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

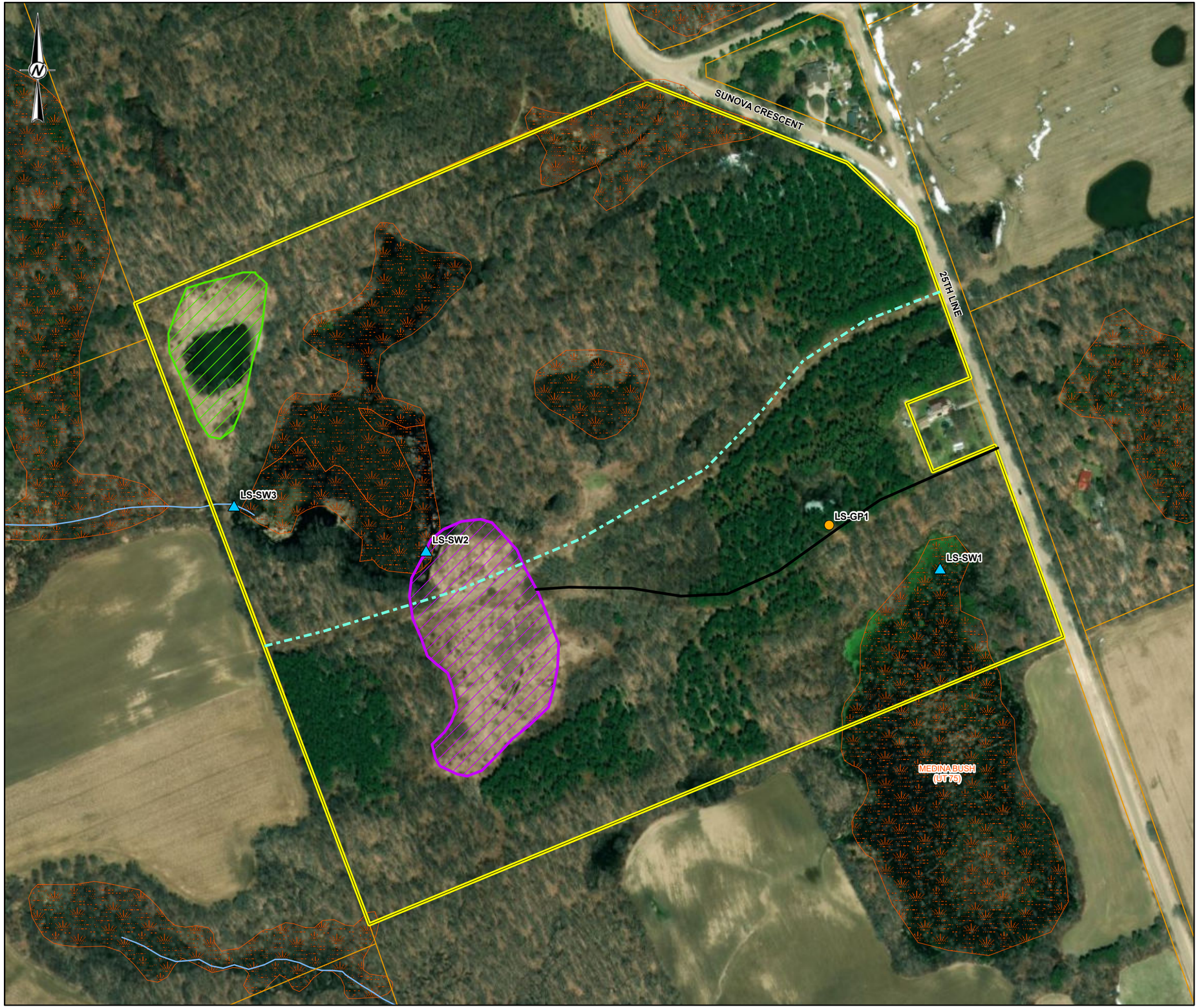
PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: S:\Clients\County of Oxford\Oxford County Waste Management Facility\99 PROJ\CA-WSP-191-06761-03\40_PRO\0001 Closed Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT: 5:33:33 PM



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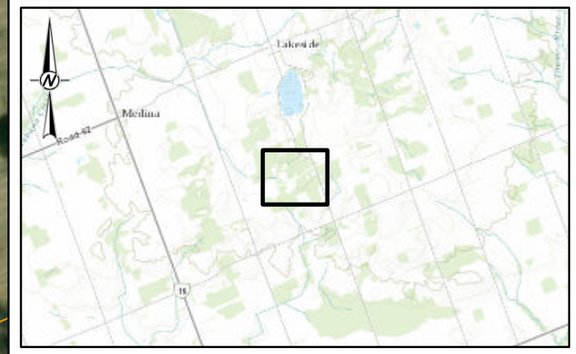


SCALE 1:100,000

LEGEND

- GAS PROBE LOCATION
- SURFACE WATER SAMPLING LOCATION
- PIPELINE EASEMENT
- FORMER ENTRANCE ROAD
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- ESTIMATED EXTENT OF BORROW AREA
- PROVINCIALLY SIGNIFICANT WETLAND

0 25 50 75 100 125

1:3,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: MIDDLESEX COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
   BING MAPS AERIAL: © 2024 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
LAKESIDE CLOSED LANDFILL SITE PLAN

CONSULTANT

wsp

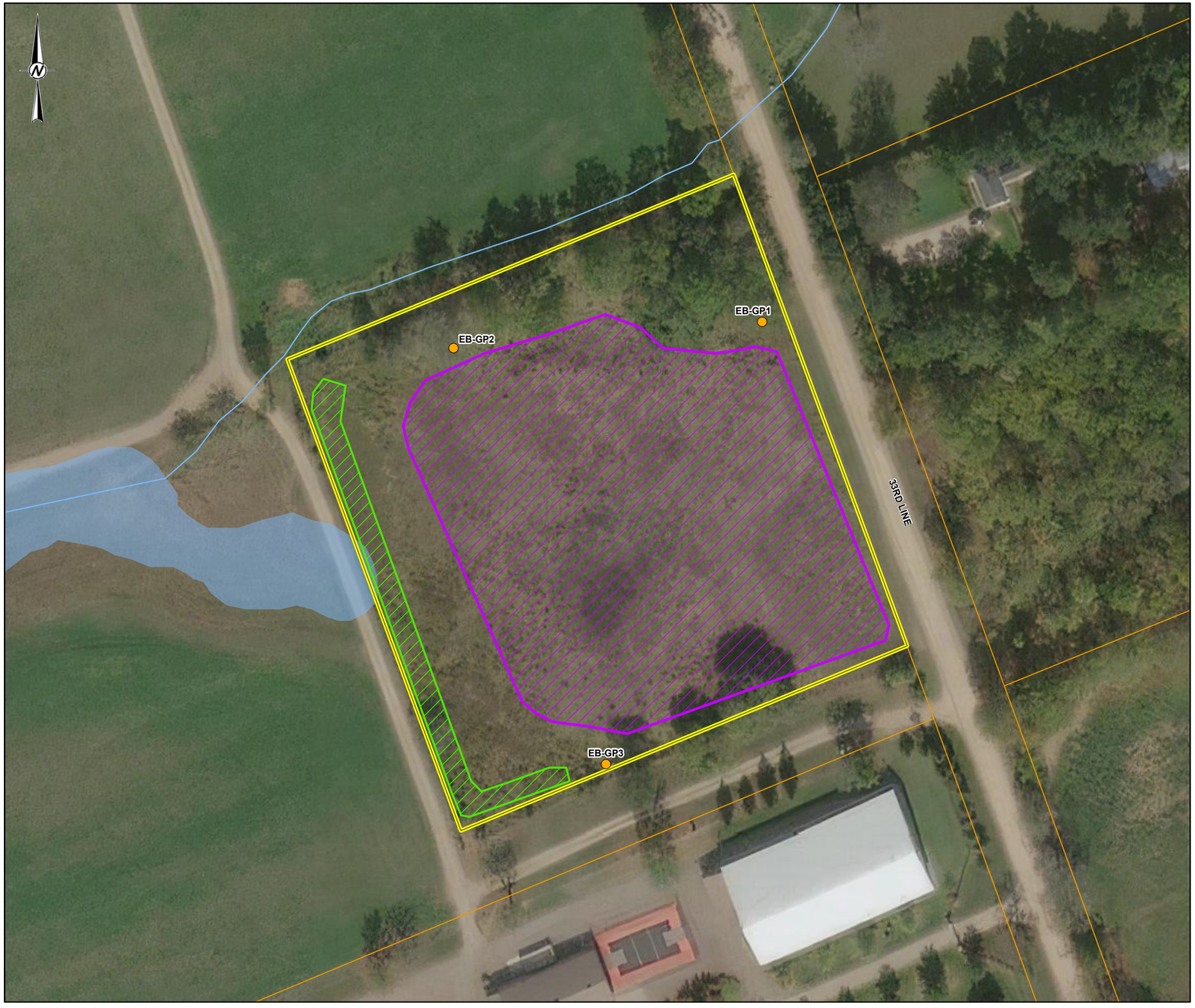
YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\99_PROJ\CA-WSP-191-06761-03\40_PROD\0001_Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT: 5:36:12 PM



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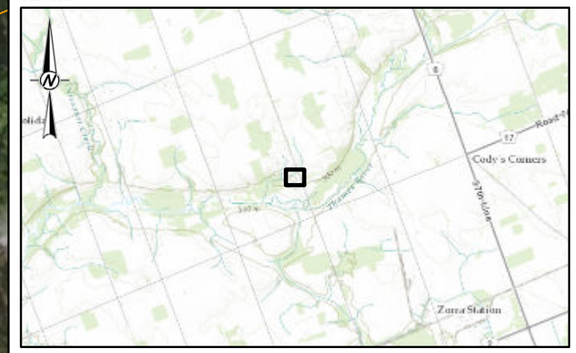


SCALE 1:100,000

LEGEND

- GAS PROBE LOCATION
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- ESTIMATED EXTENT OF BORROW AREA
- WATER BODY

0 25 50

1:1,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: MIDDLESEX COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
   BING MAPS AERIAL: © 2024 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
EMBRO CLOSED LANDFILL SITE PLAN

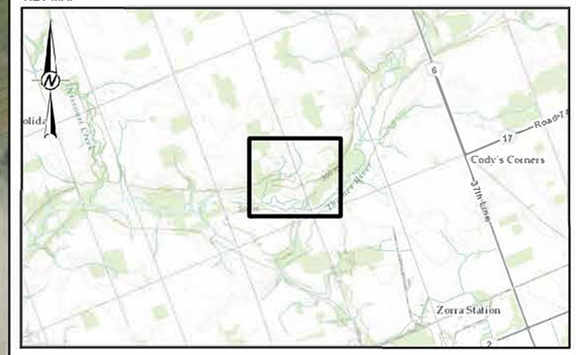
CONSULTANT

wsp

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	3-1

KEY MAP



SCALE 1:100,000

LEGEND

- PRIVATE DRINKING WATER WELL
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- WATER BODY

0 100 200

1:5,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: MIDDLESEX COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2023 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023)
DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
EMBRO CLOSED LANDFILL
PRIVATE WELL SAMPLING LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	-----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	3-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\09_PROJ\CA-WSP-191-06761-03\40_PROD\0001_Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT 7:19:51 PM

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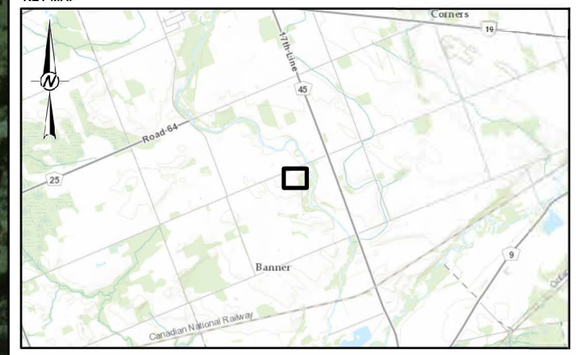

SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- SURFACE WATER SAMPLING LOCATION
- DRAINAGE SWALE
- PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE

0 12.5 25 50

1:1,250 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: MIDDLESEX COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
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DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
THAMESFORD CLOSED LANDFILL SITE PLAN

CONSULTANT

wsp

YYYY-MM-DD	2024-01-12
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

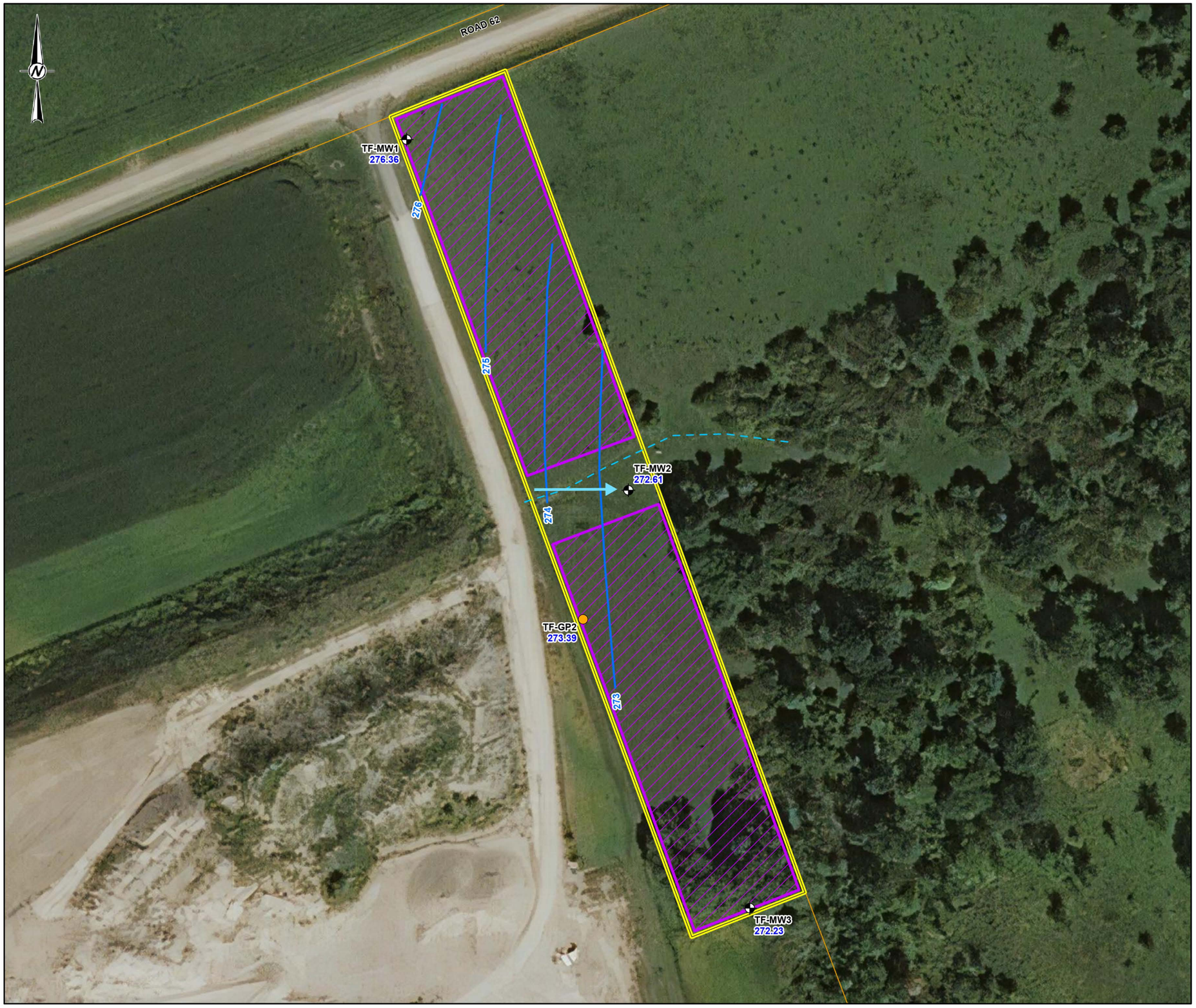
PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	4-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: S:\Clients\County of Oxford\Oxford County Waste Management Facilities\66 PROJ\CA-WSP-191-06761-03\40 PROD\0001 Closed Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT 9:08:45 AM



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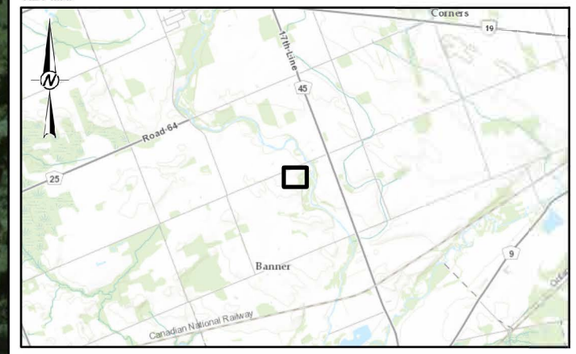

SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- 272.61 GROUNDWATER ELEVATION FOR APRIL 2023 (mASL)
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER CONTOUR FOR APRIL 2023 (mASL)
- DRAINAGE SWALE
- PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE

0 12.5 25 50

1:1,250 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. mASL = METRES ABOVE SEA LEVEL

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: MIDDLESEX COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
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DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
THAMESFORD CLOSED LANDFILL
GROUNDWATER ELEVATIONS - APRIL 2023

CONSULTANT

wsp

YYYY-MM-DD	2024-01-12
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	4-2

KEY MAP

SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- GAS PROBE LOCATION
- SURFACE WATER SAMPLING LOCATION
- PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- ANSI, LIFE SCIENCE
- WATER BODY
- PROVINCIALLY SIGNIFICANT WETLAND

0 12.5 25 50 75

1:2,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2024 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
BLANDFORD-BLENHEIM CLOSED LANDFILL SITE PLAN

CONSULTANT

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	5-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\99_PROJ\CA-WSP-191-06761-03\40_PROD\0001_Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx, PRINTED ON: Fri 5:36:57 PM

KEY MAP

SCALE 1:100,000

LEGEND

- PRIVATE DRINKING WATER WELL
- SURFACE WATER SAMPLING LOCATION
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- ANSI, LIFE SCIENCE
- WATER BODY
- PROVINCIALLY SIGNIFICANT WETLAND

0 50 100 200

1:6,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
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3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
BLANDFORD-BLENHEIM CLOSED LANDFILL
PRIVATE WELL AND SURFACE WATER SAMPLING LOCATION

CONSULTANT

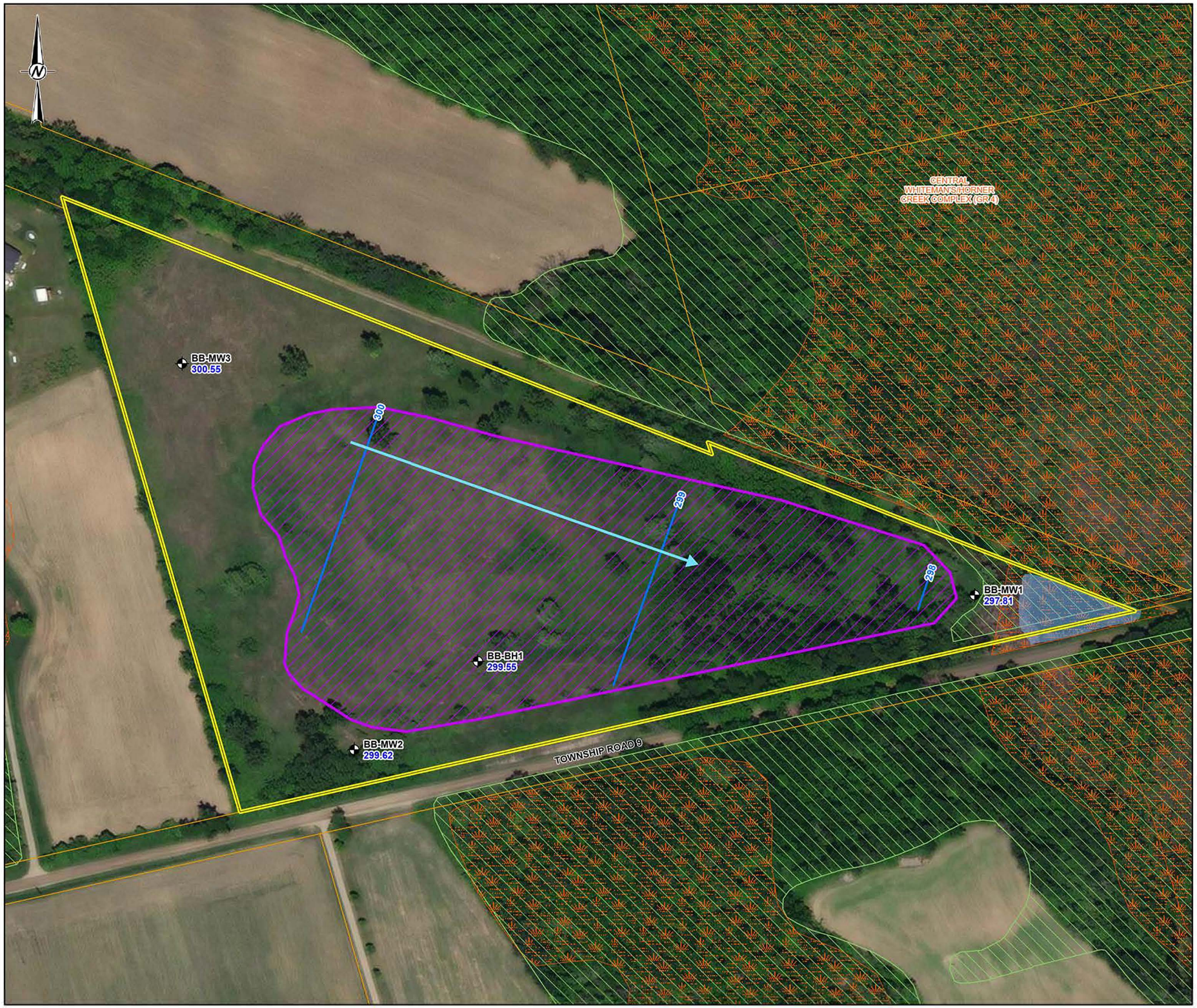
YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	5-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\99_PROJ\CA-WSP-191-06761-03\40_PROD\0001 Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT 5:35:51 PM



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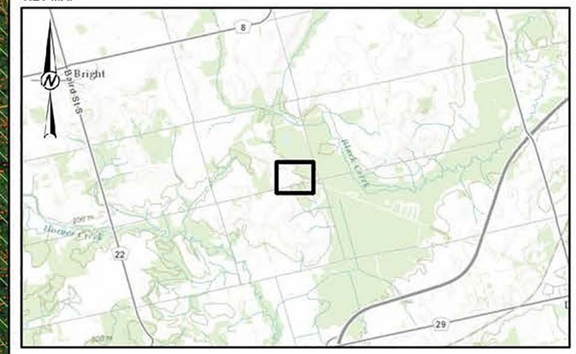


SCALE 1:100.000

LEGEND

- MONITORING WELL LOCATION
- 297.81 GROUNDWATER ELEVATION FOR APRIL 2023 (mASL)
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER CONTOUR FOR APRIL 2023 (mASL)
- PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- ANSI, LIFE SCIENCE
- WATER BODY
- PROVINCIALLY SIGNIFICANT WETLAND

0 12.5 25 50 75

1:2,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. mASL = METRES ABOVE SEA LEVEL

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2023 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
BLANDFORD-BLENHEIM CLOSED LANDFILL GROUNDWATER ELEVATIONS - APRIL 2023

CONSULTANT

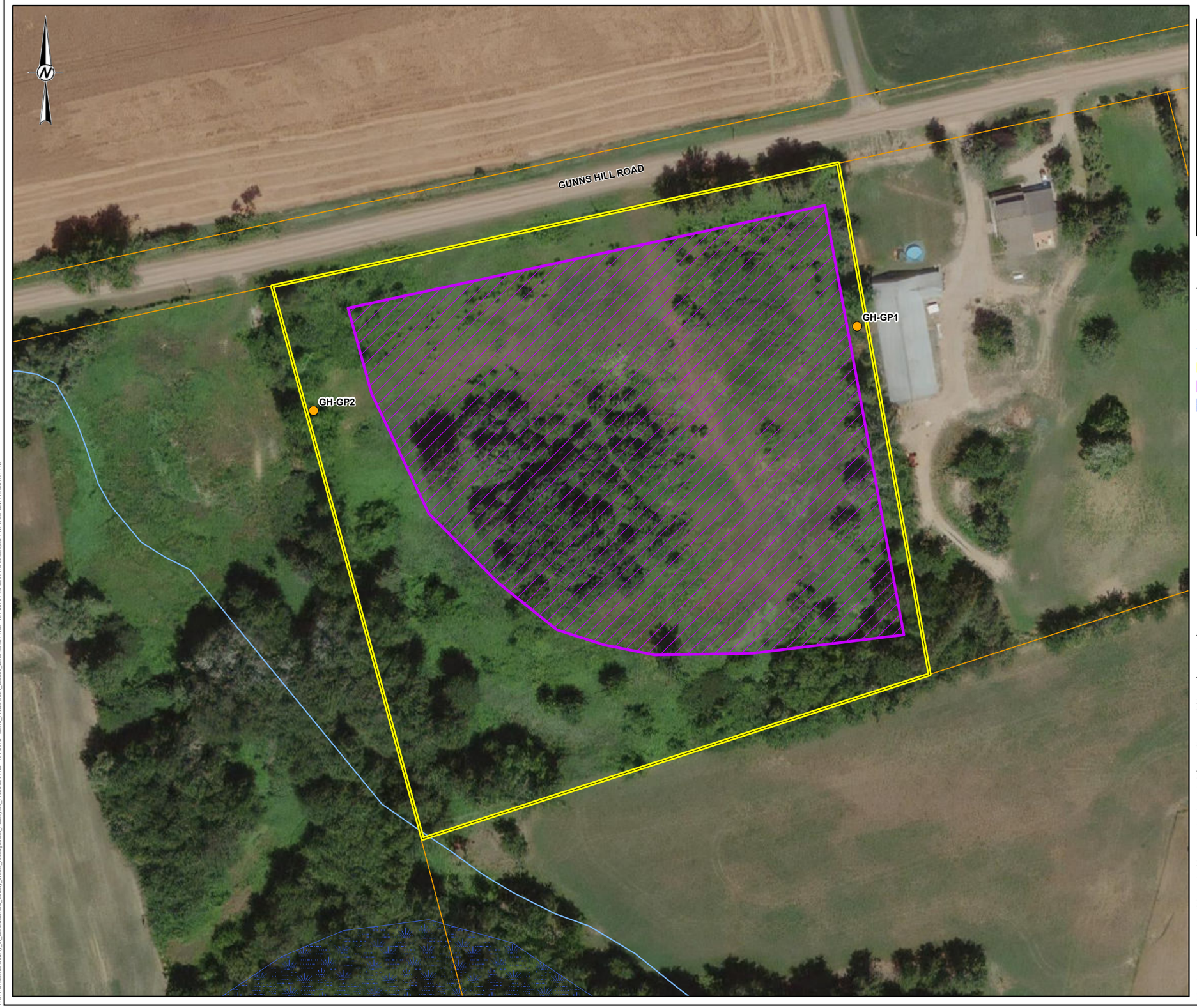
wsp

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	5-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm



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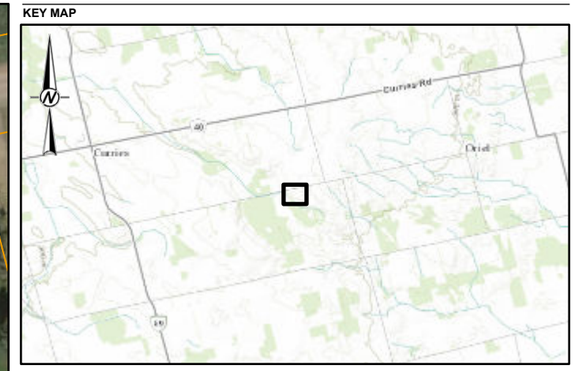

SCALE 1:100,000

LEGEND

- GAS PROBE LOCATION
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE
- WETLAND

0 25 50

1:1,250 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
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3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
GUNN'S HILL CLOSED LANDFILL SITE PLAN

CONSULTANT

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	6-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\69_PROJ\CA-WSP-191-06761-03\40_PRO\0001_Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT: 5:34:41 PM

KEY MAP

SCALE 1:100,000

LEGEND

- PRIVATE DRINKING WATER WELL
- PROPERTY BOUNDARY
- WATERCOURSE
- APPROXIMATE SITE BOUNDARY
- WETLAND

0 100 200

1:5,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2024 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
GUNN'S HILL CLOSED LANDFILL
PRIVATE WELL SAMPLING LOCATION

CONSULTANT

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	6-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\99_PROJ\CA-WSP-191-06761-03\40_PROD\0001 Closed_Landfills\CA-WSP-191-06761-03-0001-mHS-0000.aprx PRINTED ON: AT: 5:36:54 PM

KEY MAP

SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- DRAINAGE SWALE
- PROPERTY BOUNDARY
- UTILITY LINE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE

0 12.5 25 50

1:1,250 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: NORFOLK COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
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3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
OTTERVILLE CLOSED LANDFILL SITE PLAN

CONSULTANT

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	7-1

KEY MAP

SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- 246.02 GROUNDWATER ELEVATION FOR APRIL 2023 (mASL)
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER CONTOUR FOR APRIL 2023 (mASL)
- PROPERTY BOUNDARY
- UTILITY LINE
- APPROXIMATE SITE BOUNDARY
- ESTIMATED EXTENT OF REFUSE

0 12.5 25 50

1:1,250 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE
2. mASL = METRES ABOVE SEA LEVEL

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD TOPOGRAPHIC MAP: NORFOLK COUNTY, OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2024 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
OTTERVILLE CLOSED LANDFILL
GROUNDWATER ELEVATIONS - APRIL 2023

CONSULTANT

wsp

YYYY-MM-DD	2024-01-12
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	7-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

0

PATH: S:\Clients\County of Oxford\Oxford County Waste Management Facilities\06 PROJ\CA-WSP-191-06761-03\40 PRODUCTION\001 Closed Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx PRINTED ON: AT 9:46:01 AM

HIGHWAY 3

NORTHERN PARCEL

TB-BH6

TB-BH7

TB-BH8

TB-SW6

TB-SW5

Big Otter Creek

TB-SW4

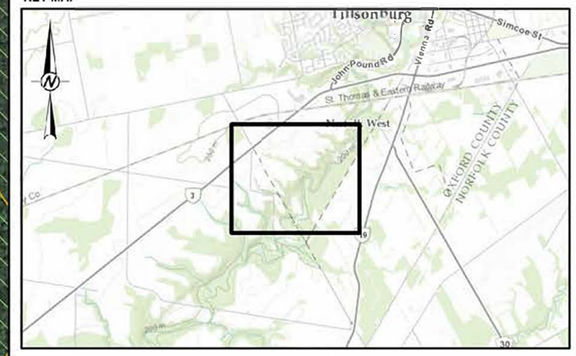
TB-SW2

TB-SW3

BAYHAM DRIVE

TB-SW1

KEY MAP



SCALE 1:100,000

LEGEND

- MONITORING WELL LOCATION
- SURFACE WATER SAMPLING LOCATION
- PROPERTY BOUNDARY
- WATERCOURSE
- RAILWAY
- APPROXIMATE SITE BOUNDARY
- NORTHERN PARCEL
- ESTIMATED EXTENT OF REFUSE
- ESTIMATED EXTENT OF BORROW AREA
- ANSI, LIFE SCIENCE
- WATER BODY

0 175 350

1:7,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS; WORLD TOPOGRAPHIC MAP: OXFORD COUNTY, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCAN
BING MAPS AERIAL: © 2023 MICROSOFT CORPORATION © 2023 MAXAR ©CNES (2023) DISTRIBUTION AIRBUS DS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
OXFORD COUNTY

PROJECT
OXFORD COUNTY CLOSED LANDFILLS

TITLE
TILLSONBURG CLOSED LANDFILL SITE PLAN

CONSULTANT

wsp

YYYY-MM-DD	2024-01-08
DESIGNED	DB
PREPARED	DB
REVIEWED	JM
APPROVED	-----

PROJECT NO.	CONTROL	REV.	FIGURE
CA-WSP-191-06761-03	0001	A	8-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

PATH: S:\Clients\County_of_Oxford\Oxford_County_Waste_Management_Facility\99_PROJ\CA WSP-191-06761-03\40_PROD\50001_Closed_Landfills\CA-WSP-191-06761-03-0001-HS-0000.aprx, PRINTED ON: Fri 7:32:31 PM

APPENDIX

A BOREHOLE LOGS

APPENDIX

A-1 *LAKESIDE LANDFILL*

LOG OF BOREHOLE LS-GP1

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-04
location |	Lakeside, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4781022 N: 498584 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)
0.0	367.6	**GROUND SURFACE**					367.5
	367.5 / 0.1	Dark brown sandy **TOPSOIL**, some organics, moist, loose.					
0.5		Brown **SANDY SILT**, some clay, moist, firm.		1	SS	4	367.0
	366.8 / 0.8	Light brown very fine **SILTY SAND**, dry, loose.		2	SS	21	366.5
1.0							
1.5				3	SS	22	366.0
2.0							365.5
	365.3 / 2.3	Light brown very fine **SILTY SAND**, dry, compact.		4	SS	23	
2.5							365.0
3.0				5	SS	28	364.5
3.5	363.8 / 3.8	**END OF BOREHOLE**					364.0

Penetration Test Values (Blows / 0.3m): Dynamic Cone — 10, 20, 30, 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40, 80, 120, 160

Water Content (%) & Plasticity: PL, MC, LL — 0, 0, 0

PID Readings

Well Details: Bentonite seal; Filter pack; slotted pipe

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

Borehole was dry upon completion.

APPENDIX

A-2 *EMBRO LANDFILL*

LOG OF BOREHOLE EB-GP1

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-04
location |	Embro, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4774166 N: 506536 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0.0	304.0 GROUND SURFACE	Dark brown sandy **TOPSOIL**, some organics, moist, loose.				
		Brown gravelly coarse **SAND**, some medium to coarse gravel, moist, loose.		1	SS	33
0.5						
	303.1					
1.0	0.9 / 302.9	Brown **CLAYEY SILT**, trace fine to medium gravel, dry, stiff.		2	SS	25
	1.1	Brown gravelly coarse **SAND**, some medium to coarse gravel, moist, loose.				
1.5				3	SS	26
2.0	301.7					
	2.3	Large gravelly **COBBLES to BOULDERS**, dry, loose.		4	SS	
2.5						
3.0	301.0					
	3.1	**END OF BOREHOLE** Auger refusal				

Borehole was dry upon completion.

Elevation Scale (mASL): 303.5, 303.0, 302.5, 302.0, 301.5, 301.0

Penetration Test Values (Blows / 0.3m): Dynamic Cone — 10, 20, 30, 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40, 80, 120, 160

Water Content (%) & Plasticity: PL, MC, LL — 0, 0, 0

PID Readings

Well Details: Bentonite seal; Filter pack; slotted pipe

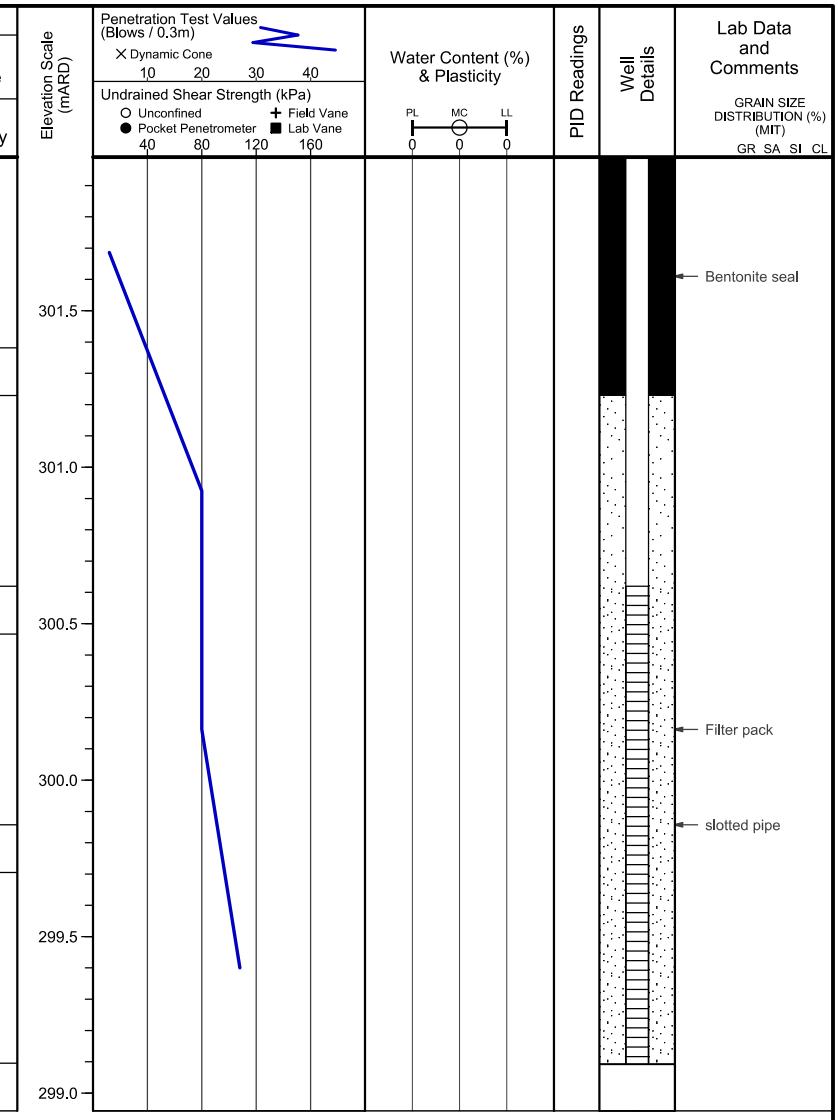
Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

...at 2.3m, well was installed through cobbles using casing.

LOG OF BOREHOLE EB-GP2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-04
location |	Embro, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4774161 N: 506450 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	Type	SPT N-Value / Core Recovery
0.0	302.0	**GROUND SURFACE**				
	301.9 / 0.1	Dark brown sandy **TOPSOIL** , some organics, wet, loose.				
		Brown **SANDY SILT**, some clay, some medium to coarse gravel, moist, loose.		1	SS	3
0.5	301.2 / 0.8	Light brown **CLAYEY SILT**, some coarse sand, trace fine gravel, moist, firm to stiff.		2	SS	20
1.0						
1.5				3	SS	20
2.0	299.7 / 2.3	Light brown **CLAYEY SILT**, some coarse sand, trace medium to coarse gravel, dry, stiff to very stiff.		4	SS	27
2.5						
3.0	299.0 / 3.1	**END OF BOREHOLE**				
		Borehole was dry upon completion.				

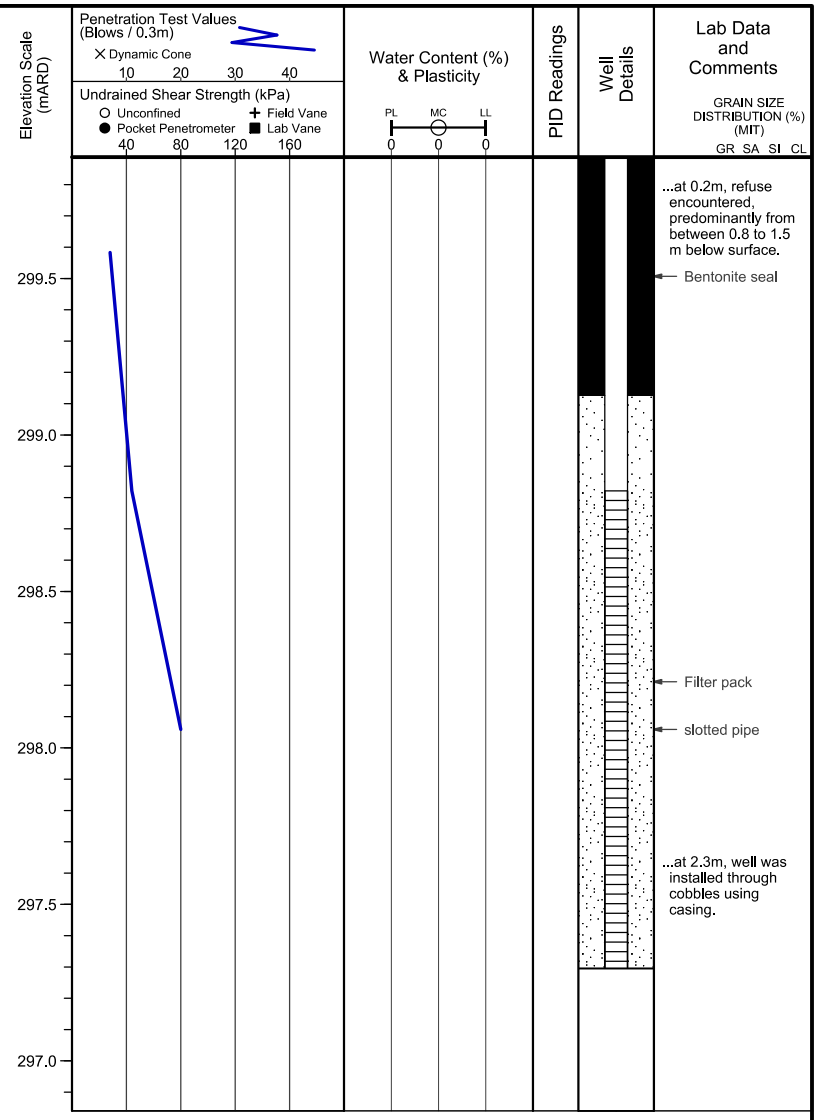


LOG OF BOREHOLE EB-GP3

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-04
location |	Embro, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4774058 N: 506510 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0.0	299.9	**GROUND SURFACE**				
	299.8 / 0.1	Dark brown sandy **TOPSOIL**, some organics, trace refuse, moist, loose.				
		Brown **SANDY SILT**, trace clay, trace refuse, moist, loose.		1	SS	7
0.5	299.1 / 0.8	Refuse mixed with coarse **SAND** to coarse **GRAVEL**, moist, loose.		2	SS	11
1.0						
1.5				3	SS	20
2.0	297.6 / 2.3	Large gravelly **COBBLES**, dry, loose.				
2.5				4	SS	
3.0	296.9 / 3.1	**END OF BOREHOLE** Auger refusal				

Borehole was dry upon completion.



APPENDIX

A-3 *THAMESFORD LANDFILL*

LOG OF BOREHOLE TF-GP2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-03
location |	Thamesford, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4763266 N: 504840 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0	274.7	**GROUND SURFACE**				
		Dark brown sandy **TOPSOIL** , some organics, wet, loose.		1	SS	2
		Brown **CLAYEY SILT**, some coarse sand, wet, soft.		2	SS	1
1	273.2 / 1.5	Light brown coarse **SAND**, some fine to medium gravel, trace clay, wet, very loose.		3	SS	3
2	272.4 / 2.3	Brown gravelly coarse **SAND**, wet, loose.		4	SS	23
				5	SS	39
3	270.9 / 3.8	**END OF BOREHOLE**				

Elevation Scale (mARD): 274, 273, 272, 271

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 0, 0, 0; Water level on completion

PID Readings

Well Details: Bentonite seal; Filter pack; slotted pipe

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

library: genivar - library.glb report: gen log v1 file: thamesford bh logs 2021.gpj

LOG OF BOREHOLE TF-MW1

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-03
location |	Thamesford, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4763437 N: 501777 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	Type	SPT N-Value / Core Recovery
0	276.3	**GROUND SURFACE**				
		Brown **CLAYEY SILT**, some coarse sand, trace gravel, wet, loose.		1	SS	4
	275.4					
1	0.9	Light brown **SANDY SILT**, trace clay, trace gravel, wet, loose to compact.		2	SS	12
				3	SS	20
2	274.0					
	2.3	Light brown coarse **SAND**, wet, loose.		4	SS	29
	273.7					
	2.6	Brown to grey **CLAYEY SILT**, trace sand, trace fine to medium gravel, dry to moist, stiff.				
3	273.3					
	3.1	Grey **CLAYEY SILT TILL**, trace to some gravel, trace sand, dry, stiff. (ASSUMED)		5	SS	58
				6	SS	100
4	271.8					
	4.5	**END OF BOREHOLE** Auger refusal				

Elevation Scale (mARD): 276, 275, 274, 273, 272

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
0 0 0
Water level on completion

PID Readings

Well Details
- Bentonite seal
- Filter pack
- slotted pipe

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

...at 3.0m, rig could not drill through the till, even with direct push method.

LOG OF BOREHOLE TF-MW2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-03
location |	Thamesford, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4763311 N: 501864 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	SAMPLE Type	SPT N-Value / Core Recovery
0	272.7	**GROUND SURFACE**				
	272.4 / 0.3	Dark brown clayey silt **TOPSOIL** , some organics, wet, loose.				
1		Light brown **SANDY SILT**, trace clay, trace fine to medium gravel, moist, loose.		1	DP	
2	270.7 / 2.0	Brown **CLAYEY SILT**, trace sand, trace fine to medium gravel, dry to moist, stiff.		2	DP	
3	269.7 / 3.1	Grey **CLAYEY SILT TILL**, trace to some gravel, trace sand, dry, stiff.		3	DP	
4	268.1 / 4.6	**END OF BOREHOLE** Auger refusal				

Elevation Scale (mASRD): 272, 271, 270, 269

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 0, 0, 0; Water level on completion

PID Readings

Well Details: Bentonite seal; Filter pack; slotted pipe

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

library: genivar - library.glb report: gen log v1 file: thamesford bh logs 2021.gpj

LOG OF BOREHOLE TF-MW3

project |	Oxford County Closed Landfills			**project no. |**	191-06761-01
client |	County of Oxford	**rig type |**	GEOPROBE, track-mounted	**date started |**	2021-03-03
location |	Thamesford, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 4763183 N: 501887 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	SAMPLE Number	SAMPLE Type	SPT N-Value / Core Recovery
0	272.6	**GROUND SURFACE**				
	272.3 / 0.3	Dark brown clayey silt **TOPSOIL** , some organics, wet, loose.				
1		Light brown **SANDY SILT**, trace clay, trace fine to medium gravel, occasional cobble, moist, loose to compact.		1	DP	
2	270.0 / 2.6			2	DP	
		Brown **CLAYEY SILT**, trace sand, trace fine to medium gravel, dry to moist, stiff.				
3	269.6 / 3.1	Light grey **CLAYEY SILT**, trace sand, trace fine to medium gravel, moist, stiff.		3	DP	
4	268.0 / 4.6	Grey **CLAYEY SILT TILL**, trace to some gravel, trace sand, dry, stiff.		4	DP	
5						
6	266.5 / 6.1	**END OF BOREHOLE**				

Elevation Scale (mASL): 272, 271, 270, 269, 268, 267

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 0, 0, 0 — Water level on completion

PID Readings

Well Details: Bentonite seal; Filter pack; slotted pipe

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

...at 4.3m, 10 cm thick grey medium to coarse sand seam, wet, loose

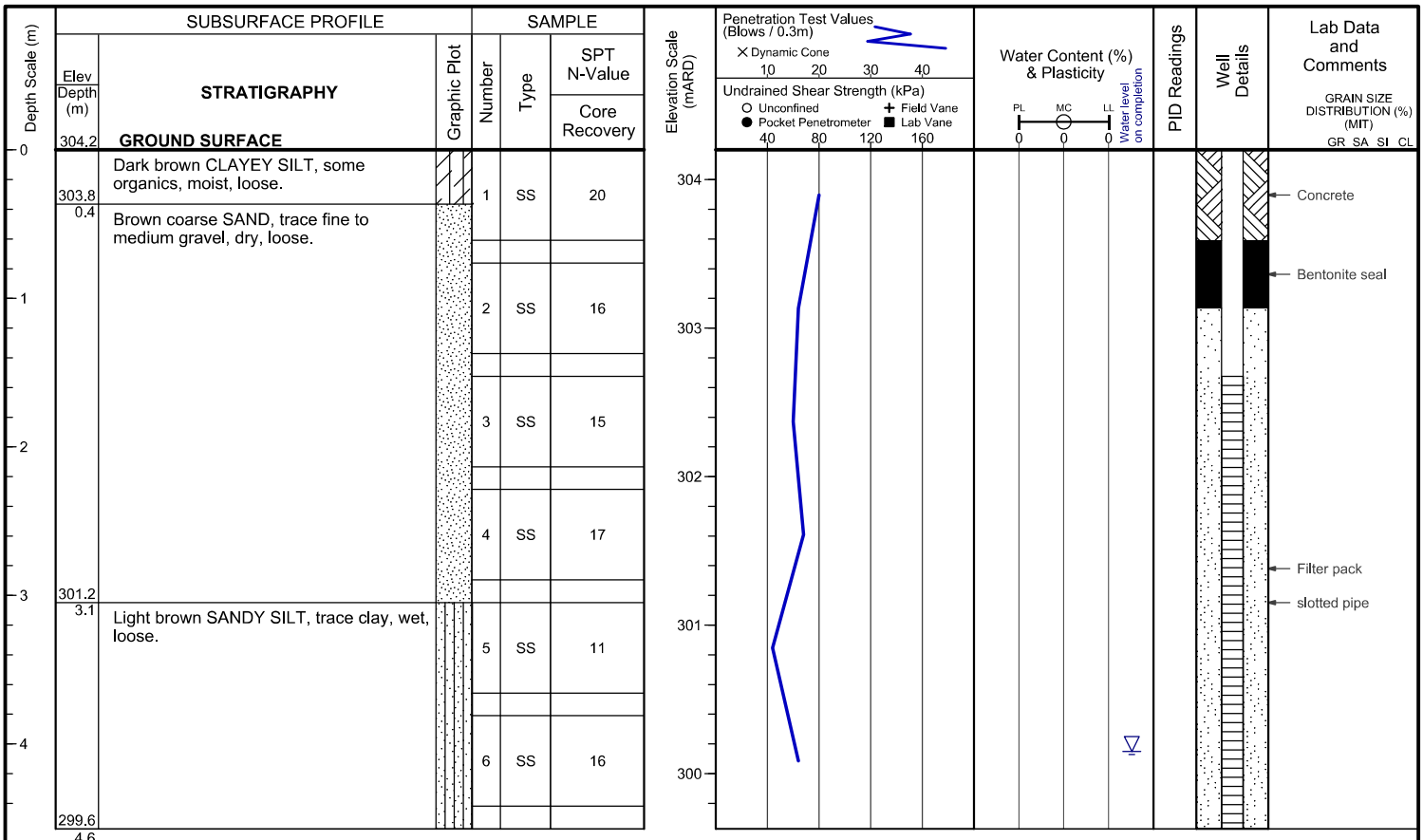
library: genivar - library.glb report: gen log v1 file: thamesford bh logs 2021.gpj

APPENDIX

A-4 BLANDFORD-BLENHEIM LANDFILL

LOG OF BOREHOLE BB-GP1

project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-18
location |	Blandford-Blenheim Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS

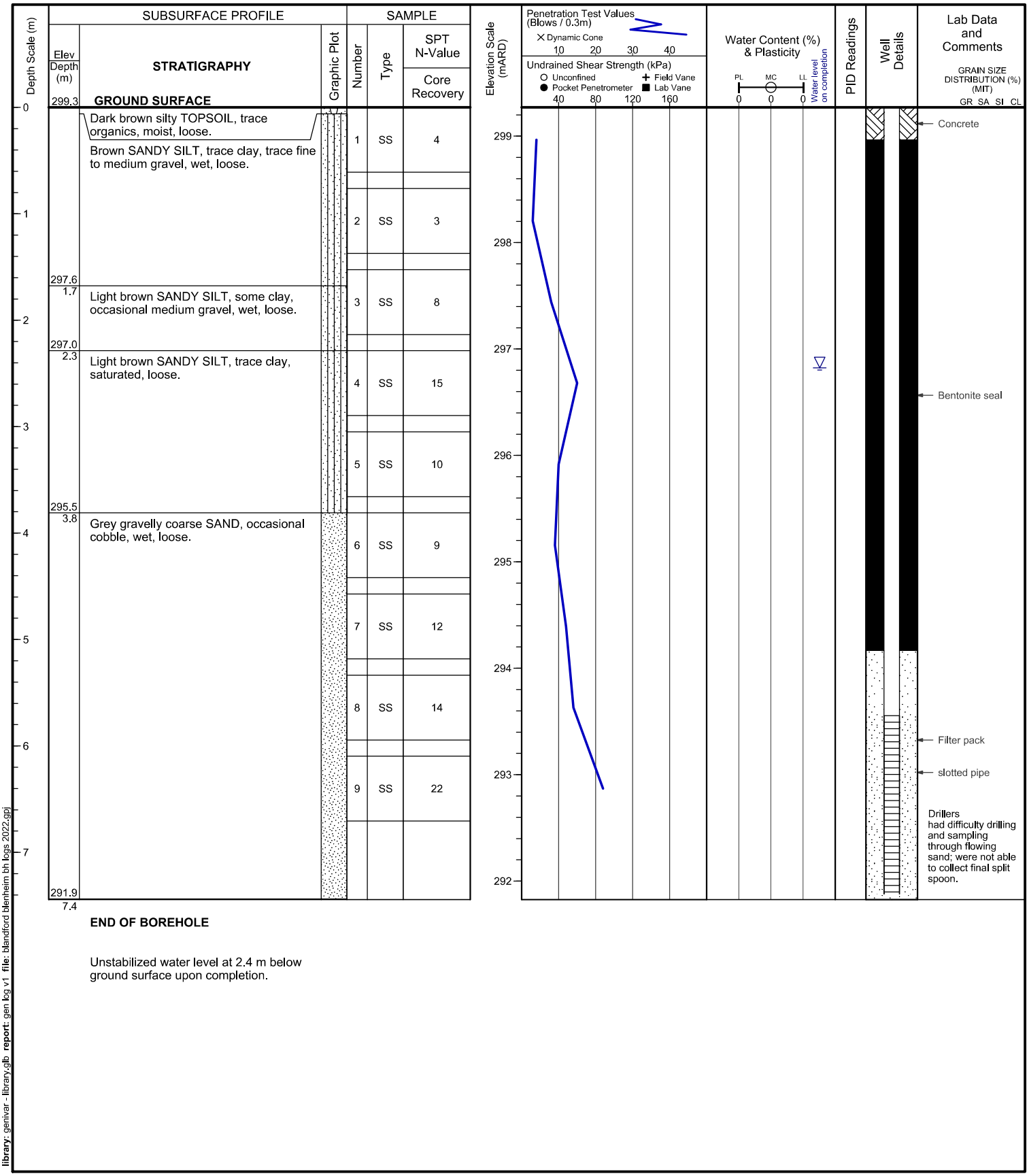


END OF BOREHOLE

Unstabilized water level at 4.1 m below ground surface upon completion.

LOG OF BOREHOLE BB-MW1

project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-19
location |	Blandford-Blenheim Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS

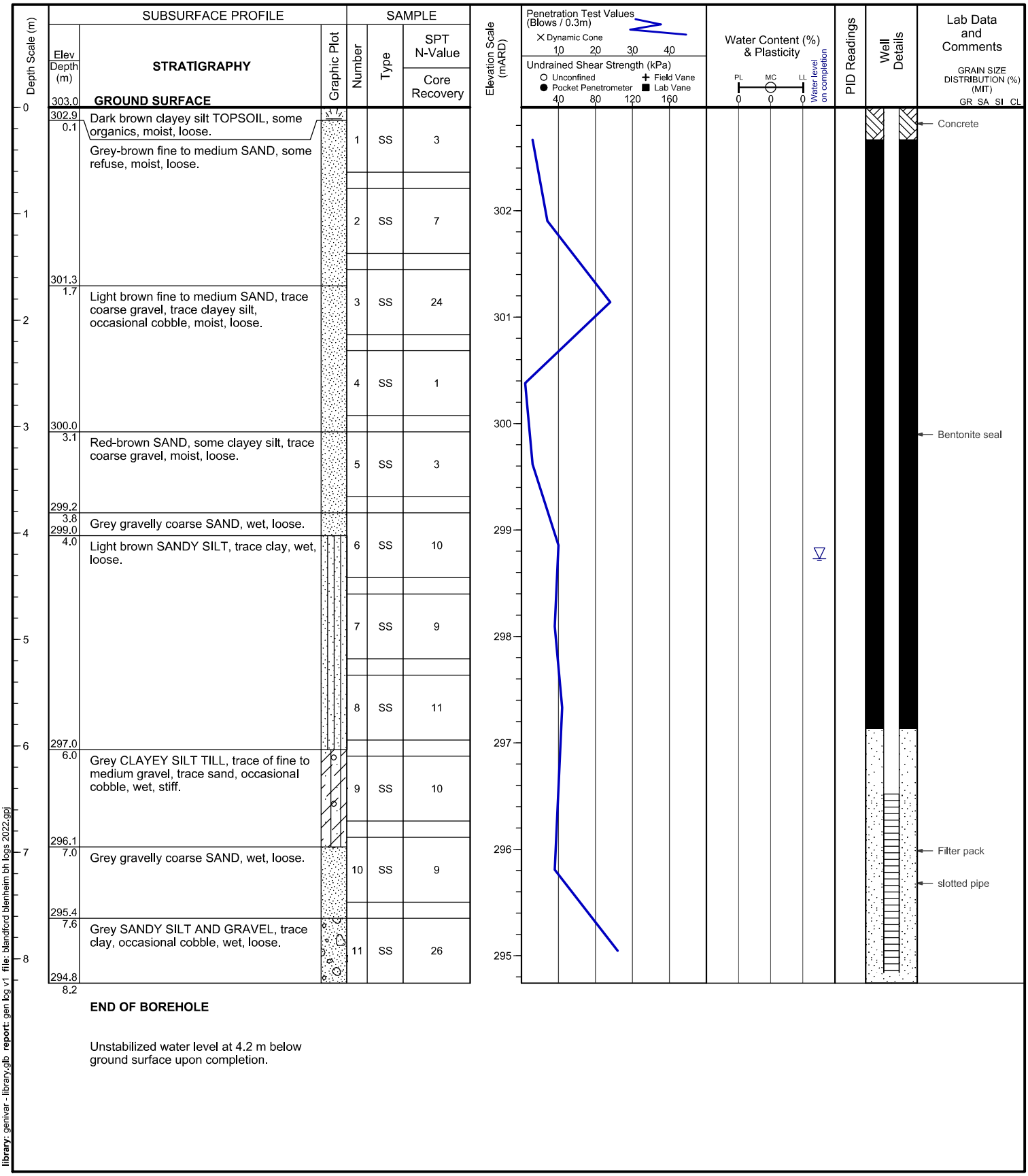


Number	Type	SPT N-Value / Core Recovery
1	SS	4
2	SS	3
3	SS	8
4	SS	15
5	SS	10
6	SS	9
7	SS	12
8	SS	14
9	SS	22

Unstabilized water level at 2.4 m below ground surface upon completion.

LOG OF BOREHOLE BB-MW2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-19
location |	Blandford-Blenheim Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS



END OF BOREHOLE

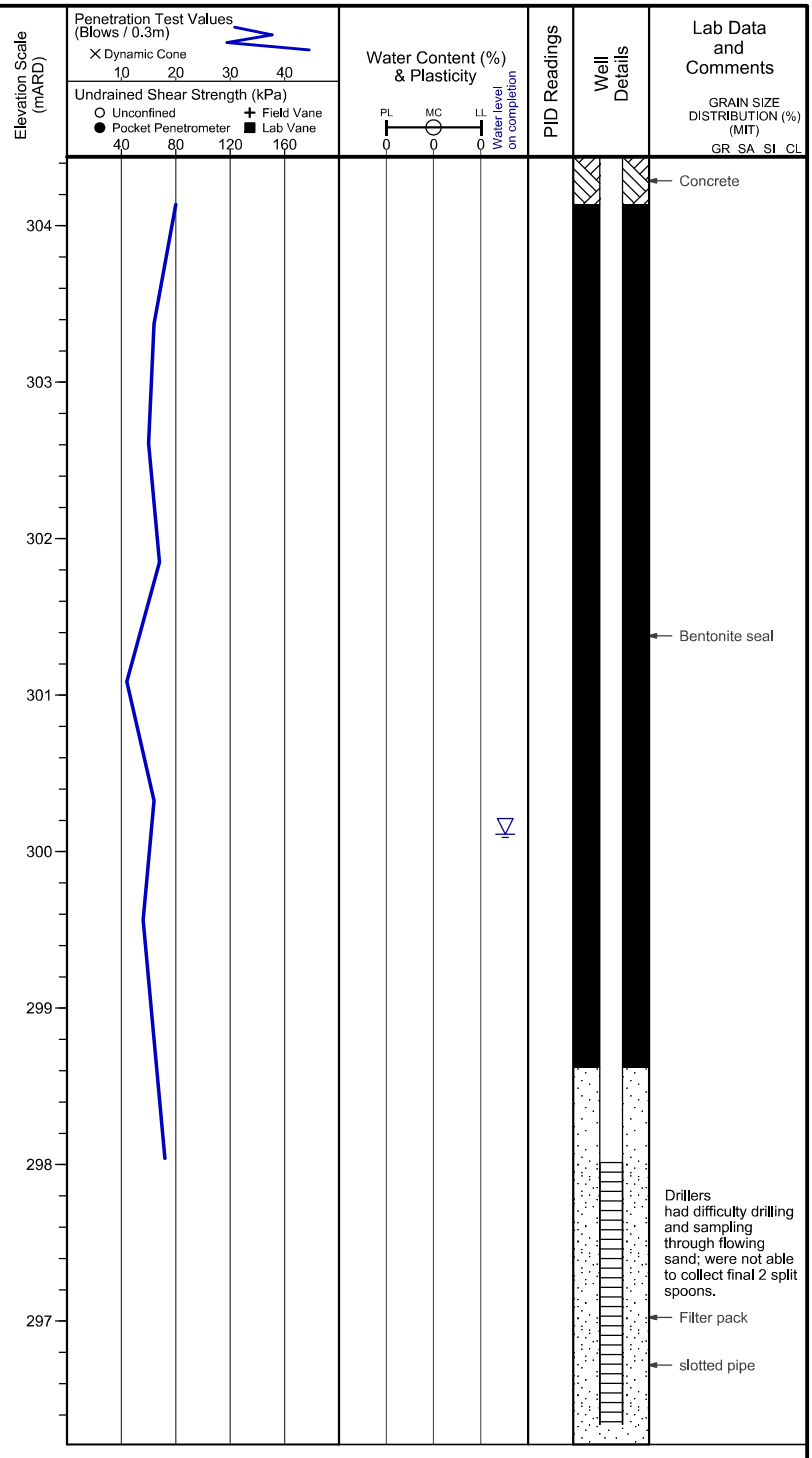
Unstabilized water level at 4.2 m below ground surface upon completion.

LOG OF BOREHOLE BB-MW3

project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-18
location |	Blandford-Blenheim Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0	304.4	**GROUND SURFACE**				
	304.0 / 0.4	Dark brown CLAYEY SILT, some organics, moist, loose.		1	SS	20
1		Brown coarse SAND, trace fine to medium gravel, dry, loose.		2	SS	16
2				3	SS	15
				4	SS	17
3	301.4 / 3.1	Light brown SANDY SILT, trace clay, wet, loose.		5	SS	11
4				6	SS	16
5	299.2 / 5.2	Grey gravelly coarse SAND, occasional cobble, wet, loose.		7	SS	14
				8	SS	16
6				9	SS	18
7						
8	296.2 / 8.2	**END OF BOREHOLE**				

Unstabilized water level at 4.3 m below ground surface upon completion.



Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

4706488

MUNICIP 47002 CON. CON 109

COUNTY OR DISTRICT [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE BLANDFORD-BLENHEIM

CON. BLOCK, TRACT, SURVEY, ETC 9

LOT 19

DATE COMPLETED DAY 15 MO 03 YR 89

[redacted] RR #3 BRIGHT

RC. ELEVATION 1000 RC. BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
				0	1
TOP SOIL					
BROWN	SAND	WITH	STONES	1	3
BROWN	SAND		COARSE DRY	3	4
BROWN	SAND			4	20
BROWN	SAND		FINE	20	40

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
20-40	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
36	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	3"	0'	40'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE: GRAVEL	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER

PUMPING RATE: GPM

DURATION OF PUMPING: HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

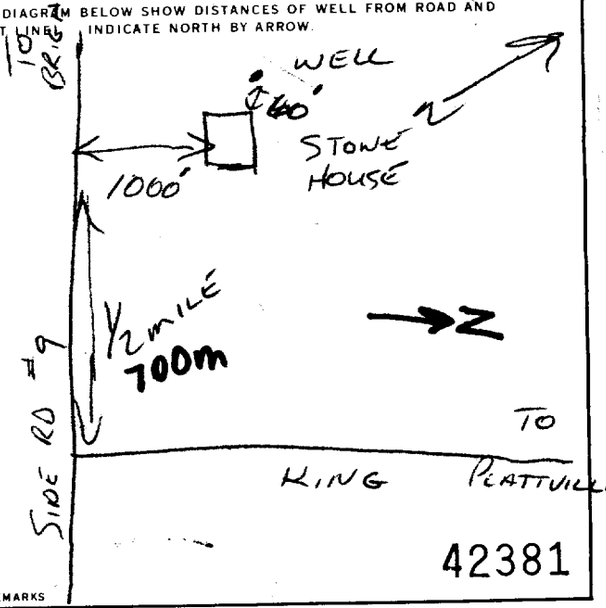
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 38 FEET

RECOMMENDED PUMPING RATE: 1 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINES. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 42381

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☒ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: ~~D~~ JOHNSON & BAETZ

WELL CONTRACTOR'S LICENCE NUMBER: 3030

ADDRESS: RR #1 MT. PLEASANT

NAME OF WELL TECHNICIAN: DON BAETZ

WELL TECHNICIAN'S LICENCE NUMBER: T0338

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature]

SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE

CONTRACTOR: 3030

DATE RECEIVED: APR 20 1989

DATE OF INSPECTION

INSPECTOR

REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

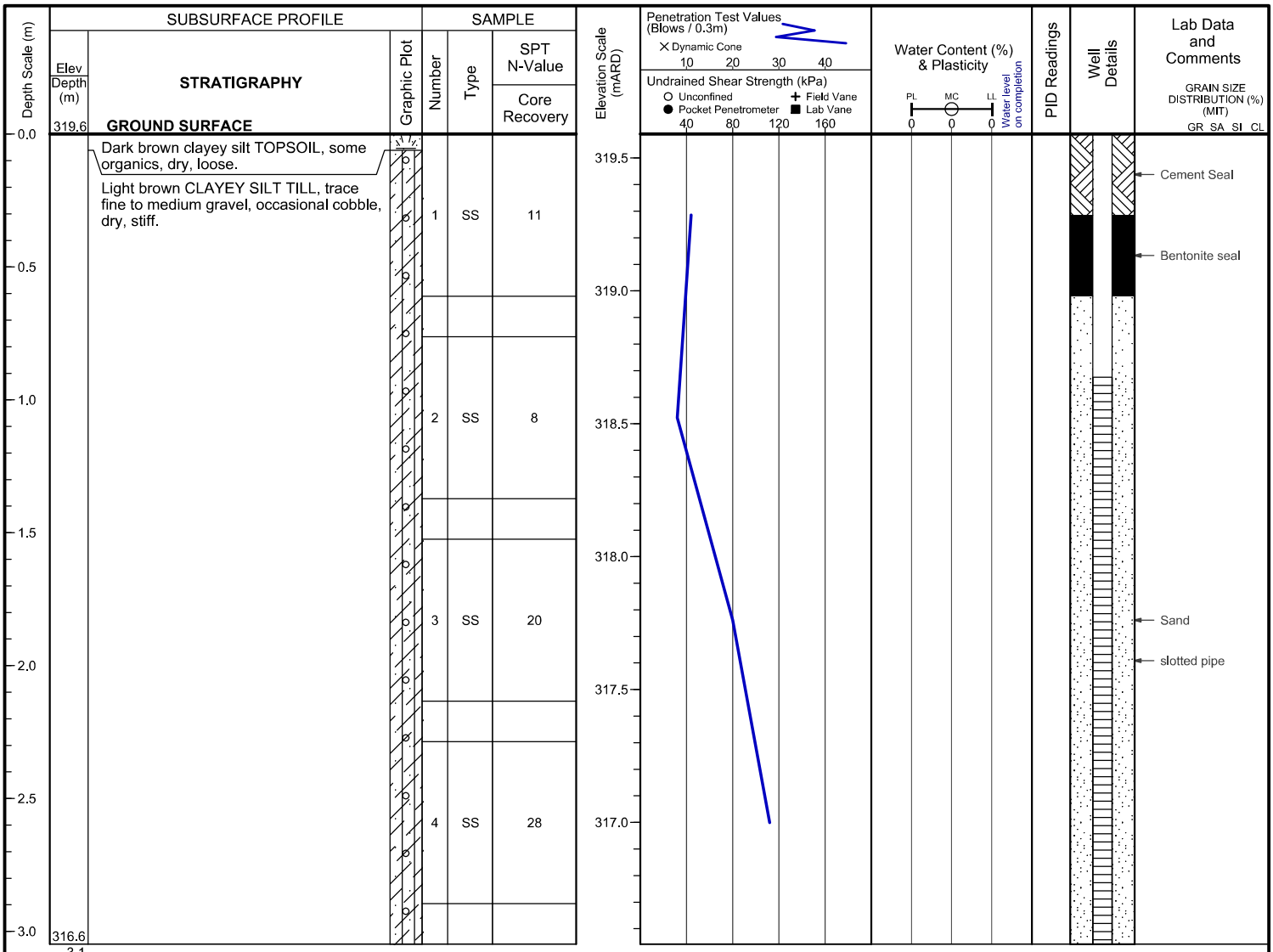
FORM NO. 0506 (11/86) FORM 9

APPENDIX

A-5 *GUNN'S HILL LANDFILL*

LOG OF BOREHOLE GH-GP1

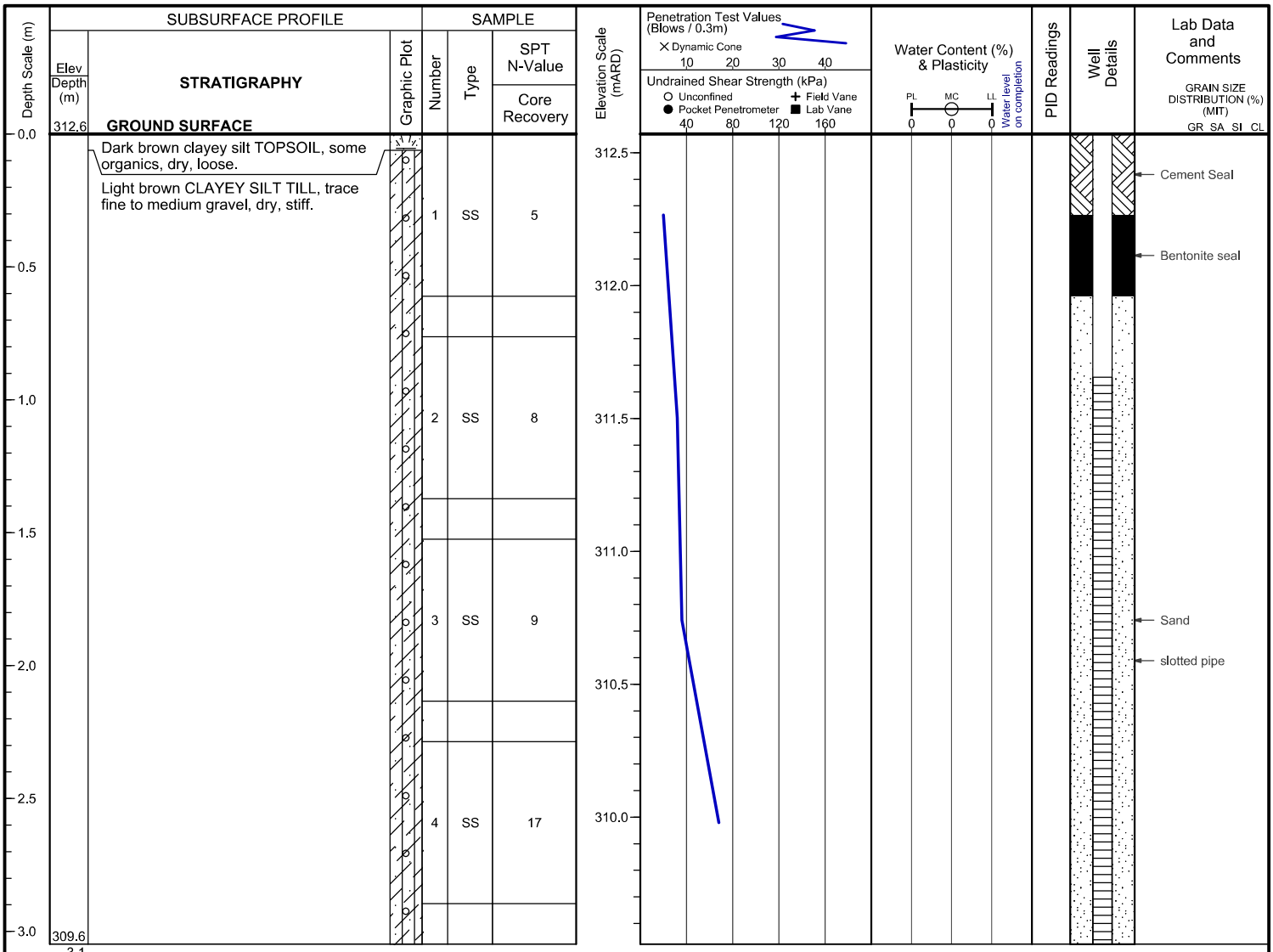
project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-19
location |	Gunn's Hill Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS



Borehole was dry and open upon completion.

LOG OF BOREHOLE GH-GP2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-02
client |	County of Oxford	**rig type |**	CME 75, track-mounted	**date started |**	2022-01-19
location |	Gunn's Hill Landfill, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |		**coring |**	*n/a*	**reviewer |**	AMS



Borehole was open and dry upon completion.

40P2b

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

4703235

MUNICIP. 47007 CON. CON 07

COUNTY ~~OR DISTRICT~~	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., ~~BLOCK, TRACT, SURVEY, ETC.~~	LOT
Oxford	Oxford E.	7	~~N.W.13~~ 14 / 014

[redacted] ...odstock R-4

DATE COMPLETED: DAY 17 MO 08 YR 71

[redacted] 67810 | RC. 4 | ELEVATION ~~1066~~ 1056 | RC. 4 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	TO
Yellowish	Clay		Hard	0	90
quicksand				90	160
grey	Clay	+ gravel mixture	hard	160	212
	Sand			212	213

31 | 0090505 | 0160 07 | 0212205N | 0213 09

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0212 ~~212-213~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	TO
~~6~~ 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	1.88	0	~~213~~ 0213
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0008 GPM.

DURATION OF PUMPING: 02 HOURS 00 MINS.

1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
080 FEET	090 ~~080~~ FEET	090 FEET	090 FEET	090 FEET	090 FEET

IF FLOWING, GIVE RATE: GPM.

PUMP INTAKE SET AT: 114 FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

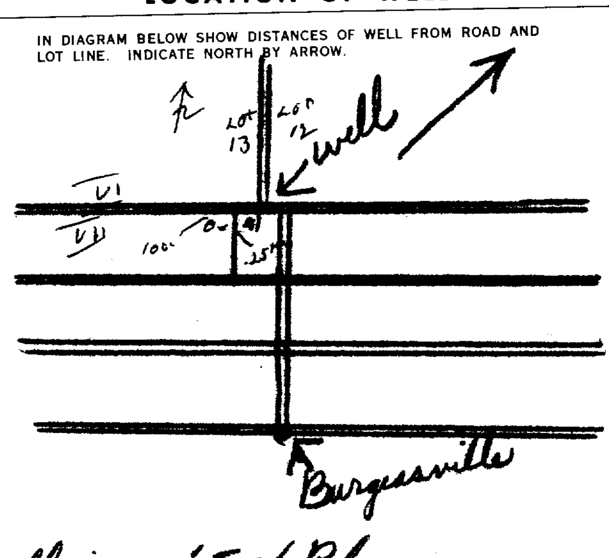
RECOMMENDED PUMP SETTING: 114 FEET

RECOMMENDED PUMPING RATE: 0008 GPM.

0008 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



Well is 100' S of Rd.
Well is 100' E of W. line

DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE

12

1 ☒ DOMESTIC
2 ☒ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Elgin Stewart — LICENCE NUMBER: 4804

ADDRESS: RR#3 Burgessville

NAME OF DRILLER OR BORER: Same — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Elgin Stewart — SUBMISSION DATE: DAY 17 MO 8 YR 71

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 4804 | DATE RECEIVED: 080971

DATE OF INSPECTION: 6.12.71 | INSPECTOR: 21P

REMARKS:

OWRC COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

40 P/28

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 4705875 MUNICIP 47007 CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
OXFORD	EAST OXFORD	7 VL	13

[redacted] RR#4 Woodstock

DATE COMPLETED: DAY 24 MO 4 YR 86

NG 768010 RC ELEVATION 1070 RC BASIN CODE

526220 4768010 1070

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY			0	4
GREY	CLAY	SAND	DENSE	4	~~189~~
GREY	CLAY	SAND STONES	CEMENTED	~~89~~	110
WHITE	SAND	STONES		110	215
GREY	CLAY	STONES		215	242
GREY	SHALE			242	244
GREY	LIMESTONE			244	248

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
247	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5½	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	244
5	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		244	248
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 20 GPM

DURATION OF PUMPING: 1 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING
90 FEET	100 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 100 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

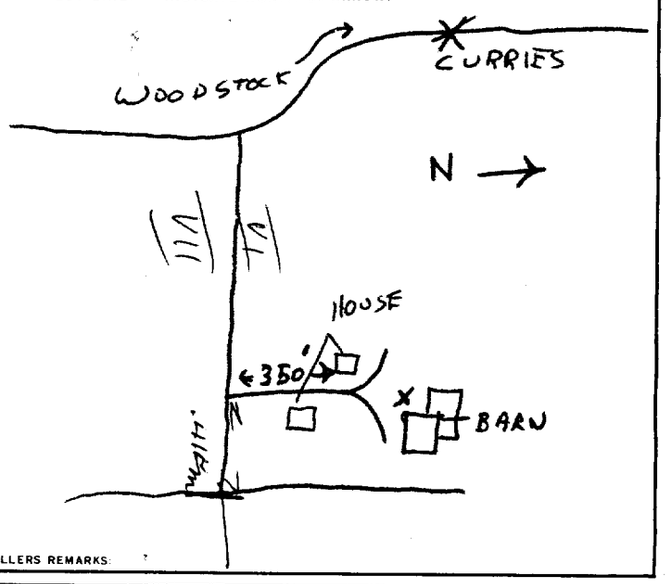
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 100 FEET

RECOMMENDED PUMPING RATE: 20 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☒ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: McLEOD WELL DRILLING LTD — LICENCE NUMBER: 3563

ADDRESS: RR# 4 INGERSOLL

NAME OF DRILLER OR BORER: DAVE OATMAN — LICENCE NUMBER: 4009

SIGNATURE OF CONTRACTOR: Ralph McLeod — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: 01 05 86

DATE OF INSPECTION: 5,5,87 | INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. **Tag#: A188068**

A 188068

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
445262 GUNNSHILL ROAD	NORWICH	14	7
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
OXFORD	WOODSTOCK	Ontario	N4S7V8
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 83 17 525848 4767832			

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BRN	CLAY			0	13
BRN	CLAY	COBBLE	HARD	13	17
GRY	GRAVEL	SAND		17	42
GRY	SAND	GRAVEL		42	48

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	25	BENTONITE - BENSEAL	
25	48	GRAVEL	

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☑ Domestic ☐ Municipal ☐ Dewatering
☑ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4	STEEL	.188	+2.5	38
6 1/4	STEEL	.188	46	48

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6 5/8	STAINLESS STEEL	10	38	46

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
38	☐	☑ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	48	9

Results of Well Yield Testing

After test of well yield, water was: ☑ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM): 15

Duration of pumping: 2 hrs + 0 min

Final water level end of pumping (m/ft): 33

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft): 36

Recommended pump rate (l/min / GPM): 15

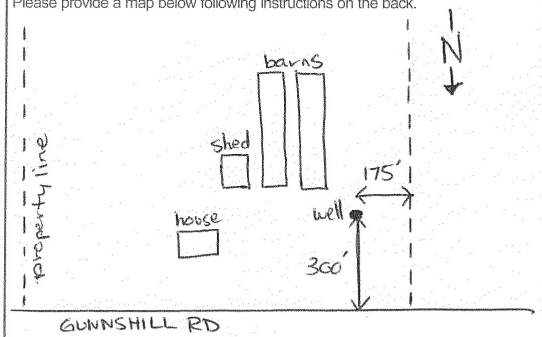
Well production (l/min / GPM): 18

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		20.6		33.0
1		24.8	1	31.1
2		27.3	2	29.9
3		29.0	3	28.7
4		30.2	4	27.4
5		31.6	5	26.7
10		32.3	10	26.0
15		32.8	15	25.3
20		33.0	20	24.9
25		33.0	25	23.2
30		33.0	30	22.5
40		33.0	40	20.3
50		33.0	50	20.0
60		33.0	60	20.0

Map of Well Location

Please provide a map below following instructions on the back.



Comments: HIDDLETOWN LINE 3000' EAST

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
McLEOD WATER WELLS LTD.	7343
Business Address (Street Number/Name)	**Municipality**
9500 TOWNSEND LINE	KERWOOD
Province	**Postal Code**
ONTARIO	N0M2B0
Business E-mail Address	
mcleodwaterwells@gmail.com	
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
5199473053	MITCHELL, WES
Well Technician's Licence No.	**Signature of Technician and/or Contractor**
3845	
Date Submitted	
2015 09 22	

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2015 09 21	2015 09 21

Ministry Use Only

Audit No Z 221487

Received OCT 16 2015

506E (2014/11)

Ministry's Copy

Ministry of the Environment

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 4706517 — MUNICIP. 47007 — CON. CON 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	[redacted]ORD	CON. 7	14

[redacted] R. 4, WOODSTOCK, ONTARIO

DATE COMPLETED: DAY 06 MO 12 YR 89

ELEVATION 1000 — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY			0	3
GREY	CLAY	HARD		3	16
GREY	GRAVEL			16	37
GREY	GRAVEL	LOOSE		37	40

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
40	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5 ½	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	37
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
10	6 INCHES	3 FEET

MATERIAL AND TYPE: Stainless Steel — DEPTH TO TOP OF SCREEN: 37-40 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
AIR (1 ☐ PUMP 2 ☐ BAILER)	12 GPM	1 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
12 FEET	24 FEET				

IF FLOWING, GIVE RATE: GPM — PUMP INTAKE SET AT: 24 FEET — WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☑ SHALLOW ☑ DEEP — RECOMMENDED PUMP SETTING: 24 FEET — RECOMMENDED PUMPING RATE: 12 GPM

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED
☐ DEWATERING

WATER USE

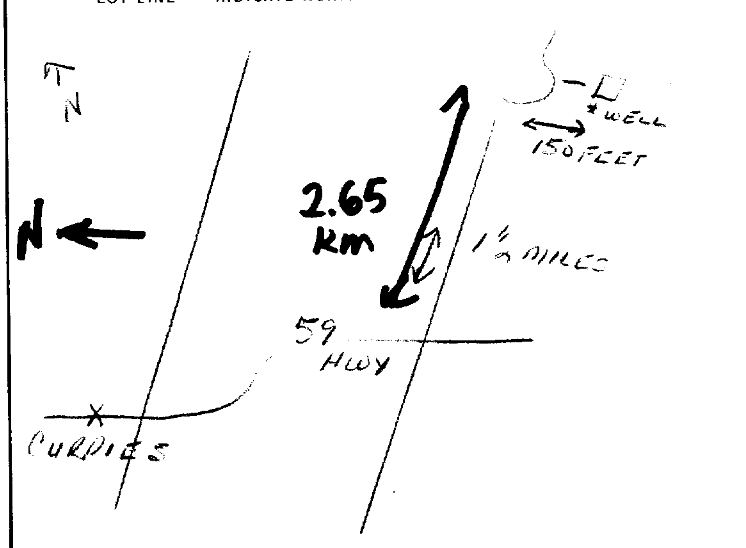
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL
2 ☑ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☑ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING
☐ DIGGING ☐ OTHER

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



46851

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: MC LEOD WELL DRILLING LTD — WELL CONTRACTOR'S LICENCE NUMBER: 3563

ADDRESS: R. R. 4, INGERSOLL, ONTARIO N5C 3J7

NAME OF WELL TECHNICIAN: David D. Oatman — WELL TECHNICIAN'S LICENCE NUMBER: T-0067

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature] — SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR 3563 — DATE RECEIVED JUN 20 1989

DATE OF INSPECTION — INSPECTOR

REMARKS

CSS.38

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

APPENDIX

A-6 OTTERVILLE LANDFILL

LOG OF BOREHOLE OT-MW1

project | Oxford County Closed Landfills
project no. | 191-06761-03
client | County of Oxford
rig type | D50, track-mounted
date started | 2023-02-21
location | Otterville, Ontario
method | Hollow stem augers, 215 mm dia.
supervisor | MEQ
position | E: 534048 N: 4752248 (17T, Geodetic (mASL))
coring | *n/a*
reviewer | AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0	250.7	**GROUND SURFACE**				
		Dark brown **TOPSOIL**, some rootlets and organics, trace sand, trace silt, moist, loose.		1	SS	4
1		Brown **SILTY SAND**, trace clay, trace gravel, dry, loose.		2	SS	2
2				3	SS	11
	248.4					
	2.3	Brown **CLAYEY SILT TILL**, trace gravel, dry, firm.		4	SS	12
3	247.7					
	3.1	Light brown fine **SILTY SAND**, occasional gravel, dry to moist, loose.		5	SS	6
4				6	SS	3
5				7	SS	26
				8	SS	5
6	244.6					
	6.1	Light brown fine **SILTY SAND**, trace clay, trace gravel, occasional cobble, wet, loose.		9	SS	6
7				10	SS	13
				11	SS	16
8	242.3					
	8.4	Brown to grey **SANDY SILT**, wet, compact.		12	SS	9
9				13	SS	9
	240.9					
	9.8	**END OF BOREHOLE**				

Unstabilized water level at 7.8 m below ground surface upon completion.

Elevation Scale (mASL): 250, 249, 248, 247, 246, 245, 244, 243, 242, 241

Penetration Test Values (Blows / 0.3m): Dynamic Cone — 10, 20, 30, 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40, 80, 120, 160

Water Content (%) & Plasticity: PL, MC, LL — 0, 0, 0; Water level on completion

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

LOG OF BOREHOLE OT-MW2

project |	Oxford County Closed Landfills			**project no. |**	191-06761-03
client |	County of Oxford	**rig type |**	D50, track-mounted	**date started |**	2023-02-21
location |	Otterville, Ontario	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	MEQ
position |	E: 534206 N: 4752284 (17T, Geodetic (mASL))	**coring |**	*n/a*	**reviewer |**	AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery	Elevation Scale (mASRD)
0	250.9	**GROUND SURFACE**					
	250.8 / 0.1	Dark brown **TOPSOIL**, some rootlets and organics, trace sand, trace silt, moist, loose.		1	SS	5	
		Brown **SAND**, some silt, trace gravel, dry, loose.		2	SS	8	250
1				3	SS	8	
2	248.6 / 2.3	Light brown fine **SILTY SAND**, occasional gravel, dry, loose.		4	SS	8	249
				5	SS	10	
3				6	SS	17	248
4				7	SS	25	
5	245.1 / 5.8	Brown fine **SILTY SAND**, trace clay, occasional gravel, wet, loose to compact.		8	SS	24	247
				9	SS	17	
6				10	SS	25	246
7				11	SS	16	
8				12	SS	7	245
9				13	SS	10	
	241.1 / 9.8	**END OF BOREHOLE**					244
		Unstabilized water level at 7.1 m below ground surface upon completion.					243
							242

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Water Content (%) & Plasticity: PL MC LL — 0 0 0; Water level on completion

PID Readings

Well Details

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

LOG OF BOREHOLE OT-MW3

project | Oxford County Closed Landfills
project no. | 191-06761-03
client | County of Oxford
rig type | D50, track-mounted
date started | 2023-02-22
location | Otterville, Ontario
method | Hollow stem augers, 215 mm dia.
supervisor | MEQ
position | E: 534194 N: 4752176 (17T, Geodetic (mASL))
coring | *n/a*
reviewer | AMS

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Sample Number	Sample Type	SPT N-Value / Core Recovery
0	254.8	**GROUND SURFACE**				
	254.7 / 0.1	Dark brown **TOPSOIL**, some rootlets and organics, trace silt, moist, loose.		1	SS	3
	254.0 / 0.8	Brown **CLAYEY SILT**, trace gravel, moist, loose.				
1		Brown **CLAYEY SILT TILL**, trace medium and fine gravel, moist to dry, firm.		2	SS	4
2				3	SS	22
				4	SS	23
3	251.8 / 3.1	Mottled brown/grey **CLAYEY SILT TILL**, trace medium and fine gravel, dry, firm to compact.		5	SS	24
4				6	SS	20
				7	SS	20
5	249.6 / 5.2	Light brown fine **SILTY SAND**, trace gravel, dry, compact.		8	SS	50
6				9	SS	27
7				10	SS	20
				11	SS	24
8	246.4 / 8.4	Brown to grey **SILTY SAND**, wet, compact.		12	SS	20
9				13	SS	22
10				14	SS	20
				15	SS	7
11	243.5 / 11.3	**END OF BOREHOLE**				

Unstabilized water level at 10.2 m below ground surface upon completion.

Elevation Scale (mASL): 254, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244

Penetration Test Values (Blows / 0.3m)
Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa)
Unconfined / Pocket Penetrometer / Field Vane / Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
0 0 0
Water level on completion

PID Readings

Well Details

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

APPENDIX

B HISTORIC DATA

APPENDIX

B-1 HISTORIC GROUNDWATER CHEMISTRY RESULTS

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Embro Landfill					
		P2		P3		P4	
		14-Apr-21	6-Apr-23	15-Apr-21	6-Apr-23	14-Apr-21	6-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	7.61	7.44	7.98	7.71	7.61	7.38
Conductivity (field - µS/cm)		483	539	474	635	512	596
Temperature (field - ºC)	15 AO	12.0	11.4	11.5	13.6	12.2	12.0
pH (lab - pH units)	6.5 - 8.5 OG	8.10	8.24	8.23	8.30	7.96	8.21
Conductivity (lab - µS/cm)		500	514	496	597	528	549
Total Dissolved Solids	500 AO	289	283	294	343	317	320
Chemical Oxygen Demand		9	26	<8	<8	<8	<8
Dissolved Organic Carbon	5 AO	1.5	1	1.4	1	3.5	2
Alkalinity	30 - 500 OG	254	271	261	273	266	258
Chloride	250 AO	9	10	4	12	10	13
Sulphate	500 AO	28	29	21	36	35	33
Calcium		73.1	70.8	132	2.76	77.5	81.6
Magnesium		24.5	24.4	33.0	0.905	25.1	24.5
Sodium	200 AO	10.8	11.1	22.5	134	6.78	6.34
Potassium		1.32	1.13	3.36	0.789	1.11	1.86
Total Kjehldahl Nitrogen		<0.5	0.08	<0.5	0.13	<0.5	<0.05
Ammonia		0.2	0.15	<0.1	0.08	<0.1	<0.04
Nitrate	10.0 MAC	<0.06	<0.06	<0.06	<0.06	<0.06	0.64
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus		<0.03	<0.03	0.04	<0.03	<0.03	<0.03
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	0.01 MAC	0.0002	0.0002	0.0003	0.0010	0.0010	0.0002
Barium	1.0 MAC	0.214	0.178	0.156	0.007	0.255	0.187
Boron	5.0 IMAC	0.047	0.031	0.028	0.031	0.025	0.021
Cadmium	0.005 MAC	<0.000003	0.000006	<0.000003	0.000005	0.000005	0.000011
Chromium	0.05 MAC	0.00015	0.00008	0.00016	0.00010	0.00009	0.00009
Copper	1 AO	0.0083	0.0203	0.0116	0.0130	0.0050	0.0301
Iron	0.3 AO	<0.01	0.090	<0.01	0.060	**0.40**	0.016
Lead	0.010 MAC	<0.00001	<0.00009	<0.00001	0.00033	<0.00001	<0.00009
Manganese	0.05 AO	0.041	0.0377	0.030	0.00163	0.029	0.0122
Mercury	0.001 MAC	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.014	0.067	<0.002	0.022	0.009	0.046
Total Suspended Solids		<2	2	3	<2	3	2
Biological Oxygen Demand		<4	<4	<4	<4	<4	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	0.8	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- ºC - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Thamesford Landfill										
		TF-MW1			TF-MW2			TF-MW3			TF-GP2	
		15-Apr-21	12-Oct-21	5-Apr-23	15-Apr-21	12-Oct-21	5-Apr-23	15-Apr-21	12-Oct-21	5-Apr-23	15-Apr-21	12-Oct-21
pH (field - pH units)	6.5 - 8.5 OG	7.72	7.28	7.56	7.45	7.05	7.36	7.78	7.28	7.41	D	6.88
Conductivity (field - µS/cm)		874	775	495	755	658	797	638	613	834	R	759
Temperature (field - °C)	15 AO	9.3	17.2	6.5	8.2	16.1	6.2	9.2	15.1	7.7	Y	16.5
pH (lab - pH units)	6.5 - 8.5 OG	7.99	8.17	8.07	7.80	8.17	7.94	7.91	8.21	7.99		8.08
Conductivity (lab - µS/cm)		921	881	472	787	733	746	677	674	757		829
Total Dissolved Solids	500 AO	**511**	480	289	491	426	469	440	411	451		**503**
Chemical Oxygen Demand		<8	<8	<8	<8	<8	9	<8	<8	<8		<8
Dissolved Organic Carbon	5 AO	1.5	2.0	2	2.4	2.7	2	2.2	2.0	1		2.6
Alkalinity	30 - 500 OG	255	249	231	429	353	348	306	272	296		333
Chloride	250 AO	160	160	16	24	26	29	22	28	38		55
Sulphate	500 AO	9	23	24	20	41	67	83	84	82		30
Calcium		134	98.9	68.8	143	99.1	110	120	94.4	99.3		134
Magnesium		33.2	35.8	9.16	30.7	27.7	30.4	33.8	31.2	31.1		23.2
Sodium	200 AO	21.9	23.4	22.9	8.84	19.8	10.8	10.5	18.3	26.4		16.3
Potassium		3.10	5.47	0.579	1.93	2.11	1.44	2.02	1.78	1.68		5.42
Total Kjehldahl Nitrogen		<0.5	<0.5	0.15	<0.5	<0.5	0.19	0.6	<0.5	<0.05		<0.5
Ammonia		<0.1	<0.1	0.04	<0.1	<0.1	0.04	<0.1	<0.1	<0.04		<0.1
Nitrate	10.0 MAC	0.69	<0.06	<0.06	<0.06	0.34	<0.06	<0.06	<0.06	0.09		5.06
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03
Total Phosphorus		0.51	0.46	0.60	0.20	0.49	0.95	0.07	0.09	<0.03		0.84
Phenols		<0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002		<0.002
Arsenic	0.01 MAC	0.0003	0.0010	<0.0002	0.0005	0.0019	0.0004	0.0011	0.0007	0.0004		<0.0002
Barium	1.0 MAC	0.143	0.150	0.0280	0.181	0.141	0.0842	0.123	0.096	0.0977		0.040
Boron	5.0 IMAC	0.027	0.063	0.011	0.053	0.047	0.029	0.020	0.023	0.024		0.052
Cadmium	0.005 MAC	0.00011	0.00001	<0.000003	0.00005	0.00002	0.000004	0.00132	0.00001	<0.000003		0.00012
Chromium	0.05 MAC	0.0150	0.0001	0.00020	0.0091	0.0001	<0.00008	0.0122	0.0001	0.00013		0.0005
Copper	1 AO	0.0157	0.0015	0.0080	0.0078	0.0009	0.0031	0.0999	0.0003	0.0041		0.0015
Iron	0.3 AO	<0.007	<0.01	<0.007	0.027	0.02	<0.007	0.195	0.02	<0.007		<0.01
Lead	0.010 MAC	0.00001	<0.001	<0.00009	0.00004	<0.001	<0.00009	0.00025	<0.001	<0.00009		<0.001
Manganese	0.05 AO	0.026	**0.119**	0.00020	0.020	**0.163**	0.0201	**0.116**	**0.106**	0.00924		0.022
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		<0.00001
Zinc	5.0 AO	<0.002	0.003	<0.002	0.007	0.012	0.002	0.004	0.003	<0.002		0.011
Total Suspended Solids		863	725	1240	480	1030	1580	22200	35300	14300		4170
Biological Oxygen Demand		<4	<4	<4	<4	<4	<4	<4	<4	<4		<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- °C - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Blandford-Blenheim Landfill								
		BB-MW1			BB-MW2			BB-MW3		
		11-Apr-22	18-Oct-22	4-Apr-23	11-Apr-22	18-Oct-22	4-Apr-23	11-Apr-22	18-Oct-22	4-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	6.98	6.97	7.00	6.78	7.25	7.19	6.89	7.51	7.51
Conductivity (field - µS/cm)		1070	1000	1110	595	634	684	351	382	472
Temperature (field - ºC)	15 AO	8.35	11.10	9.41	8.52	10.11	9.88	9.25	10.29	9.92
pH (lab - pH units)	6.5 - 8.5 OG	7.93	8.16	7.80	8.13	8.09	8.03	8.20	8.16	8.04
Conductivity (lab - µS/cm)		1190	1080	1120	651	627	638	381	372	437
Total Dissolved Solids	500 AO	**617**	**574**	**614**	420	394	411	234	206	260
Chemical Oxygen Demand		30	23	29	11	<8	9	<8	<8	<8
Dissolved Organic Carbon	5 AO	**9.3**	**8**	**7**	1.1	3	2	1.3	<1	2
Alkalinity	30 - 500 OG	**597**	498	**503**	248	231	234	213	202	216
Chloride	250 AO	48	79	58	27	37	25	3	0.9	<1
Sulphate	500 AO	22	24	32	73	82	89	7	3.5	24
Calcium		118	101	113	90.5	73.6	88.7	56.3	52.3	66.2
Magnesium		45.5	37.4	43.5	31.1	23.8	29.0	10.9	8.97	11.9
Sodium	200 AO	35.4	29.0	37.6	5.02	3.85	4.75	13.2	4.50	15.1
Potassium		15.4	9.69	12.1	1.34	1.16	1.34	0.833	0.652	0.922
Total Kjehldahl Nitrogen		24.6	16.2	19.0	<0.5	<0.5	<0.05	1.6	<0.5	<0.05
Ammonia		23.9	15.2	18.1	0.2	0.1	0.08	<0.1	<0.1	<0.04
Nitrate	10.0 MAC	<0.06	<0.06	<0.06	0.70	0.45	0.44	0.34	0.32	0.55
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	0.14	0.11	<0.03	<0.03	<0.03	<0.03
Total Phosphorus		0.73	0.26	0.10	0.05	<0.03	<0.03	<0.03	0.06	<0.03
Phenols		<0.002	0.002	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002
Arsenic	0.01 MAC	0.0005	0.0003	<0.0002	0.0011	0.0007	0.0016	0.0009	0.0003	0.0003
Barium	1.0 MAC	0.519	0.358	0.458	0.0633	0.0613	0.0627	0.0104	0.00835	0.0110
Boron	5.0 IMAC	0.176	0.103	0.166	0.013	0.007	0.015	0.018	0.005	0.045
Cadmium	0.005 MAC	<0.000003	<0.000003	<0.000003	0.000005	<0.000003	0.000006	0.000003	0.000010	<0.000003
Chromium	0.05 MAC	0.00064	0.00044	0.00040	0.00014	0.00013	0.00009	0.00057	0.00037	0.00043
Copper	1 AO	0.0003	<0.0002	0.0025	0.0008	<0.0002	0.0043	0.0011	0.0006	0.0037
Iron	0.3 AO	**3.84**	**3.28**	**3.30**	0.198	0.095	0.293	<0.007	<0.007	0.012
Lead	0.010 MAC	<0.00009	<0.00009	<0.00009	0.00019	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Manganese	0.05 AO	**0.0972**	**0.0636**	**0.0751**	0.0318	0.0190	0.0229	0.00477	0.00041	0.00021
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.002	<0.002	<0.002	0.004	<0.002	<0.002	0.003	<0.002	<0.002
Total Suspended Solids		-	-	227	-	-	49900	-	-	17500
Biological Oxygen Demand		-	-	<4	-	-	<4	-	-	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- ºC - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Blandford-Blenheim Landfill									
		BB-BH1-1				BB-BH1-2				BB-P1	
		18-Apr-22	18-Oct-22	25-Nov-22	4-Apr-23	18-Apr-22	18-Oct-22	25-Nov-22	4-Apr-23	11-Apr-22	4-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	6.89	6.94	6.94	7.48	6.75	6.65	6.65	6.54	7.38	7.53
Conductivity (field - µS/cm)		740	671	671	745	2050	2100	2100	2360	527	599
Temperature (field - °C)	15 AO	9.7	9.60	9.60	11.0	9.3	9.75	9.75	11.8	4.58	7.89
pH (lab - pH units)	6.5 - 8.5 OG	7.86	8.01	7.72	7.85	7.15	7.42	7.20	7.39	8.08	8.09
Conductivity (lab - µS/cm)		573	676	687	687	2110	2350	2100	2110	557	564
Total Dissolved Solids	500 AO	331	446	369	400	**780**	**880**	**820**	**851**	346	320
Chemical Oxygen Demand		<8	8	20	<8	116	250	131	117	<8	<8
Dissolved Organic Carbon	5 AO	2	2	1.8	2	**27**	**25**	**30.5**	**24**	1.5	1
Alkalinity	30 - 500 OG	304	335	334	345	**1150**	455	**1070**	**1080**	295	284
Chloride	250 AO	15	13	15	16	31	34	37	36	2	6
Sulphate	500 AO	12	9.0	4	11	<2	47	<20	11	5	7
Calcium		92.4	-	111	108	184	-	195	188	82.3	84.6
Magnesium		18.9	-	18.4	20.0	48.9	-	40.7	43.1	22.4	20.9
Sodium	200 AO	4.30	-	3.90	4.13	50.4	-	31.9	34.9	4.94	4.38
Potassium		3.81	-	4.56	4.91	70.4	-	60.7	63.0	5.12	4.45
Total Kjehldahl Nitrogen		2.46	<0.5	2.00	2.00	122	109	99.2	112	<0.5	0.20
Ammonia		<0.1	<0.1	1.8	1.81	112	105	100	108	<0.1	<0.04
Nitrate	10.0 MAC	2.53	3.88	0.56	1.72	<0.06	<0.06	<0.06	0.18	5.28	5.45
Nitrite	1.0 MAC	<0.03	<0.03	0.07	0.32	<0.3	<0.03	<0.3	<0.3	<0.03	<0.03
Total Phosphorus		0.12	0.16	0.16	0.07	0.60	1.03	0.58	0.54	<0.03	<0.03
Phenols		<0.002	-	0.003	<0.002	0.008	-	0.016	0.010	<0.002	<0.002
Arsenic	0.01 MAC	0.0004	-	0.0004	0.0008	0.0014	-	0.0016	0.0016	<0.0002	<0.0002
Barium	1.0 MAC	0.0398	-	0.0561	0.0533	0.217	-	0.278	0.228	0.0304	0.0301
Boron	5.0 IMAC	0.125	-	0.063	0.075	0.765	-	0.750	0.787	0.045	0.048
Cadmium	0.005 MAC	0.000137	-	0.000004	0.000045	0.000003	-	0.000010	0.000011	0.000007	0.000008
Chromium	0.05 MAC	0.00014	-	0.00019	0.00014	0.00376	-	0.00377	0.00447	0.00096	0.00064
Copper	1 AO	0.0022	-	0.0010	0.0038	0.0006	-	0.0008	0.0025	0.0048	0.0070
Iron	0.3 AO	0.045	-	0.08	**0.528**	**44.3**	**-**	**73.5**	**64.6**	<0.007	<0.007
Lead	0.010 MAC	0.00014	**-**	<0.001	0.00012	<0.00009	**-**	<0.001	0.00014	0.00017	<0.00009
Manganese	0.05 AO	**0.657**	-	**0.852**	**0.826**	**0.701**	-	**0.548**	**0.547**	0.00024	0.00026
Mercury	0.001 MAC	<0.00001	-	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.026	-	0.011	0.010	0.011	-	0.007	0.006	0.218	0.503
Total Suspended Solids		-	238	89	89	-	1590	238	239	-	<2
Biological Oxygen Demand		-	<4	22	<4	-	28	8	11.0	-	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	**5.9**	**-**	**5.7**	**4.2**	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	**2.6**	**-**	**3.2**	**2.2**	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5	<0.5	0.5	-	1.2	0.7	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- °C - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Gunn's Hill Landfill						
		GH-P1		GH-P2	GH-P3A		GH-P3B	
		11-Apr-22	17-Apr-23	11-Apr-22	11-Apr-22	6-Apr-23	11-Apr-22	6-Apr-23
pH (field - pH units)	6.5 - 8.5 OG	6.99	7.15	7.05	6.89	7.39	6.98	7.50
Conductivity (field - µS/cm)		429	548	439	483	595	472	581
Temperature (field - ºC)	15 AO	13.26	13.94	10.99	11.20	14.79	11.68	11.99
pH (lab - pH units)	6.5 - 8.5 OG	8.04	7.88	8.00	8.04	8.04	8.01	7.97
Conductivity (lab - µS/cm)		462	458	493	517	534	525	554
Total Dissolved Solids	500 AO	223	246	260	337	334	303	334
Chemical Oxygen Demand		<8	11	<8	<8	<8	8	<8
Dissolved Organic Carbon	5 AO	1.0	1.1	<1.0	<1.0	2	1.3	2
Alkalinity	30 - 500 OG	254	266	267	244	254	246	249
Chloride	250 AO	2	5	4	8	6	8	9
Sulphate	500 AO	16	10	18	54	47	54	53
Calcium		61.9	56.9	65.4	78.9	87.4	74.8	90.0
Magnesium		22.9	22.8	24.0	24.3	23.4	23.5	23.9
Sodium	200 AO	15.0	14.1	15.2	4.04	4.28	3.83	4.32
Potassium		1.07	1.19	1.20	1.02	1.40	0.968	2.17
Total Kjehldahl Nitrogen		<0.5	0.7	<0.5	<0.5	<0.05	<0.5	0.07
Ammonia		0.3	0.3	0.2	<0.1	<0.04	<0.1	<0.04
Nitrate	10.0 MAC	<0.06	<0.06	<0.06	<0.06	0.68	0.6	0.62
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	0.01 MAC	0.0054	0.0052	0.0004	0.0028	0.0004	0.0046	0.0004
Barium	1.0 MAC	0.131	0.138	0.179	0.186	0.212	0.194	0.210
Boron	5.0 IMAC	0.052	0.057	0.050	0.009	0.019	0.019	0.017
Cadmium	0.005 MAC	0.000003	0.000005	<0.000003	0.000003	0.000006	<0.000003	0.000016
Chromium	0.05 MAC	0.00022	0.00033	0.00009	0.00024	0.00008	0.00010	<0.00008
Copper	1 AO	0.0017	0.0047	0.0019	0.0029	0.0090	0.0012	0.0271
Iron	0.3 AO	**1.43**	**1.88**	**1.10**	**1.00**	0.019	**1.05**	0.115
Lead	0.010 MAC	<0.00009	<0.001	<0.00009	<0.00009	<0.00009	<0.00009	0.00010
Manganese	0.05 AO	0.0268	0.032	0.0223	**0.0527**	0.0482	0.0341	**0.0519**
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001
Zinc	5.0 AO	0.007	0.003	<0.002	0.018	0.027	0.026	0.030
Total Suspended Solids		-	7	-	-	<2	-	2
Biological Oxygen Demand		-	4	-	-	<4	-	<4
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- ºC - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-1: Historic Groundwater Chemistry Results
Oxford County Closed Landfill Sites

Parameter	ODWQS	Otterville Landfill					
		OT-MW1		OT-MW2		OT-MW3	
		4-Apr-23	17-Oct-23	4-Apr-23	17-Oct-23	4-Apr-23	17-Oct-23
pH (field - pH units)	6.5 - 8.5 OG	7.37	7.26	7.50	7.33	7.16	7.10
Conductivity (field - µS/cm)		605	358	516	410	1420	1343
Temperature (field - ºC)	15 AO	11.2	10.1	10.6	9.6	12.3	11.4
pH (lab - pH units)	6.5 - 8.5 OG	7.91	7.93	8.03	7.97	7.94	8.01
Conductivity (lab - µS/cm)		584	698	479	454	1430	1320
Total Dissolved Solids	500 AO	371	343	274	217	**843**	**726**
Chemical Oxygen Demand		<8	12	<8	8	<8	20
Dissolved Organic Carbon	5 AO	1	1.1	1	1.4	2	**6.7**
Alkalinity	30 - 500 OG	232	293	244	233	303	309
Chloride	250 AO	23	22	14	5	**320**	180
Sulphate	500 AO	35	34	10	6	56	50
Calcium		91.8	130	88.6	86.0	133	116
Magnesium		17.8	20.4	12.6	11.5	43.6	32.5
Sodium	200 AO	3.34	3.56	4.68	3.51	150	57.4
Potassium		1.11	1.01	0.841	0.564	2.42	2.19
Total Kjehldahl Nitrogen		0.86	<0.5	0.36	<0.5	<0.05	2.10
Ammonia		0.05	<0.1	0.04	<0.1	<0.04	1.30
Nitrate	10.0 MAC	8.73	9.24	1.81	0.39	0.60	1.77
Nitrite	1.0 MAC	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus		0.80	1.52	1.50	0.04	1.96	1.74
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002	0.022
Arsenic	0.01 MAC	0.0004	0.0004	<0.0002	<0.0002	0.0009	0.0013
Barium	1.0 MAC	0.0614	0.0575	0.0237	0.0164	0.397	0.289
Boron	5.0 IMAC	0.037	0.016	0.015	0.021	0.019	0.023
Cadmium	0.005 MAC	0.000012	0.000007	0.000006	0.000004	0.000013	<0.000003
Chromium	0.05 MAC	0.00070	0.00077	0.00054	0.00085	0.00020	0.00020
Copper	1 AO	0.0044	0.0026	0.0114	0.0035	0.0173	0.0008
Iron	0.3 AO	0.008	<0.01	0.018	<0.01	0.021	0.09
Lead	0.010 MAC	<0.00009	<0.001	<0.00009	<0.001	<0.00009	<0.001
Manganese	0.05 AO	0.0149	0.003	0.0030	<0.002	**0.257**	**0.065**
Mercury	0.001 MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Zinc	5.0 AO	0.002	<0.002	0.002	0.002	<0.002	<0.002
Total Suspended Solids		8760	291000	2640	77600	3300	66700
Biological Oxygen Demand		<4	<4	<4	<4	<4	7.0
Benzene (µg/L)	1 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	5 MAC, 1 AO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	50 MAC	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	60 MAC, 24 AO	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	1 MAC	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All units in mg/L unless otherwise noted
- ODWQS - Ontario Drinking Water Quality Standard (June 2003)
- Bold values indicate exceedance of ODWQS
- All units in mg/L unless otherwise noted
- µS/cm - microSiemens per centimetre
- ºC - degrees Celsius
- µg/L - micrograms per litre
- MAC - Maximum Acceptable Concentration
- IMAC - Interim Maximum Acceptable Concentration
- AO - Aesthetic Objective
- OG - Operational Guideline
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

APPENDIX

B-2 HISTORIC SURFACE WATER CHEMISTRY RESULTS

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Lakeside Landfill								
		LS-SW1			LS-SW2			LS-SW3		
		26-Mar-21	7-Oct-21	3-Apr-23	26-Mar-21	7-Oct-21	3-Apr-23	26-Mar-21	7-Oct-21	3-Apr-23
pH (field - pH units)		7.58		6.77	7.83	6.92	6.84	7.27	7.25	6.56
Conductivity (field - µS/cm)		112	D	215	153	142	68	200	116	75
Temperature (field - °C)		11.15	R	9.86	9.06	17.98	1.79	10.53	17.87	7.11
Dissolved Oxygen (field)	4-7 (temp dependent)	**4.45**	Y	7.85	5.33	5.39	5.35	**4.56**	**4.95**	5.26
Flow Rate (L/s)		no flow		no flow	no flow	no flow	no flow	no flow	no flo	no flow
pH (lab - pH units)	6.5 - 8.5	7.42		7.12	7.37	7.34	7.20	7.41	7.56	6.70
Conductivity (lab - µS/cm)		277		194	134	150	114	109	129	73
Total Dissolved Solids		209		143	57	60	57	71	160	46
Chemical Oxygen Demand		65		76	18	90	21	45	73	38
Biological Oxygen Demand		15		16	7	9	<4	6	8	5
Total Suspended Solids		66		27	18	53	41	16	16	16
Alkalinity	<75% background	107		71	**61**	60	**51**	**50**	56	**28**
Chloride		3		2	3	7	3	5	7	5
Sulphate		36		36	4	<20	4	<2	<20	<2
TKN		2.1		1.03	0.9	1.5	0.56	0.8	1.2	0.50
Ammonia		0.7		0.06	0.3	<0.1	0.11	<0.1	<0.1	0.06
Un-ionized Ammonia	0.02	0.005		<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate		2.29		<0.06	0.65	<0.06	0.56	0.10	<0.06	0.10
Nitrite		0.07		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus	0.03*	**1.33**		**0.507**	**0.108**	**0.421**	**0.143**	**0.101**	**0.293**	**0.118**
Phenols	0.001	**0.010**		<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001
Arsenic	0.005*	0.0009		0.0010	0.0005	0.0025	0.0003	0.0005	0.0013	0.0004
Barium		0.026		0.0186	0.015	0.018	0.00839	0.014	0.010	0.00564
Boron	0.200*	0.037		0.058	0.018	0.046	0.013	0.007	0.044	0.015
Cadmium	0.0001*	<0.0001		**0.000140**	<0.0001	<0.0001	**0.000104**	<0.0001	<0.0001	0.000035
Chromium	0.0089**	<0.003		0.00043	<0.003	<0.003	0.00039	<0.003	<0.003	0.00103
Copper	0.005	0.003		**0.0072**	0.002	0.002	0.0037	0.002	<0.001	0.0040
Iron	0.3	**1.02**		0.246	**0.62**	**1.44**	**0.572**	**0.61**	0.27	**0.882**
Lead	0.003*	0.0005		0.00031	0.0010	<0.001	0.00069	0.0014	<0.001	0.00019
Mercury	0.0002	<0.00001		0.00002	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	0.00001
Zinc	0.02*	0.013		0.019	0.010	0.015	0.012	<0.005	<0.005	0.004
Benzene (µg/L)	100*	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Thamesford Landfill				
		TF-SW1			TF-SW2	
		26-Mar-21	15-Oct-21	23-Mar-23	15-Oct-21	23-Mar-23
pH (field - pH units)		7.00	7.54	7.72	8.15	7.78
Conductivity (field - µS/cm)		567	761	445	769	379
Temperature (field - °C)		8.27	17.28	5.20	16.10	6.65
Dissolved Oxygen (field)	4-7 (temp dependent)	8.50	10.62	7.51	10.27	6.56
Flow Rate (L/s)		sheet flow	sheet flow	sheet flow	0.26	39
pH (lab - pH units)	6.5 - 8.5	8.12	7.86	7.99	8.16	7.94
Conductivity (lab - µS/cm)		441	817	449	844	381
Total Dissolved Solids		254	477	266	554	214
Chemical Oxygen Demand		24	12	10	9	<8
Biological Oxygen Demand		4	<4	<4	<4	<4
Total Suspended Solids		85	16	50	5	151
Alkalinity	<75% background	192	333	157	338	138
Chloride		24	58	31	60	24
Sulphate		13	28	18	30	11
TKN		0.6	0.9	1.54	0.7	0.56
Ammonia		<0.1	<0.1	<0.04	<0.1	<0.04
Un-ionized Ammonia	0.02	<0.001	<0.001	<0.001	<0.004	<0.001
Nitrate		2.17	5.31	7.24	5.63	3.72
Nitrite		0.03	<0.03	<0.03	<0.03	<0.03
Total Phosphorus	0.03*	**0.129**	**0.448**	**0.305**	**0.096**	**0.529**
Phenols	0.001	**0.003**	**0.002**	<0.001	**0.003**	<0.001
Arsenic	0.005*	0.0011	0.0007	0.0010	0.0004	0.0026
Barium		0.054	0.390	0.0313	0.042	0.0548
Boron	0.200*	0.024	0.037	0.024	0.039	0.025
Cadmium	0.0001*	<0.0001	<0.0001	0.00005	<0.0001	**0.00014**
Chromium	0.0089**	<0.003	<0.003	0.00229	<0.003	0.00808
Copper	0.005	0.005	0.003	**0.0067**	0.001	**0.0138**
Iron	0.3	**2.05**	**0.45**	**2.20**	0.06	**7.74**
Lead	0.003*	0.0017	<0.001	0.00224	<0.001	**0.00734**
Mercury	0.0002	<0.00001	<0.00001	<0.00001	<0.00001	0.00002
Zinc	0.02*	0.010	**0.224**	0.016	**0.037**	**0.040**
Benzene (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Blandford-Blenheim Landfill								
		BB-SW1			BB-SW2			BB-SW3		
		22-Mar-22	18-Oct-22	24-Mar-23	22-Mar-22	18-Oct-22	24-Mar-23	22-Mar-22	18-Oct-22	24-Mar-23
pH (field - pH units)		7.32		7.94	7.34		7.52	7.91		7.61
Conductivity (field - µS/cm)		174		353	278		513	501		415
Temperature (field - °C)		5.02	DRY	2.62	2.96	DRY	1.80	5.24	DRY	4.03
Dissolved Oxygen (field)	4-7 (temp dependent)	7.58		8.37	12.94		9.75	11.94		10.55
Flow Rate (L/s)		no flow		no flow	no flow		no flow	no flow		No Flow
pH (lab - pH units)	6.5 - 8.5	7.83	-	7.79	7.91	-	7.83	7.66	-	7.71
Conductivity (lab - µS/cm)		182	-	352	310	-	528	437	-	447
Total Dissolved Solids		100	-	211	166	-	320	306	-	243
Chemical Oxygen Demand		<8	-	10	28	-	14	25	-	22
Biological Oxygen Demand		<4	-	<4	4	-	<4	<4	-	<4
Total Suspended Solids		4	-	27	7	-	4	10	-	41
Alkalinity	<75% background	76	-	99	153	-	191	264	-	157
Chloride		11	-	38	6.5	-	24	13	-	43
Sulphate		2.0	-	8	2.2	-	63	5.0	-	36
TKN		<0.5	-	0.19	4.1	-	2.46	3.6	-	1.27
Ammonia		<0.1	-	<0.04	3.8	-	1.69	3.2	-	0.57
Un-ionized Ammonia	0.02	<0.001	-	<0.001	0.009	-	0.005	**0.033**	-	0.003
Nitrate		<0.03	-	4.40	<0.03	-	2.41	<0.03	-	0.12
Nitrite		<0.06	-	<0.03	0.76	-	0.10	0.07	-	<0.03
Total Phosphorus	0.03*	<0.03	-	**0.080**	<0.03	-	**0.032**	<0.03	-	**0.069**
Phenols	0.001	<0.002	-	<0.001	**0.002**	-	<0.001	<0.002	-	<0.001
Arsenic	0.005*	0.0003	-	0.0006	0.0003	-	0.0004	0.0006	-	0.0010
Barium		0.00911	-	0.0206	0.0219	-	0.0345	0.0445	-	0.0351
Boron	0.200*	0.006	-	0.009	0.055	-	**0.237**	0.078	-	0.115
Cadmium	0.0001*	0.000008	-	0.00002	0.000030	-	0.00001	0.000009	-	0.00003
Chromium	0.0089**	0.00026	-	0.00076	0.00037	-	0.00028	0.00024	-	0.00026
Copper	0.005	0.0021	-	0.0034	0.0029	-	0.0034	0.0008	-	**0.0068**
Iron	0.3	0.088	-	0.171	**1.26**	-	0.063	**1.41**	-	**2.53**
Lead	0.003*	0.00009	-	0.00054	0.00125	-	0.00017	0.00015	-	0.00098
Mercury	0.0002	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-	<0.00001
Zinc	0.02*	0.004	-	0.004	0.005	-	0.004	0.005	-	0.009
Benzene (µg/L)	100*	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
Dichloromethane (µg/L)	100*	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
Toluene (µg/L)	0.8*	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Gunn's Hill Landfill		
		GH-SEEP	GH-SW1	GH-SW2
pH (field - pH units)		No seeps were observed on February 15, March 22, March 30, July 13, October 17, or December 12, 2022. No seeps observed on April 6, April 17, or July 4, 2023.	-	-
Conductivity (field - µS/cm)			-	-
Temperature (field - °C)			-	-
Dissolved Oxygen (field)	4-7 (temp dependent)		-	-
Flow Rate (L/s)			-	-
pH (lab - pH units)	6.5 - 8.5	-	-	-
Conductivity (lab - µS/cm)		-	-	-
Total Dissolved Solids		-	-	-
Chemical Oxygen Demand		-	-	-
Biological Oxygen Demand		-	-	-
Total Suspended Solids		-	-	-
Alkalinity	<75% background	-	-	-
Chloride		-	-	-
Sulphate		-	-	-
TKN		-	-	-
Ammonia		-	-	-
Un-ionized Ammonia	0.02	-	-	-
Nitrate		-	-	-
Nitrite		-	-	-
Total Phosphorus	0.03*	-	-	-
Phenols	0.001	-	-	-
Arsenic	0.005*	-	-	-
Barium		-	-	-
Boron	0.200*	-	-	-
Cadmium	0.0001*	-	-	-
Chromium	0.0089**	-	-	-
Copper	0.005	-	-	-
Iron	0.3	-	-	-
Lead	0.003*	-	-	-
Mercury	0.0002	-	-	-
Zinc	0.02*	-	-	-
Benzene (µg/L)	100*	-	-	-
1,4 - Dichlorobenzene (µg/L)	4	-	-	-
Dichloromethane (µg/L)	100*	-	-	-
Toluene (µg/L)	0.8*	-	-	-
Vinyl Chloride (µg/L)	600*	-	-	-

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Tillsonburg Landfill							
		TB-SW1		TB-SW2		TB-SW3		TB-SW4	
		20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23	20-Mar-23	17-Oct-23
pH (field - pH units)		8.00	7.82	8.18	7.67	8.20	6.82	7.41	7.13
Conductivity (field - µS/cm)		518	656	529	670	338	784	1000	985
Temperature (field - °C)		2.91	11.18	3.02	11.26	9.00	11.00	3.93	11.75
Dissolved Oxygen (field)	4-7 (temp dependent)	10.20	12.30	7.98	11.54	5.31	4.21	6.75	10.32
Flow Rate (L/s)		>10,000	>10,000	>10,000	>10,000	2	1	1	1
pH (lab - pH units)	6.5 - 8.5	8.09	8.13	8.08	8.21	8.17	7.72	7.58	8.10
Conductivity (lab - µS/cm)		505	695	514	700	566	819	979	975
Total Dissolved Solids		377	429	369	394	391	537	666	620
Chemical Oxygen Demand		15	<8	12	9	10	12	25	21
Biological Oxygen Demand		<4	<4	<4	<4	<4	6	<4	<4
Total Suspended Solids		66	8	59	11	1670	6	74	42
Alkalinity	<75% background	167	226	168	224	296	399	554	506
Chloride		40	53	38	55	16	18	21	19
Sulphate		33	48	36	48	17	15	14	8
TKN		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.0	2.4
Ammonia		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.1	2.3
Un-ionized Ammonia	0.02	<0.001	<0.001	<0.002	<0.001	<0.003	<0.001	0.006	0.007
Nitrate		10.6	4.89	10.0	4.96	2.41	6.94	1.42	3.55
Nitrite		0.06	<0.03	0.06	<0.03	<0.03	0.22	<0.03	0.04
Total Phosphorus	0.03*	**0.181**	**0.054**	**0.170**	**0.057**	**0.585**	0.015	**0.150**	0.007
Phenols	0.001	<0.001	<0.001	<0.001	0.001	<0.001	**0.002**	<0.001	<0.001
Arsenic	0.005*	0.001	<0.001	0.0009	<0.001	0.0037	<0.001	**0.0066**	0.002
Barium		0.0443	0.045	0.0465	0.045	0.084	0.032	0.111	0.099
Boron	0.200*	0.027	0.037	0.028	0.038	0.021	0.014	**0.341**	**0.370**
Cadmium	0.0001*	<0.0001	<0.0001	<0.0001	<0.0001	**0.0004**	<0.0001	<0.0001	<0.0001
Chromium	0.0089**	<0.003	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.003
Copper	0.005	**0.010**	0.003	0.005	0.002	**0.023**	0.002	0.004	0.002
Iron	0.3	**2.01**	0.18	**1.93**	0.20	**11.0**	0.13	**15.0**	**2.10**
Lead	0.003*	0.001	<0.001	0.001	<0.001	**0.014**	<0.001	0.001	<0.001
Mercury	0.0002	<0.00001	<0.0001	<0.00001	<0.0001	0.0001	<0.0001	<0.00001	<0.0001
Zinc	0.02*	0.013	<0.005	0.012	<0.005	**0.061**	<0.005	0.008	<0.005
Benzene (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (µg/L)	100*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (µg/L)	0.8*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride (µg/L)	600*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

Table B-2: Historic Surface Water Chemistry Results
Oxford County Closed Landfill Sites

Parameter	PWQO	Tillsonburg Landfill			
		TB-SW5		TB-SW6	
		20-Mar-23	17-Oct-23	20-May-23	17-Oct-23
pH (field - pH units)		8.18	7.50		
Conductivity (field - µS/cm)		738	749		
Temperature (field - °C)		4.11	11.45	DRY	DRY
Dissolved Oxygen (field)	4-7 (temp dependent)	7.43	9.32		
Flow Rate (L/s)		20	3		
pH (lab - pH units)	6.5 - 8.5	8.17	8.07		
Conductivity (lab - µS/cm)		743	785		
Total Dissolved Solids		503	406		
Chemical Oxygen Demand		9	<8		
Biological Oxygen Demand		<4	<4		
Total Suspended Solids		11	27		
Alkalinity	<75% background	322	305		
Chloride		47	53		
Sulphate		43	41		
TKN		<0.5	0.5		
Ammonia		<0.1	<0.1		
Un-ionized Ammonia	0.02	<0.002	<0.001		
Nitrate		0.17	0.11		
Nitrite		<0.03	<0.03		
Total Phosphorus	0.03*	**0.042**	**0.037**		
Phenols	0.001	<0.001	<0.001		
Arsenic	0.005*	0.0008	<0.001		
Barium		0.115	0.140		
Boron	0.200*	**0.247**	0.177		
Cadmium	0.0001*	<0.0001	<0.0001		
Chromium	0.0089**	<0.003	<0.003		
Copper	0.005	0.002	0.002		
Iron	0.3	**1.00**	**0.89**		
Lead	0.003*	<0.001	<0.001		
Mercury	0.0002	<0.00001	<0.0001		
Zinc	0.02*	0.005	<0.005		
Benzene (µg/L)	100*	<0.5	<0.5		
1,4 - Dichlorobenzene (µg/L)	4	<0.5	<0.5		
Dichloromethane (µg/L)	100*	<0.5	<0.5		
Toluene (µg/L)	0.8*	<0.5	<0.5		
Vinyl Chloride (µg/L)	600*	<0.2	<0.2		

Notes:
- All concentrations are mg/L, unless otherwise noted.
- Un-ionized ammonia concentration calculated based on the fraction of NH_3 (f) in the total ammonia.
  where: f = 1/(10^{pKa-pH})+1)
  pKa=0.09018 + 2729.92/T
  T = ambient water temperature in Kelvin (K = C + 273.16)
- Bold values exceed the PWQO.
- PWQO - Provincial Water Quality Objectives (July 1994 with updates)
- * indicates an interim PWQO.
- ** indicates PWQO for Chromium III
- <value - parameter not detected above associated laboratory reported detection limit
- dry - sampling location dry at the time of sampling
- - or blank - parameter not analysed during sampling event

APPENDIX

B-3 *HISTORIC LANDFILL GAS MEASUREMENTS AND WATER LEVEL ELEVATIONS*

Table B-3
Historic Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Lakeside Landfill								
LS-GP1	4-Mar-21	0	0.00	368.45	DRY	<364.55	366.07	No
	20-Mar-21	0	0.00	368.45	DRY	<364.55	366.07	No
	15-Jul-21	0	0.00	368.45	DRY	<364.55	366.07	No
	7-Oct-21	0	0.00	368.45	DRY	<364.55	366.07	No
	10-Jan-22	0	0.00	368.45	DRY	<364.55	366.07	No
	15-Feb-22	0	0.00	368.45	DRY	<364.55	366.07	No
	8-Feb-23	0	0.00	368.45	DRY	<364.55	366.07	No
	3-Apr-23	0	0.00	368.45	DRY	<364.55	366.07	No
	4-Jul-23	0	0.00	368.45	DRY	<364.55	366.07	No
	4-Dec-23	0	0.00	368.45	DRY	<364.55	366.07	No
Embro Landfill								
EB-GP1	4-Mar-21	0	0.00	304.85	DRY	<301.06	302.58	No
	20-Mar-21	0	0.00	304.85	DRY	<301.06	302.58	No
	15-Jul-21	0	0.00	304.85	3.47	301.38	302.58	No
	7-Oct-21	0	0.00	304.85	3.42	301.43	302.58	No
	10-Jan-22	0	0.00	304.85	3.51	301.34	302.58	No
	15-Feb-22	0	0.00	304.85	3.32	301.53	302.58	No
	8-Feb-23	0	0.00	304.85	3.24	301.61	302.58	No
	6-Apr-23	0	0.00	304.85	2.48	302.37	302.58	No
	4-Jul-23	0	0.00	304.85	3.32	301.53	302.58	No
	4-Dec-23	0	0.00	304.85	3.18	301.67	302.58	No
EB-GP2	4-Mar-21	0	0.00	302.98	DRY	<299.10	300.62	No
	20-Mar-21	0	0.00	302.98	DRY	<299.10	300.62	No
	15-Jul-21	0	0.00	302.98	2.62	300.36	300.62	No
	7-Oct-21	0	0.00	302.98	2.57	300.41	300.62	No
	10-Jan-22	0	0.00	302.98	2.65	300.33	300.62	No
	15-Feb-22	0	0.00	302.98	2.14	300.84	300.62	Yes
	8-Feb-23	0	0.00	302.98	2.20	300.78	300.62	Yes
	6-Apr-23	0	0.00	302.98	1.68	301.30	300.62	Yes
	4-Jul-23	0	0.00	302.98	2.44	300.54	300.62	No
	4-Dec-23	0	0.00	302.98	2.29	300.69	300.62	Yes
EB-GP3	4-Mar-21	0	0.00	301.09	DRY	<297.30	298.82	No
	20-Mar-21	0	0.00	301.09	DRY	<297.30	298.82	No
	15-Jul-21	0	0.00	301.09	DRY	<297.30	298.82	No
	7-Oct-21	0	0.00	301.09	DRY	<297.30	298.82	No
	10-Jan-22	0	0.00	301.09	DRY	<297.30	298.82	No
	15-Feb-22	0	0.00	301.09	DRY	<297.30	298.82	No
	8-Feb-23	0	0.00	301.09	3.58	297.51	298.82	No
	6-Apr-23	0	0.00	301.09	3.06	298.03	298.82	No
	4-Jul-23	0	0.00	301.09	3.60	297.49	298.82	No
	4-Dec-23	0	0.00	301.09	3.51	297.58	298.82	No

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table B-3
Historic Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Thamesford Landfill								
TF-GP2	3-Mar-21	0	0.00	275.99	2.85	273.14	273.39	No
	20-Mar-21	0	0.00	275.99	2.95	273.04	273.39	No
	14-Apr-21	-	-	275.99	2.91	273.08	273.39	No
	15-Jul-21	0	0.00	275.99	3.13	272.86	273.39	No
	7-Oct-21	0	0.00	275.99	2.93	273.06	273.39	No
	10-Jan-22	0	0.00	275.99	2.90	273.09	273.39	No
	15-Feb-22	0	0.00	275.99	3.07	272.92	273.39	No
	8-Feb-23	0	0.00	275.99	3.12	272.87	273.39	No
	4-Apr-23	0	0.00	275.99	2.60	273.39	273.39	No
	4-Jul-23	0	0.00	275.99	3.15	272.84	273.39	No
	4-Dec-23	0	0.00	275.99	2.97	273.02	273.39	No
TF-MW1	3-Mar-21	0	0.00	277.44	1.92	275.52	275.26	Yes
	26-Mar-21	0	0.00	277.44	1.45	275.99	275.26	Yes
	14-Apr-21	-	-	277.44	1.52	275.92	275.26	Yes
	15-Jul-21	0	0.00	277.44	2.10	275.34	275.26	Yes
	7-Oct-21	0	0.00	277.44	1.79	275.65	275.26	Yes
	10-Jan-22	0	0.00	277.44	1.73	275.71	275.26	Yes
	15-Feb-22	0	0.00	277.44	2.20	275.24	275.26	No
	8-Feb-23	0	0.00	277.44	1.99	275.45	275.26	Yes
	4-Apr-23	0	0.00	277.44	1.08	276.36	275.26	Yes
	4-Jul-23	0	0.00	277.44	2.49	274.95	275.26	No
	4-Dec-23	0	0.00	277.44	1.98	275.46	275.26	Yes
TF-MW2	3-Mar-21	0	0.00	273.66	1.17	272.49	271.18	Yes
	26-Mar-21	0	0.00	273.66	0.99	272.67	271.18	Yes
	14-Apr-21	-	-	273.66	1.16	272.50	271.18	Yes
	15-Jul-21	0	0.00	273.66	1.42	272.24	271.18	Yes
	7-Oct-21	0	0.00	273.66	1.20	272.46	271.18	Yes
	10-Jan-22	0	0.00	273.66	1.25	272.41	271.18	Yes
	15-Feb-22	0	0.00	273.66	1.23	272.43	271.18	Yes
	8-Feb-23	0	0.00	273.66	1.20	272.46	271.18	Yes
	4-Apr-23	0	0.00	273.66	1.05	272.61	271.18	Yes
	4-Jul-23	0	0.00	273.66	1.35	272.31	271.18	Yes
	4-Dec-23	0	0.00	273.66	1.16	272.50	271.18	Yes
TF-MW3	3-Mar-21	0	0.00	273.49	2.25	271.24	269.77	Yes
	26-Mar-21	0	0.00	273.49	1.32	272.17	269.77	Yes
	14-Apr-21	-	-	273.49	1.42	272.07	269.77	Yes
	15-Jul-21	0	0.00	273.49	1.51	271.98	269.77	Yes
	7-Oct-21	0	0.00	273.49	1.41	272.08	269.77	Yes
	10-Jan-22	0	0.00	273.49	1.47	272.02	269.77	Yes
	15-Feb-22	0	0.00	273.49	1.45	272.04	269.77	Yes
	8-Feb-23	0	0.00	273.49	1.50	271.99	269.77	Yes
	4-Apr-23	0	0.00	273.49	1.26	272.23	269.77	Yes
	4-Jul-23	0	0.00	273.49	1.55	271.94	269.77	Yes
	4-Dec-23	0	0.00	273.49	1.38	272.11	269.77	Yes

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table B-3
Historic Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Blandford-Blenheim Landfill								
BB-GP1	15-Feb-22	0	0.00	304.95	4.24	300.71	302.68	No
	13-Jul-22	0	0.00	304.95	4.18	300.77	302.68	No
	18-Oct-22	0	0.00	304.95	4.84	300.11	302.68	No
	12-Dec-22	0	0.00	304.95	5.08	299.87	302.68	No
	8-Feb-23	0	0.00	304.95	4.99	299.96	302.68	No
	4-Apr-23	0	0.00	304.95	4.32	300.63	302.68	No
	4-Jul-23	0	0.00	304.95	4.90	300.05	302.68	No
	4-Dec-23	0	0.00	304.95	4.71	300.24	302.68	No
BB-MW1	15-Feb-22	0	0.00	300.08	2.41	297.67	293.55	Yes
	11-Apr-22	-	-	300.08	2.36	297.72	293.55	Yes
	13-Jul-22	0	0.00	300.08	2.47	297.61	293.55	Yes
	18-Oct-22	0	0.00	300.08	2.93	297.15	293.55	Yes
	12-Dec-22	0	0.00	300.08	2.71	297.37	293.55	Yes
	8-Feb-23	0	0.00	300.08	2.56	297.52	293.55	Yes
	4-Apr-23	0	0.00	300.08	2.27	297.81	293.55	Yes
	4-Jul-23	0	0.00	300.08	2.48	297.60	293.55	Yes
	4-Dec-23	0	0.00	300.08	2.30	297.78	293.55	Yes
BB-MW2	15-Feb-22	0	0.00	303.88	4.40	299.48	296.52	Yes
	11-Apr-22	-	-	303.88	3.99	299.89	296.52	Yes
	13-Jul-22	0	0.00	303.88	4.43	299.45	296.52	Yes
	18-Oct-22	0	0.00	303.88	4.94	298.94	296.52	Yes
	12-Dec-22	0	0.00	303.88	5.03	298.85	296.52	Yes
	8-Feb-23	0	0.00	303.88	4.90	298.98	296.52	Yes
	4-Apr-23	0	0.00	303.88	4.26	299.62	296.52	Yes
	4-Jul-23	0	0.00	303.88	4.82	299.06	296.52	Yes
	4-Dec-23	0	0.00	303.88	4.69	299.19	296.52	Yes
BB-MW3	15-Feb-22	0	0.00	305.22	4.52	300.70	298.02	Yes
	11-Apr-22	-	-	305.22	4.07	301.15	298.02	Yes
	13-Jul-22	0	0.00	305.22	4.56	300.66	298.02	Yes
	18-Oct-22	0	0.00	305.22	5.20	300.02	298.02	Yes
	12-Dec-22	0	0.00	305.22	5.42	299.80	298.02	Yes
	8-Feb-23	0	0.00	305.22	5.34	299.88	298.02	Yes
	4-Apr-23	0	0.00	305.22	4.67	300.55	298.02	Yes
	4-Jul-23	0	0.00	305.22	5.20	300.02	298.02	Yes
	4-Dec-23	0	0.00	305.22	5.00	300.22	298.02	Yes

Notes:
LEL - Lower Explosive Limit for methane in air
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masl - metres above sea level
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NA - not applicable

Table B-3
Historic Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Blandford-Blenheim Landfill								
BB-BH1-1	15-Feb-22	0	0.00	303.52	4.75	298.77	N/A	N/A
	11-Apr-22	-	-	303.52	5.94	297.58	N/A	N/A
	13-Jul-22	0	0.00	303.52	4.47	299.05	N/A	N/A
	18-Oct-22	0	0.00	303.52	6.58	296.94	N/A	N/A
	12-Dec-22	0	0.00	303.52	4.90	298.62	N/A	N/A
	8-Feb-23	0	0.00	303.52	4.98	298.54	N/A	N/A
	4-Apr-23	0	0.00	303.52	4.99	298.53	N/A	N/A
	4-Jul-23	0	0.00	303.52	4.98	298.54	N/A	N/A
	4-Dec-23	0	0.00	303.52	4.98	298.54	N/A	N/A
BB-BH1-2	15-Feb-22	0	0.00	303.50	4.36	299.14	N/A	N/A
	11-Apr-22	-	-	303.50	4.10	299.40	N/A	N/A
	13-Jul-22	0	0.00	303.50	4.16	299.34	N/A	N/A
	18-Oct-22	0	0.00	303.50	4.51	298.99	N/A	N/A
	12-Dec-22	0	0.00	303.50	4.41	299.09	N/A	N/A
	8-Feb-23	0	0.00	303.50	4.67	298.83	N/A	N/A
	4-Apr-23	0	0.00	303.50	3.95	299.55	N/A	N/A
	4-Jul-23	0	0.00	303.50	4.56	298.94	N/A	N/A
	4-Dec-23	0	0.00	303.50	4.35	299.15	N/A	N/A
Gunn's Hill Landfill								
GH-GP1	15-Feb-22	0	0.00	320.51	2.08	318.43	318.67	No
	13-Jul-22	0	0.00	320.51	2.55	317.96	318.67	No
	17-Oct-22	0	0.00	320.51	2.57	317.94	318.67	No
	12-Dec-22	0	0.00	320.51	2.62	317.89	318.67	No
	8-Feb-23	0	0.00	320.51	1.56	318.95	318.67	Yes
	6-Apr-23	0	0.00	320.51	1.03	319.48	318.67	Yes
	4-Jul-23	0	0.00	320.51	2.25	318.26	318.67	No
	4-Dec-23	0	0.00	320.51	2.00	318.51	318.67	No
GH-GP2	15-Feb-22	0	0.00	313.54	DRY	<309.52	311.66	No
	13-Jul-22	0	0.00	313.54	DRY	<309.52	311.66	No
	17-Oct-22	0	0.00	313.54	DRY	<309.52	311.66	No
	12-Dec-22	0	0.00	313.54	DRY	<309.52	311.66	No
	8-Feb-23	0	0.00	313.54	DRY	<309.52	311.66	No
	6-Apr-23	0	0.00	313.54	3.75	309.79	311.66	No
	4-Jul-23	0	0.00	313.54	3.73	309.81	311.66	No
	4-Dec-23	0	0.00	313.54	3.55	309.99	311.66	No

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

Table B-3
Historic Landfill Gas Measurements and Water Level Elevations
Oxford County Closed Landfills

Well ID	Date	% LEL	Relative Pressure (in H20)	Measuring Point (masl)	Water Level (mbMP)	Groundwater Elevation (masl)	Top of Screen Elevation (masl)	Well Screen Submerged
Otterville Landfill								
OT-MW1	21-Feb-23	-	-	251.54	7.75	243.79	243.44	Yes
	5-Apr-23	0	0.00	251.54	7.20	244.34	243.44	Yes
	17-Oct-23	0	0.00	251.54	7.44	244.10	243.44	Yes
OT-MW2	21-Feb-23	-	-	251.74	7.08	244.66	243.85	Yes
	5-Apr-23	0	0.00	251.74	6.62	245.12	243.85	Yes
	17-Oct-23	0	0.00	251.74	6.79	244.95	243.85	Yes
OT-MW3	22-Feb-23	-	-	255.64	10.18	245.46	245.81	No
	5-Apr-23	0	0.00	255.64	9.62	246.02	245.81	Yes
	17-Oct-23	0	0.00	255.64	9.99	245.65	245.81	No

Notes:
LEL - Lower Explosive Limit for methane in air
in H20 - inches of water
masl - metres above sea level
mbMP - metres below measuring point (top of pipe)
NA - not applicable

APPENDIX

C

LABORATORY CERTIFICATES OF ANALYSIS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10, Windsor
Canada, N8W 5V7
Phone: 905-687-1771 x 240, Fax:

Project : 191-06761-03-100-1003, Tillsonburg Landfill Site SW

28-March-2023

Date Rec. : 21 March 2023
LR Report: **CA40210-MAR23**
Reference: 191-06761-100-1003, Albert Siertsema

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: SW1	7: SW2	8: SW3	9: SW4	10: SW5	11: SWDUP	12: Trip Blank
Sample Date & Time				20-Mar-23 12:15	20-Mar-23 11:15	20-Mar-23 10:00	20-Mar-23 10:30	20-Mar-23 11:00	20-Mar-23	20-Mar-23
Temp Upon Receipt [°C]	***	***	***	***	***	***	***	***	***	***
BOD5 [mg/L]	22-Mar-23	27-Mar-23	2	< 4	< 4	< 4	< 4	< 4	< 4	---
pH [No unit]	23-Mar-23	24-Mar-23	0.05	8.09	8.08	8.17	7.58	8.17	8.10	---
Conductivity [uS/cm]	23-Mar-23	24-Mar-23	2	505	514	566	979	743	508	---
TDS [mg/L]	22-Mar-23	23-Mar-23	30	377	369	391	666	503	354	---
TSS [mg/L]	22-Mar-23	23-Mar-23	2	66	59	1670	74	11	69	---
Hardness [mg/L as CaCO3]	27-Mar-23	28-Mar-23	0.05	253	258	363	558	370	254	---
Alkalinity [mg/L as CaCO3]	23-Mar-23	24-Mar-23	2	167	168	296	554	322	158	---
Cl [mg/L]	23-Mar-23	23-Mar-23	1	40	38	16	21	47	38	---
SO4 [mg/L]	23-Mar-23	23-Mar-23	2	33	36	17	14	43	35	---
NO2 [as N mg/L]	22-Mar-23	28-Mar-23	0.03	0.06	0.06	< 0.03	< 0.03	< 0.03	0.06	---
NO3 [as N mg/L]	22-Mar-23	28-Mar-23	0.06	10.6	10.0	2.41	1.42	0.17	10.6	---
NO2+NO3 [as N mg/L]	22-Mar-23	28-Mar-23	0.06	10.6	10.1	2.41	1.42	0.17	10.6	---
NH3+NH4 [as N mg/L]	22-Mar-23	23-Mar-23	0.1	< 0.1	< 0.1	< 0.1	2.1	< 0.1	< 0.1	---
TKN [as N mg/L]	22-Mar-23	23-Mar-23	0.5	< 0.5	< 0.5	< 0.5	3.0	< 0.5	0.8	---
4AAP-Phenolics [mg/L]	23-Mar-23	24-Mar-23	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---
Hg (diss) [mg/L]	24-Mar-23	27-Mar-23	0.00001	< 0.00001	< 0.00001	0.00010	< 0.00001	< 0.00001	< 0.00001	---
P (tot) [mg/L]	27-Mar-23	28-Mar-23	0.003	0.181	0.170	0.585	0.150	0.042	0.186	---
COD [mg/L]	23-Mar-23	27-Mar-23	8	15	12	10	25	9	18	---

OnLine LIMS

00032799996

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : 191-06761-03-100-1003, Tillsonburg Landfill Site SW
LR Report : CA10210-MAR23

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: SW1	7: SW2	8: SW3	9: SW4	10: SW5	11: SWDUP	12: Trip Blank
As (tot) [mg/L]	27-Mar-23	28-Mar-23	0.002	0.0010	0.0009	0.0037	0.0066	0.0008	0.0010	---
Ba (tot) [mg/L]	27-Mar-23	28-Mar-23	0.002	0.0443	0.0465	0.0840	0.111	0.115	0.0442	---
B (tot) [mg/L]	27-Mar-23	28-Mar-23	0.002	0.027	0.028	0.021	0.341	0.247	0.029	---
Cd (tot) [mg/L]	27-Mar-23	28-Mar-23	0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	---
Cr (tot) [mg/L]	27-Mar-23	28-Mar-23	0.003	< 0.003	< 0.003	0.014	< 0.003	< 0.003	< 0.003	---
Cu (tot) [mg/L]	27-Mar-23	28-Mar-23	0.001	0.010	0.005	0.023	0.004	0.002	0.005	---
Fe (tot) [mg/L]	27-Mar-23	28-Mar-23	0.01	2.01	1.93	11.0	15.0	1.00	1.98	---
Zn (tot) [mg/L]	27-Mar-23	28-Mar-23	0.005	0.013	0.012	0.061	0.008	0.005	0.011	---
Pb (tot) [mg/L]	27-Mar-23	28-Mar-23	0.00001	0.001	0.001	0.014	0.001	< 0.001	0.001	---
Benzene [ug/L]	22-Mar-23	23-Mar-23	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	---	< 0.5
1,4-Dichlorobenzene [µg/L]	22-Mar-23	23-Mar-23	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	---	< 0.5
Dichloromethane [µg/L]	22-Mar-23	23-Mar-23	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	---	< 0.5
Toluene [ug/L]	22-Mar-23	23-Mar-23	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	---	< 0.5
Vinyl Chloride [µg/L]	22-Mar-23	23-Mar-23	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	---	< 0.2

PWQO - Provincial Water Quality Objectives
Limits based on MOE PIBS 3303E publication July 1994 reprinted February 1999
a PWQO limit based on pH >6.5-9.0 (at pH 4.5-5.5 PWQO = 15ug/L, pH >5.5-6.5 PWQO 10% above background levels in geological area.
b PWQO limit based on Hardness <75 mg/L (For Hardness >75 mg/L PWQO = 1100 ug/L)
c PWQO limit based on Hardness 0-100 mg/L(For Hardness >100 mg/L PWQO = 0.5 ug/L)
d PWQO limit based on Cr VI (PWQO limit for Cr III = 8.9 ug/L)
e PWQO limit based on Hardness 0-20 (For Hardness >20 mg/L PWQO = 5 ug/L)
f PWQO limit based on Hardness <30 (For Hardness 30-80 PWQO = 3 ug/L, & >80 PWQO=5)

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar - surface waters	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Parameter	Description	SGS Method Code
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (total)	Asby ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Barium (total)	Ba by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (total)	B by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (total)	Cd by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (total)	Cr by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (total)	Cu by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Hardness	Hardness (CaCO3) by ICP-MS	ME-CA-[ENV]SPE-LAK-AN-006
Iron (total)	Fe by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Lead (total)	Pb by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrate + Nitrite (as N)	Total Nitrate/Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	P by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen	Tot. kjeldahl Nitrogen by Skalar	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (total)	Zn by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006

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Phone: 705-652-2000 FAX: 705-652-6365

Project : 191-06761-03-100-1003, Tillsonburg Landfill Site SW
LR Report : CA10210-MAR23

Jill Campbell, B.Sc.,GISAS
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003279996

SGS Canada Inc.
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Project : 191-06761-03-100-1003, Tillsonburg Landfill Site SW
LR Report : CA10210-MAR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0283-MAR23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	94	60	130	97	50	140	
Benzene	0.5	ug/L	<0.5			ND	30	97	60	130	100	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	95	60	130	100	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	97	60	130	99	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	99	50	140	100	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0396-MAR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	102	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0195-MAR23														
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			1	10	101	90	110	97	75	125	
Anions by discrete analyzer - QCBatchID: DIO5101-MAR23														
Chloride	1	mg/L	<1			ND	20	105	80	120	116	75	125	
Sulphate	2	mg/L	<2			ND	20	108	80	120	111	75	125	
Anions by IC - QCBatchID: DIO0499-MAR23														
Nitrate (as N)	0.06	mg/L	<0.06			0	20	104	90	110	103	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			1	20	98	90	110	100	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0046-MAR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			4	30	103	70	130	88	70	130	
Chemical Oxygen Demand - QCBatchID: EWL0403-MAR23														
Chemical Oxygen Demand	8	mg/L	<8			4	20	106	80	120	110	75	125	
Conductivity - QCBatchID: EWL0396-MAR23														
Conductivity	2	uS/cm	< 2			3	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0035-MAR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	97	80	120	120	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0161-MAR23														
Arsenic (total)	0.0002	mg/L	<0.0002			10	20	104	90	110	106	70	130	
Barium (total)	0.00008	mg/L	<0.00002			5	20	99	90	110	100	70	130	
Boron (total)	0.002	mg/L	<0.002			8	20	105	90	110	109	70	130	
Cadmium (total)	0.0001	mg/L	<0.000003			0	20	107	90	110	88	70	130	
Chromium (total)	0.003	mg/L	<0.00008			9	20	100	90	110	108	70	130	

SGS Canada Inc.
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Project : 191-06761-03-100-1003, Tillsonburg Landfill Site SW
LR Report : CA10210-MAR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Copper (total)	0.001	mg/L	<0.0002			4	20	102	90	110	95	70	130
Iron (total)	0.01	mg/L	<0.007			2	20	107	90	110	125	70	130
Lead (total)	0.001	mg/L	<0.00001			7	20	101	90	110	97	70	130
Phosphorus (total)	0.003	mg/L	<0.003			0	20	100	90	110	NV	70	130
Zinc (total)	0.005	mg/L	<0.002			2	20	103	90	110	101	70	130
pH - QCBatchID: EWL0396-MAR23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0198-MAR23													
4AAP-Phenolics	0.001	mg/L	<0.001			ND	10	105	80	120	98	75	125
Solids Analysis - QCBatchID: EWL0377-MAR23													
Total Dissolved Solids	30	mg/L	<30			1	20	95	80	120	NA		
Suspended Solids - QCBatchID: EWL0383-MAR23													
Total Suspended Solids	2	mg/L	< 2			0	10	98	90	110	NA		
Suspended Solids - QCBatchID: EWL0386-MAR23													
Total Suspended Solids	2	mg/L	< 2			3	10	97	90	110	NA		
Total Nitrogen - QCBatchID: SKA0191-MAR23													
Total Kjeldahl Nitrogen	0.5	as N mg/L	<0.5			5	10	100	90	110	108	75	125

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Project : 191-06761-03-100-1003,
Thamesford Landfill Site - SW

03-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10
Windsor, ON
N8W 5V7, Canada

Phone: 905-687-1771 x 240
Fax:

Date Rec. : 24 March 2023
LR Report: **CA14621-MAR23**
Reference: PO#:191-06761-03-100-1003, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	6: TF-SW1	7: TF-SW2	8: Trip Blank
Sample Date & Time			23-Mar-23 12:00	23-Mar-23 12:45	23-Mar-23
Temp Upon Receipt [@ London Lab °C]	***	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***	***
BOD5 [mg/L]	03-Apr-23	09:56	< 4	< 4	---
TSS [mg/L]	29-Mar-23	13:40	50	151	---
Alkalinity [mg/L as CaCO3]	28-Mar-23	09:57	157	138	---
pH [No unit]	28-Mar-23	09:57	7.99	7.94	---
Conductivity [uS/cm]	28-Mar-23	09:57	449	381	---
TDS [mg/L]	28-Mar-23	14:51	266	214	---
COD [mg/L]	31-Mar-23	16:45	10	< 8	---
TKN [as N mg/L]	28-Mar-23	09:53	1.54	0.56	---
NH3+NH4 [as N mg/L]	28-Mar-23	10:18	< 0.04	< 0.04	---
4AAP-Phenolics [mg/L]	28-Mar-23	08:36	< 0.001	< 0.001	---
SO4 [mg/L]	29-Mar-23	14:04	18	11	---
Cl [mg/L]	29-Mar-23	14:04	31	24	---
NO2 [as N mg/L]	30-Mar-23	09:25	< 0.03	< 0.03	---
NO3 [as N mg/L]	30-Mar-23	09:25	7.24	3.72	---
NO2+NO3 [as N mg/L]	30-Mar-23	09:25	7.24	3.72	---
Hg (diss) [mg/L]	30-Mar-23	09:27	< 0.00001	0.00002	---
As (tot) [mg/L]	31-Mar-23	11:08	0.0010	0.0026	---
Ba (tot) [mg/L]	31-Mar-23	11:08	0.0313	0.0548	---
B (tot) [mg/L]	31-Mar-23	11:08	0.024	0.025	---
Cd (tot) [mg/L]	31-Mar-23	11:08	0.000045	0.000138	---
Cr (tot) [mg/L]	31-Mar-23	11:08	0.00229	0.00808	---
Cu (tot) [mg/L]	31-Mar-23	11:08	0.0067	0.0138	---
Fe (tot) [mg/L]	31-Mar-23	11:08	2.20	7.74	---
Pb (tot) [mg/L]	31-Mar-23	11:08	0.00224	0.00734	---
P (tot) [mg/L]	31-Mar-23	11:08	0.305	0.529	---
Zn (tot) [mg/L]	31-Mar-23	11:08	0.016	0.040	---

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Project : 191-06761-03-100-1003, Thamesford Landfill Site - SW
LR Report : CA14621-MAR23

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	6: TF-SW1	7: TF-SW2	8: Trip Blank
Benzene [µg/L]	28-Mar-23	14:24	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	28-Mar-23	14:24	< 0.5	< 0.5	< 0.5
Dichloromethane [µg/L]	28-Mar-23	14:24	< 0.5	< 0.5	< 0.5
Toluene [µg/L]	28-Mar-23	14:24	< 0.5	< 0.5	< 0.5
Trichloroethylene [µg/L]	28-Mar-23	14:24	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	28-Mar-23	14:24	< 0.2	< 0.2	< 0.2

Temperature of Sample upon Receipt: 10 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Method Descriptions

Units	Description	SGS Method Code
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	phenol by Skalar - surface waters	ME-CA-[ENV]SFA-LAK-AN-006
mg/L as CaCO3	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
mg/L	Asby ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ba by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
mg/L	B by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cd by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
mg/L	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
mg/L	Cr by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
uS/cm	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Cu by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Fe by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Pb by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
mg/L	Nitrate by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Total Nitrate/Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Nitrite by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
No unit	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	P by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
mg/L	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
mg/L	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Zn by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006

Maarit Wolfe, Hon.B.Sc

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Project : 191-06761-03-100-1003, Thamesford Landfill Site - SW
LR Report : CA14621-MAR23

Project Specialist,
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Project : 191-06761-03-100-1003, Thamesford Landfill Site - SW
LR Report : CA14821-MAR23

Quality Control Report

Organic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Volatile Organics - QCBatchID: GCM0344-MAR23													
1,4-Dichlorobenzene	0.5	µg/L	<0.5			ND	30	101	60	130	98	50	140
Benzene	0.5	µg/L	<0.5			ND	30	103	60	130	100	50	140
Dichloromethane	0.5	µg/L	<0.5			ND	30	100	60	130	97	50	140
Toluene	0.5	µg/L	<0.5			ND	30	104	60	130	101	50	140
Trichloroethylene	0.5	µg/L	<0.5			ND	30	103	60	130	100	50	140
Vinyl Chloride	0.2	µg/L	<0.2			ND	30	98	50	140	97	50	140

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Alkalinity - QCBatchID: EWL0469-MAR23													
Alkalinity	2	mg/L as Ca	< 2			4	20	100	80	120	NA		
Ammonia by SFA - QCBatchID: SKA0228-MAR23													
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	100	75	125
Anions by discrete analyzer - QCBatchID: DIO5114-MAR23													
Chloride	1	mg/L	<1			17	20	107	80	120	88	75	125
Sulphate	2	mg/L	<2			2	20	106	80	120	88	75	125
Anions by IC - QCBatchID: DIO0575-MAR23													
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	100	90	110	100	75	125
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA		
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	99	90	110	100	75	125
Biochemical Oxygen Demand - QCBatchID: BOD0053-MAR23													
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			2	30	96	70	130	97	70	130
Chemical Oxygen Demand - QCBatchID: EWL0453-MAR23													
Chemical Oxygen Demand	8	mg/L	<8			ND	20	92	80	120	82	75	125
Conductivity - QCBatchID: EWL0469-MAR23													
Conductivity	2	uS/cm	< 2			1	20	100	90	110	NA		
Mercury by CVAAS - QCBatchID: EHG0040-MAR23													
Mercury (dissolved)	0.00001	mg/L	< 0.00001			0	20	109	80	120	96	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0194-MAR23													
Arsenic (total)	0.0002	mg/L	<0.0002			3	20	104	90	110	NV	70	130
Barium (total)	0.00008	mg/L	<0.00002			0	20	100	90	110	NV	70	130
Boron (total)	0.002	mg/L	<0.002			2	20	108	90	110	99	70	130
Cadmium (total)	0.000003	mg/L	<0.000003			5	20	105	90	110	NV	70	130

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Project : 191-06761-03-100-1003, Thamesford Landfill Site - SW
LR Report : CA14821-MAR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Chromium (total)	0.00008	mg/L	<0.00008			8	20	102	90	110	NV	70	130
Copper (total)	0.0002	mg/L	<0.0002			1	20	100	90	110	NV	70	130
Iron (total)	0.007	mg/L	<0.007			8	20	107	90	110	NV	70	130
Lead (total)	0.00009	mg/L	<0.00009			4	20	107	90	110	NV	70	130
Phosphorus (total)	0.003	mg/L	<0.003			5	20	103	90	110	NV	70	130
Zinc (total)	0.002	mg/L	<0.002			3	20	102	90	110	NV	70	130
pH - QCBatchID: EWL0469-MAR23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0230-MAR23													
4AAP-Phenolics	0.001	mg/L	<0.001			ND	10	102	80	120	86	75	125
Solids Analysis - QCBatchID: EWL0473-MAR23													
Total Dissolved Solids	30	mg/L	<30			1	20	100	80	120	NA		
Suspended Solids - QCBatchID: EWL0489-MAR23													
Total Suspended Solids	2	mg/L	< 2			0	10	99	90	110	NA		
Total Nitrogen - QCBatchID: SKA0229-MAR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			ND	10	100	90	110	98	75	125

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site SW

03-April-2023

WSP Canada Inc.
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Date Rec. : 24 March 2023
LR Report: **CA14629-MAR23**
Reference: 191-06761-03-100-1003, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	6: BB-SW1	7: BB-SW2
Sample Date & Time			24-Mar-23 10:00	24-Mar-23 09:30
Temp Upon Receipt [@ London Lab °C]	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***
BOD5 [mg/L]	03-Apr-23	09:57	< 4	< 4
TSS [mg/L]	29-Mar-23	13:40	27	4
Alkalinity [mg/L as CaCO3]	28-Mar-23	09:58	99	191
pH [No unit]	28-Mar-23	09:58	7.79	7.83
Conductivity [uS/cm]	28-Mar-23	09:58	352	528
TDS [mg/L]	28-Mar-23	14:51	211	320
COD [mg/L]	31-Mar-23	16:44	10	14
TKN [as N mg/L]	30-Mar-23	14:35	0.19	2.46
NH3+NH4 [as N mg/L]	29-Mar-23	11:37	< 0.04	1.69
4AAP-Phenolics [mg/L]	28-Mar-23	08:38	< 0.001	< 0.001
SO4 [mg/L]	29-Mar-23	14:04	8	63
Cl [mg/L]	29-Mar-23	14:04	38	24
NO2 [as N mg/L]	30-Mar-23	09:26	< 0.03	0.10
NO3 [as N mg/L]	30-Mar-23	09:26	4.40	2.41
NO2+NO3 [as N mg/L]	30-Mar-23	09:26	4.40	2.51
Hg (diss) [mg/L]	30-Mar-23	09:27	< 0.00001	< 0.00001
As (tot) [mg/L]	31-Mar-23	11:09	0.0006	0.0004
Ba (tot) [mg/L]	31-Mar-23	11:09	0.0206	0.0345
B (tot) [mg/L]	31-Mar-23	11:09	0.009	0.237
Cd (tot) [mg/L]	31-Mar-23	11:09	0.000023	0.000012
Cr (tot) [mg/L]	31-Mar-23	11:09	0.00076	0.00028
Cu (tot) [mg/L]	31-Mar-23	11:09	0.0034	0.0034
Fe (tot) [mg/L]	31-Mar-23	11:09	0.171	0.063
Pb (tot) [mg/L]	31-Mar-23	11:09	0.00054	0.00017
P (tot) [mg/L]	31-Mar-23	11:09	0.080	0.032
Zn (tot) [mg/L]	31-Mar-23	11:09	0.004	0.004
Benzene [µg/L]	28-Mar-23	14:23	< 0.5	< 0.5

OnLine LIMS

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site SW
LR Report : CA14629-MAR23

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	6: BB-SW1	7: BB-SW2
1,4-Dichlorobenzene [µg/L]	28-Mar-23	14:23	< 0.5	< 0.5
Dichloromethane [µg/L]	28-Mar-23	14:23	< 0.5	< 0.5
Toluene [µg/L]	28-Mar-23	14:23	< 0.5	< 0.5
Vinyl Chloride [µg/L]	28-Mar-23	14:23	< 0.2	< 0.2

Analysis	8: BB-SW3	9: Trip Blank
Sample Date & Time	24-Mar-23 10:30	24-Mar-23
Temp Upon Receipt [@ London Lab °C]	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***
BOD5 [mg/L]	< 4	---
TSS [mg/L]	41	---
Alkalinity [mg/L as CaCO3]	157	---
pH [No unit]	7.71	---
Conductivity [uS/cm]	447	---
TDS [mg/L]	243	---
COD [mg/L]	22	---
TKN [as N mg/L]	1.27	---
NH3+NH4 [as N mg/L]	0.57	---
4AAP-Phenolics [mg/L]	< 0.001	---
SO4 [mg/L]	36	---
Cl [mg/L]	43	---
NO2 [as N mg/L]	< 0.03	---
NO3 [as N mg/L]	0.12	---
NO2+NO3 [as N mg/L]	0.12	---
Hg (diss) [mg/L]	< 0.00001	---
As (tot) [mg/L]	0.0010	---
Ba (tot) [mg/L]	0.0351	---
B (tot) [mg/L]	0.115	---
Cd (tot) [mg/L]	0.000026	---
Cr (tot) [mg/L]	0.00026	---
Cu (tot) [mg/L]	0.0068	---
Fe (tot) [mg/L]	2.53	---
Pb (tot) [mg/L]	0.00098	---
P (tot) [mg/L]	0.069	---
Zn (tot) [mg/L]	0.009	---
Benzene [µg/L]	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	< 0.5	< 0.5
Dichloromethane [µg/L]	< 0.5	< 0.5
Toluene [µg/L]	< 0.5	< 0.5
Vinyl Chloride [µg/L]	< 0.2	< 0.2

Temperature of Sample upon Receipt: 5 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site SW

LR Report : CA14629-MAR23

Method Descriptions

Units	Description	SGS Method Code
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	phenol by Skalar - surface waters	ME-CA-[ENV]SFA-LAK-AN-006
mg/L as CaCO3	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
mg/L	Asby ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ba by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
mg/L	B by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cd by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
mg/L	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
mg/L	Cr by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
uS/cm	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Cu by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Fe by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Pb by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
mg/L	Nitrate by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Total Nitrate/Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Nitrite by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
No unit	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	P by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
mg/L	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
mg/L	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Zn by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site SW
LR Report : CA14629-MAR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0344-MAR23														
1,4-Dichlorobenzene	0.5	µg/L	<0.5			ND	30	101	60	130	98	50	140	
Benzene	0.5	µg/L	<0.5			ND	30	103	60	130	100	50	140	
Dichloromethane	0.5	µg/L	<0.5			ND	30	100	60	130	97	50	140	
Toluene	0.5	µg/L	<0.5			ND	30	104	60	130	101	50	140	
Vinyl Chloride	0.2	µg/L	<0.2			ND	30	98	50	140	97	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0469-MAR23														
Alkalinity	2	mg/L as Ca	< 2			4	20	100	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0228-MAR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	100	75	125	
Ammonia by SFA - QCBatchID: SKA0241-MAR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	103	75	125	
Anions by discrete analyzer - QCBatchID: DIO5114-MAR23														
Chloride	1	mg/L	<1			17	20	107	80	120	88	75	125	
Sulphate	2	mg/L	<2			2	20	106	80	120	88	75	125	
Anions by IC - QCBatchID: DIO0575-MAR23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	100	90	110	100	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	99	90	110	100	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0053-MAR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			2	30	96	70	130	97	70	130	
Chemical Oxygen Demand - QCBatchID: EWL0453-MAR23														
Chemical Oxygen Demand	8	mg/L	<8			ND	20	92	80	120	82	75	125	
Conductivity - QCBatchID: EWL0469-MAR23														
Conductivity	2	uS/cm	< 2			1	20	100	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0040-MAR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			0	20	109	80	120	96	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0194-MAR23														
Arsenic (total)	0.0002	mg/L	<0.0002			3	20	104	90	110	NV	70	130	
Barium (total)	0.00008	mg/L	<0.00002			0	20	100	90	110	NV	70	130	
Boron (total)	0.002	mg/L	<0.002			2	20	108	90	110	99	70	130	

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LR Report : CA14629-MAR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Cadmium (total)	0.000003	mg/L	<0.000003			5	20	105	90	110	NV	70	130
Chromium (total)	0.00008	mg/L	<0.00008			8	20	102	90	110	NV	70	130
Copper (total)	0.0002	mg/L	<0.0002			1	20	100	90	110	NV	70	130
Iron (total)	0.007	mg/L	<0.007			8	20	107	90	110	NV	70	130
Lead (total)	0.00009	mg/L	<0.00009			4	20	107	90	110	NV	70	130
Phosphorus (total)	0.003	mg/L	<0.003			5	20	103	90	110	NV	70	130
Zinc (total)	0.002	mg/L	<0.002			3	20	102	90	110	NV	70	130
pH - QCBatchID: EWL0469-MAR23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0230-MAR23													
4AAP-Phenolics	0.001	mg/L	<0.001			ND	10	102	80	120	86	75	125
Solids Analysis - QCBatchID: EWL0473-MAR23													
Total Dissolved Solids	30	mg/L	<30			1	20	100	80	120	NA		
Suspended Solids - QCBatchID: EWL0479-MAR23													
Total Suspended Solids	2	mg/L	< 2			0	10	96	90	110	NA		
Suspended Solids - QCBatchID: EWL0489-MAR23													
Total Suspended Solids	2	mg/L	< 2			0	10	99	90	110	NA		
Total Nitrogen - QCBatchID: SKA0229-MAR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			ND	10	100	90	110	98	75	125
Total Nitrogen - QCBatchID: SKA0252-MAR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			1	10	99	90	110	98	75	125

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Project : 191-06761-03-100-1003,
Embro Landfill Site - GW

19-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

55 King Street, Suite 700
St. Catharines, ON
L2R 3H5, Canada

Phone: 905-687-1771 x 240
Fax:

Date Rec. : 06 April 2023
LR Report: **CA14177-APR23**
Reference: 191-06761-03-100-1003,
Albert Siertsema

Copy: 2

CERTIFICATE OF ANALYSIS
Final Report - Revised

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: EB-P2	8: EB-P3	9: EB-P4
Sample Date & Time					06-Apr-23 10:00	06-Apr-23 10:30	06-Apr-23 11:00
Temp Upon Receipt [°C]	***	***	***	***	***	***	***
BOD5 [mg/L]	10-Apr-23	16:50	17-Apr-23	10:10	< 4	< 4	< 4
TSS [mg/L]	12-Apr-23	13:16	13-Apr-23	14:41	2	< 2	2
Alkalinity [mg/L as CaCO3]	10-Apr-23	15:23	12-Apr-23	11:17	271	273	258
pH [No unit]	10-Apr-23	15:23	12-Apr-23	11:17	8.24	8.30	8.21
Conductivity [uS/cm]	10-Apr-23	15:23	12-Apr-23	11:17	514	597	549
TDS [mg/L]	10-Apr-23	15:09	11-Apr-23	14:59	283	343	320
COD [mg/L]	11-Apr-23	07:47	14-Apr-23	12:44	26	< 8	< 8
TKN [as N mg/L]	12-Apr-23	16:40	18-Apr-23	16:03	0.08	0.13	< 0.05
NH3+NH4 [as N mg/L]	12-Apr-23	07:41	13-Apr-23	08:45	0.15	0.08	< 0.04
SO4 [mg/L]	12-Apr-23	12:14	12-Apr-23	19:27	29	36	33
Cl [mg/L]	12-Apr-23	12:16	12-Apr-23	19:27	10	12	13
NO2 [as N mg/L]	12-Apr-23	07:53	17-Apr-23	16:12	< 0.03	< 0.03	< 0.03
NO3 [as N mg/L]	12-Apr-23	07:53	17-Apr-23	16:12	< 0.06	< 0.06	0.64
DOC [mg/L]	11-Apr-23	15:34	12-Apr-23	08:41	1	1	2
Total P [mg/L]	12-Apr-23	15:01	14-Apr-23	11:56	< 0.03	< 0.03	< 0.03
4AAP-Phenolics [mg/L]	10-Apr-23	12:22	11-Apr-23	08:21	< 0.002	< 0.002	< 0.002
Hg (diss) [mg/L]	14-Apr-23	15:03	17-Apr-23	12:08	0.00001	< 0.00001	< 0.00001
As (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.0002	0.0010	0.0002
Ba (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.178	0.00711	0.187
B (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.031	0.031	0.021
Ca (diss) [mg/L]	15-Apr-23	13:10	19-Apr-23	17:07	70.8	2.76	81.6
Cd (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.000006	0.000005	0.000011
Cr (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.00008	0.00010	0.00009
Cu (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.0203	0.0130	0.0301
Fe (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.090	0.060	0.016
K (diss) [mg/L]	15-Apr-23	13:10	19-Apr-23	17:07	1.13	0.789	1.86
Mg (diss) [mg/L]	15-Apr-23	13:10	19-Apr-23	17:07	24.4	0.905	24.5
Mn (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.0377	0.00163	0.0122
Na (diss) [mg/L]	15-Apr-23	13:10	19-Apr-23	17:07	11.1	134	6.34
Pb (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	< 0.00009	0.00033	< 0.00009
Zn (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:33	0.067	0.022	0.046
Benzene [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5

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Project : 191-06761-03-100-1003, Embro Landfill Site - GW
LR Report : CA14177-APR23

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: EB-P2	8: EB-P3	9: EB-P4
Dichloromethane [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
Toluene [ug/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.2	< 0.2	< 0.2

Temperature of Sample upon Receipt: 11 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Revision 1 - additional metals results included

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Skalar	ME-CA-[ENV]SFA-LAK-AN-009
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002

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Parameter	Description	SGS Method Code
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

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Project : 191-06761-03-100-1003, Embro Landfill Site - GW
LR Report : CA14177-APR23

Quality Control Report

Organic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Volatile Organics - QCBatchID: GCM0178-APR23													
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	102	60	130	99	50	140
Benzene	0.5	µg/L	<0.5			ND	30	103	60	130	103	50	140
Dichloromethane	0.5	ug/L	<0.5			ND	30	109	60	130	94	50	140
Toluene	0.5	ug/L	<0.5			ND	30	99	60	130	98	50	140
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	106	50	140	107	50	140

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Alkalinity - QCBatchID: EWL0135-APR23													
Alkalinity	2	mg/L as Ca	< 2			1	20	100	80	120	NA		
Ammonia by SFA - QCBatchID: SKA0097-APR23													
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			1	10	100	90	110	90	75	125
Anions by discrete analyzer - QCBatchID: DIO5038-APR23													
Chloride	1	mg/L	<1			ND	20	104	80	120	98	75	125
Sulphate	2	mg/L	<2			ND	20	107	80	120	107	75	125
Anions by IC - QCBatchID: DIO0246-APR23													
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	103	90	110	105	75	125
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	99	90	110	102	75	125
Biochemical Oxygen Demand - QCBatchID: BOD0015-APR23													
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			19	30	92	70	130	NV	70	130
Carbon by SFA - QCBatchID: SKA0080-APR23													
Dissolved Organic Carbon	1	mg/L	<1			ND	20	102	90	110	93	75	125
Chemical Oxygen Demand - QCBatchID: EWL0148-APR23													
Chemical Oxygen Demand	8	mg/L	<8			ND	20	94	80	120	93	75	125
Conductivity - QCBatchID: EWL0135-APR23													
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA		
Mercury by CVAAS - QCBatchID: EHG0013-APR23													
Mercury (dissolved)	0.00001	mg/L	< 0.00001			0	20	111	80	120	112	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0050-APR23													
Arsenic (dissolved)	0.0002	mg/L	<0.0002			2	20	98	90	110	87	70	130
Barium (dissolved)	0.00008	mg/L	<0.00008			1	20	93	90	110	103	70	130
Boron (dissolved)	0.002	mg/L	<0.002			9	20	99	90	110	92	70	130
Cadmium (dissolved)	0.000003	mg/L	<0.000003			ND	20	98	90	110	80	70	130

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Project : 191-06761-03-100-1003, Embro Landfill Site - GW
LR Report : CA14177-APR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Calcium (dissolved)	0.01	mg/L	<0.01			1	20	95	90	110	109	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			10	20	97	90	110	75	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			2	20	97	90	110	114	70	130
Iron (dissolved)	0.007	mg/L	<0.007			ND	20	100	90	110	100	70	130
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	98	90	110	72	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			1	20	109	90	110	98	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			7	20	99	90	110	81	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			0	20	106	90	110	107	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			0	20	102	90	110	94	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			ND	20	95	90	110	73	70	130
pH - QCBatchID: EWL0135-APR23													
pH	0.05	No unit	NA			3		100			NA		
Phenols by SFA - QCBatchID: SKA0065-APR23													
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	100	80	120	97	75	125
Phosphorus by SFA - QCBatchID: SKA0103-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			2	10	100	90	110	96	75	125
Phosphorus by SFA - QCBatchID: SKA0117-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			1	10	100	90	110	110	75	125
Solids Analysis - QCBatchID: EWL0121-APR23													
Total Dissolved Solids	30	mg/L	<30			1	20	95	80	120	NA		
Suspended Solids - QCBatchID: EWL0190-APR23													
Total Suspended Solids	2	mg/L	< 2			1	10	101	90	110	NA		
Total Nitrogen - QCBatchID: SKA0104-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	100	75	125
Total Nitrogen - QCBatchID: SKA0118-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	99	75	125

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Project : Gunn's Hill Landfill Site - GW

17-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

55 King Street, Suite 700, St. Catharines
Canada, L2R 3H5
Phone: 905-687-1771 x 240, Fax:

Date Rec. : 06 April 2023
LR Report: **CA14178-APR23**
Reference: 191-06761-03-100-1003, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: GH-P3A	8: GH-P3B	9: Trip Blank
Sample Date & Time					06-Apr-23 13:00	06-Apr-23 13:30	06-Apr-23
Temp Upon Receipt [°C]	***	***	***	***	***	***	***
BOD5 [mg/L]	10-Apr-23	16:50	17-Apr-23	10:10	< 4	< 4	---
TSS [mg/L]	12-Apr-23	13:16	13-Apr-23	14:41	< 2	2	---
Alkalinity [mg/L as CaCO3]	10-Apr-23	15:23	12-Apr-23	11:18	254	249	---
pH [No unit]	10-Apr-23	15:23	12-Apr-23	11:18	8.04	7.97	---
Conductivity [uS/cm]	10-Apr-23	15:23	12-Apr-23	11:18	534	554	---
TDS [mg/L]	10-Apr-23	15:55	11-Apr-23	14:01	334	334	---
COD [mg/L]	10-Apr-23	08:35	14-Apr-23	12:43	< 8	< 8	---
TKN [as N mg/L]	12-Apr-23	16:40	13-Apr-23	14:05	< 0.05	0.07	---
NH3+NH4 [as N mg/L]	12-Apr-23	07:41	13-Apr-23	08:45	< 0.04	< 0.04	---
SO4 [mg/L]	12-Apr-23	12:14	12-Apr-23	19:28	47	53	---
Cl [mg/L]	12-Apr-23	12:16	12-Apr-23	19:28	6	9	---
NO2 [as N mg/L]	12-Apr-23	13:21	13-Apr-23	10:41	< 0.03	< 0.03	---
NO3 [as N mg/L]	12-Apr-23	13:21	13-Apr-23	10:41	0.68	0.62	---
DOC [mg/L]	11-Apr-23	15:34	12-Apr-23	08:41	2	2	---
Total P [mg/L]	12-Apr-23	15:01	13-Apr-23	13:11	< 0.03	< 0.03	---
4AAP-Phenolics [mg/L]	10-Apr-23	12:22	11-Apr-23	08:21	< 0.002	< 0.002	---
Hg (diss) [mg/L]	14-Apr-23	15:03	17-Apr-23	12:08	< 0.00001	0.00001	---
As (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.0004	0.0004	---
Ba (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.212	0.210	---
B (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.019	0.017	---
Ca (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	87.4	90.0	---
Cd (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.000006	0.000016	---
Cr (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.00008	< 0.00008	---
Cu (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.0090	0.0271	---
Fe (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.019	0.115	---
K (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	1.40	2.17	---
Mg (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	23.4	23.9	---
Mn (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.0482	0.0519	---
Na (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	4.28	4.32	---
Pb (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	< 0.00009	0.00010	---
Zn (diss) [mg/L]	15-Apr-23	13:10	17-Apr-23	17:34	0.027	0.030	---
Benzene [ug/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5

OnLine LIMS

0003302436

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Project : Gunn's Hill Landfill Site - GW

LR Report : **CA14178-APR23**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: GH-P3A	8: GH-P3B	9: Trip Blank
Dichloromethane [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
Toluene [ug/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	13-Apr-23	10:07	14-Apr-23	11:57	< 0.2	< 0.2	< 0.2

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Skalar	ME-CA-[ENV]SFA-LAK-AN-009
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004

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Project : Gunn's Hill Landfill Site - GW

LR Report : **CA14178-APR23**

Parameter	Description	SGS Method Code
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

Brad Moore Hon. B.Sc
Project Specialist,
Environment, Health & Safety

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Project : Gunn's Hill Landfill Site - GW
LR Report : **CA14178-APR23**

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0178-APR23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	102	60	130	99	50	140	
Benzene	0.5	ug/L	<0.5			ND	30	103	60	130	103	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	109	60	130	94	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	99	60	130	98	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	106	50	140	107	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0135-APR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	100	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0097-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			1	10	100	90	110	90	75	125	
Anions by discrete analyzer - QCBatchID: DIO5038-APR23														
Chloride	1	mg/L	<1			ND	20	104	80	120	98	75	125	
Sulphate	2	mg/L	<2			ND	20	107	80	120	107	75	125	
Anions by IC - QCBatchID: DIO0245-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	98	90	110	100	75	125	
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	97	90	110	99	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0015-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			19	30	92	70	130	NV	70	130	
Carbon by SFA - QCBatchID: SKA0080-APR23														
Dissolved Organic Carbon	1	mg/L	<1			ND	20	102	90	110	93	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0124-APR23														
Chemical Oxygen Demand	8	mg/L	<8			ND	20	110	80	120	97	75	125	
Conductivity - QCBatchID: EWL0135-APR23														
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0013-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			0	20	111	80	120	112	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0050-APR23														
Arsenic (dissolved)	0.0002	mg/L	<0.0002			2	20	98	90	110	87	70	130	
Barium (dissolved)	0.00008	mg/L	<0.00008			1	20	93	90	110	103	70	130	
Boron (dissolved)	0.002	mg/L	<0.002			9	20	99	90	110	92	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003			ND	20	98	90	110	80	70	130	

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Project : Gunn's Hill Landfill Site - GW

LR Report : **CA14178-APR23**

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Calcium (dissolved)	0.01	mg/L	<0.01			1	20	95	90	110	109	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			10	20	97	90	110	75	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			2	20	97	90	110	114	70	130
Iron (dissolved)	0.007	mg/L	<0.007			ND	20	100	90	110	100	70	130
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	98	90	110	72	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			1	20	109	90	110	98	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			7	20	99	90	110	81	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			0	20	106	90	110	107	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			0	20	102	90	110	94	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			ND	20	95	90	110	73	70	130
pH - QCBatchID: EWL0135-APR23													
pH	0.05	No unit	NA			3		100			NA		
Phenols by SFA - QCBatchID: SKA0065-APR23													
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	100	80	120	97	75	125
Phosphorus by SFA - QCBatchID: SKA0103-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			2	10	100	90	110	96	75	125
Solids Analysis - QCBatchID: EWL0137-APR23													
Total Dissolved Solids	30	mg/L	<30			2	20	101	80	120	NA		
Suspended Solids - QCBatchID: EWL0190-APR23													
Total Suspended Solids	2	mg/L	< 2			1	10	101	90	110	NA		
Total Nitrogen - QCBatchID: SKA0104-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	100	75	125

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Project : 191-06761-03-100-1003,
Lakeside Landfill Site - SW

12-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

55 King Street, Suite 700
St. Catharines, ON
L2R 3H5, Canada

Phone: 905-687-1771 x 240
Fax:

Date Rec. : 04 April 2023
LR Report: **CA40024-APR23**
Reference: PO#:191-06761-03-100-100
3, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Completed Date	6: LS-SW1	7: LS-SW2	8: LS-SW3
Sample Date & Time		03-Apr-23 14:15	03-Apr-23 13:30	03-Apr-23 13:00
Temp Upon Receipt [@ London Lab °C]	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***
BOD5 [mg/L]	10-Apr-23	16	< 4	5
TSS [mg/L]	06-Apr-23	27	41	16
Alkalinity [mg/L as CaCO3]	06-Apr-23	71	51	28
pH [No unit]	06-Apr-23	7.12	7.20	6.70
Conductivity [uS/cm]	06-Apr-23	194	114	73
TDS [mg/L]	10-Apr-23	143	57	46
COD [mg/L]	10-Apr-23	76	21	38
TKN [as N mg/L]	06-Apr-23	1.03	0.56	0.50
NH3+NH4 [as N mg/L]	06-Apr-23	0.06	0.11	0.06
4AAP-Phenolics [mg/L]	05-Apr-23	< 0.001	< 0.001	< 0.001
SO4 [mg/L]	11-Apr-23	36	4	< 2
Cl [mg/L]	11-Apr-23	2	3	5
NO2 [as N mg/L]	12-Apr-23	< 0.03	< 0.03	< 0.03
NO3 [as N mg/L]	12-Apr-23	< 0.06	0.56	0.10
NO2+NO3 [as N mg/L]	12-Apr-23	< 0.06	0.56	0.10
Hg (diss) [mg/L]	11-Apr-23	0.00002	0.00001	0.00001
As (tot) [mg/L]	11-Apr-23	0.0010	0.0003	0.0004
Ba (tot) [mg/L]	11-Apr-23	0.0186	0.00839	0.00564
B (tot) [mg/L]	11-Apr-23	0.058	0.013	0.015
Cd (tot) [mg/L]	11-Apr-23	0.000140	0.000104	0.000035
Cr (tot) [mg/L]	11-Apr-23	0.00043	0.00039	0.00103
Cu (tot) [mg/L]	11-Apr-23	0.0072	0.0037	0.0040
Fe (tot) [mg/L]	11-Apr-23	0.246	0.572	0.882
Pb (tot) [mg/L]	11-Apr-23	0.00031	0.00069	0.00019

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Project : 191-06761-03-100-1003, Lakeside Landfill Site - SW
LR Report : CA40024-APR23

Analysis	3: Analysis Completed Date	6: LS-SW1	7: LS-SW2	8: LS-SW3
P (tot) [mg/L]	11-Apr-23	0.507	0.143	0.118
Zn (tot) [mg/L]	11-Apr-23	0.019	0.012	0.004
Benzene [µg/L]	11-Apr-23	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	11-Apr-23	< 0.5	< 0.5	< 0.5
Dichloromethane [µg/L]	11-Apr-23	< 0.5	< 0.5	< 0.5
Toluene [µg/L]	11-Apr-23	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	11-Apr-23	< 0.2	< 0.2	< 0.2

Temperature of Sample upon Receipt: 3 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar - surface waters	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (total)	Asby ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Barium (total)	Ba by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (total)	B by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (total)	Cd by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (total)	Cr by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (total)	Cu by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Iron (total)	Fe by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Lead (total)	Pb by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
Nitrate + Nitrite (as N)	Total Nitrate/Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	P by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004

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Project : 191-06761-03-100-1003, Lakeside Landfill Site - SW
LR Report : CA40024-APR23

Parameter	Description	SGS Method Code
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (total)	Zn by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006

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Project : 191-06761-03-100-1003, Lakeside Landfill Site - SW
LR Report : CA40024-APR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0120-APR23														
1,4-Dichlorobenzene	0.5	µg/L	<0.5			ND	30	96	60	130	95	50	140	
Benzene	0.5	µg/L	<0.5			ND	30	99	60	130	99	50	140	
Dichloromethane	0.5	µg/L	<0.5			ND	30	96	60	130	97	50	140	
Toluene	0.5	µg/L	<0.5			ND	30	98	60	130	100	50	140	
Vinyl Chloride	0.2	µg/L	<0.2			ND	30	100	50	140	98	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0049-APR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	91	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0043-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			ND	10	100	90	110	100	75	125	
Anions by discrete analyzer - QCBatchID: DIO5018-APR23														
Chloride	1	mg/L	<1			14	20	108	80	120	89	75	125	
Sulphate	2	mg/L	<2			1	20	108	80	120	109	75	125	
Anions by IC - QCBatchID: DIO0099-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			1	20	100	90	110	102	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	98	90	110	99	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0007-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			2	30	99	70	130	83	70	130	
Chemical Oxygen Demand - QCBatchID: EWL0078-APR23														
Chemical Oxygen Demand	8	mg/L	<8			11	20	102	80	120	99	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0083-APR23														
Chemical Oxygen Demand	8	mg/L	<8			0	20	104	80	120	103	75	125	
Conductivity - QCBatchID: EWL0049-APR23														
Conductivity	2	uS/cm	< 2			3	20	98	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0009-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			0	20	112	80	120	115	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0026-APR23														
Arsenic (total)	0.0002	mg/L	<0.0002			4	20	101	90	110	111	70	130	
Barium (total)	0.00008	mg/L	<0.00002			5	20	100	90	110	100	70	130	
Boron (total)	0.002	mg/L	<0.002			5	20	101	90	110	94	70	130	

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Project : 191-06761-03-100-1003, Lakeside Landfill Site - SW
LR Report : CA40024-APR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Cadmium (total)	0.000003	mg/L	<0.000003			6	20	102	90	110	90	70	130
Chromium (total)	0.00008	mg/L	<0.00008			ND	20	108	90	110	103	70	130
Copper (total)	0.0002	mg/L	<0.0002			14	20	103	90	110	102	70	130
Iron (total)	0.007	mg/L	<0.007			2	20	104	90	110	125	70	130
Lead (total)	0.00009	mg/L	<0.00009			1	20	104	90	110	93	70	130
Phosphorus (total)	0.003	mg/L	<0.003			ND	20	102	90	110	NV	70	130
Zinc (total)	0.002	mg/L	<0.002			2	20	100	90	110	103	70	130
pH - QCBatchID: EWL0049-APR23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0032-APR23													
4AAP-Phenolics	0.001	mg/L	<0.001			ND	10	97	80	120	93	75	125
Solids Analysis - QCBatchID: EWL0079-APR23													
Total Dissolved Solids	30	mg/L	-6			7	20	92	80	120	NA		
Suspended Solids - QCBatchID: EWL0055-APR23													
Total Suspended Solids	2	mg/L	< 2			1	10	103	90	110	NA		
Total Nitrogen - QCBatchID: SKA0042-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			1	10	102	90	110	97	75	125

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WSP Canada Inc.
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Fax:

Project : 191-06761-03-100-1003,
Blandford-Blenheim Landfill Site GW

20-April-2023

Date Rec. : 05 April 2023
LR Report: **CA40053-APR23**
Reference: 191-06701-03-100-1003, Albert Siertsema

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	7: BB-MW1	8: BB-MW2	9: BB-MW3	10: BB-BH1-1	11: BB-BH1-2
Sample Date & Time			04-Apr-23 09:30	04-Apr-23 11:15	04-Apr-23 12:00	04-Apr-23 12:30	04-Apr-23 12:45
Temp Upon Receipt [@ London Lab °C]	***	***	***	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***	***	***	***
BOD5 [mg/L]	06-Apr-23	11-Apr-23	< 4	< 4	< 4	< 4	11
TSS [mg/L]	10-Apr-23	12-Apr-23	227	49900	17500	89	239
Alkalinity [mg/L as CaCO3]	10-Apr-23	12-Apr-23	503	234	216	345	1080
pH [No unit]	10-Apr-23	12-Apr-23	7.80	8.03	8.04	7.85	7.39
Conductivity [uS/cm]	10-Apr-23	12-Apr-23	1120	638	437	687	2110
TDS [mg/L]	10-Apr-23	11-Apr-23	614	411	260	400	851
COD [mg/L]	10-Apr-23	11-Apr-23	29	9	< 8	< 8	117
TKN [as N mg/L]	11-Apr-23	14-Apr-23	19.0	< 0.05	< 0.05	2.00	112
NH3+NH4 [as N mg/L]	11-Apr-23	13-Apr-23	18.1	0.08	< 0.04	1.81	108
Total P [mg/L]	11-Apr-23	13-Apr-23	0.10	< 0.03	< 0.03	0.07	0.54
4AAP-Phenolics [mg/L]	06-Apr-23	10-Apr-23	0.002	0.002	< 0.002	< 0.002	0.010
SO4 [mg/L]	11-Apr-23	12-Apr-23	32	89	24	11	11
Cl [mg/L]	11-Apr-23	12-Apr-23	58	25	< 1	16	36
NO2 [as N mg/L]	10-Apr-23	20-Apr-23	< 0.03	< 0.03	< 0.03	0.32	< 0.3

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site GW
LR Report : CA40053-APR23

Analysis	1: Analysis Start Date	3: Analysis Completed Date	7: BB-MW1	8: BB-MW2	9: BB-MW3	10: BB-BH1-1	11: BB-BH1-2
NO3 [as N mg/L]	10-Apr-23	12-Apr-23	< 0.06	0.44	0.55	1.72	0.18
DOC [mg/L]	11-Apr-23	14-Apr-23	7	2	2	2	24
Hg (diss) [mg/L]	12-Apr-23	13-Apr-23	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
As (diss) [mg/L]	14-Apr-23	17-Apr-23	< 0.0002	0.0016	0.0003	0.0008	0.0016
Ba (diss) [mg/L]	14-Apr-23	17-Apr-23	0.458	0.0627	0.0110	0.0533	0.228
B (diss) [mg/L]	14-Apr-23	17-Apr-23	0.166	0.015	0.045	0.075	0.787
Ca (diss) [mg/L]	14-Apr-23	17-Apr-23	113	88.7	66.2	108	188
Cd (diss) [mg/L]	14-Apr-23	17-Apr-23	< 0.000003	0.000006	< 0.000003	0.000045	0.000011
Cr (diss) [mg/L]	14-Apr-23	17-Apr-23	0.00040	0.00009	0.00043	0.00014	0.00447
Cu (diss) [mg/L]	14-Apr-23	17-Apr-23	0.0025	0.0043	0.0037	0.0038	0.0025
Fe (diss) [mg/L]	14-Apr-23	17-Apr-23	3.30	0.293	0.012	0.528	64.6
K (diss) [mg/L]	14-Apr-23	17-Apr-23	12.1	1.34	0.922	4.91	63.0
Mg (diss) [mg/L]	14-Apr-23	17-Apr-23	43.5	29.0	11.9	20.0	43.1
Mn (diss) [mg/L]	14-Apr-23	17-Apr-23	0.0751	0.0229	0.00021	0.826	0.547
Na (diss) [mg/L]	14-Apr-23	17-Apr-23	37.6	4.75	15.1	4.13	34.9
Pb (diss) [mg/L]	14-Apr-23	17-Apr-23	< 0.00009	< 0.00009	< 0.00009	0.00012	0.00014
Zn (diss) [mg/L]	14-Apr-23	17-Apr-23	< 0.002	< 0.002	< 0.002	0.010	0.006
Benzene [µg/L]	12-Apr-23	13-Apr-23	< 0.5	< 0.5	< 0.5	< 0.5	4.2
1,4-Dichlorobenzene [µg/L]	12-Apr-23	13-Apr-23	< 0.5	< 0.5	< 0.5	< 0.5	2.2
Dichloromethane [µg/L]	12-Apr-23	13-Apr-23	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene [ug/L]	12-Apr-23	13-Apr-23	< 0.5	< 0.5	< 0.5	< 0.5	0.7
Vinyl Chloride [µg/L]	12-Apr-23	13-Apr-23	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Analysis	12: BB-P1	13: GWDUP1	14: Trip Blank
Sample Date & Time	04-Apr-23 10:00	04-Apr-23	04-Apr-23
Temp Upon Receipt [@ London Lab °C]	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***
BOD5 [mg/L]	< 4	< 4	---
TSS [mg/L]	< 2	213	---
Alkalinity [mg/L as CaCO3]	284	508	---

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Analysis	12: BB-P1	13: GWDUP1	14: Trip Blank
pH [No unit]	8.09	7.79	---
Conductivity [uS/cm]	564	1110	---
TDS [mg/L]	320	583	---
COD [mg/L]	< 8	29	---
TKN [as N mg/L]	0.20	18.4	---
NH3+NH4 [as N mg/L]	< 0.04	18.5	---
Total P [mg/L]	< 0.03	0.11	---
4AAP-Phenolics [mg/L]	< 0.002	< 0.002	---
SO4 [mg/L]	7	29	---
Cl [mg/L]	6	60	---
NO2 [as N mg/L]	< 0.03	< 0.03	---
NO3 [as N mg/L]	5.45	< 0.06	---
DOC [mg/L]	1	8	---
Hg (diss) [mg/L]	< 0.00001	< 0.00001	---
As (diss) [mg/L]	< 0.0002	0.0002	---
Ba (diss) [mg/L]	0.0301	0.452	---
B (diss) [mg/L]	0.048	0.157	---
Ca (diss) [mg/L]	84.6	111	---
Cd (diss) [mg/L]	0.000008	< 0.000003	---
Cr (diss) [mg/L]	0.00064	0.00038	---
Cu (diss) [mg/L]	0.0070	0.0024	---
Fe (diss) [mg/L]	< 0.007	3.28	---
K (diss) [mg/L]	4.45	11.9	---
Mg (diss) [mg/L]	20.9	41.8	---
Mn (diss) [mg/L]	0.00026	0.0783	---
Na (diss) [mg/L]	4.38	36.1	---
Pb (diss) [mg/L]	< 0.00009	< 0.00009	---
Zn (diss) [mg/L]	0.503	< 0.002	---
Benzene [µg/L]	< 0.5	---	< 0.5
1,4-Dichlorobenzene [µg/L]	< 0.5	---	< 0.5
Dichloromethane [µg/L]	< 0.5	---	< 0.5
Toluene [ug/L]	< 0.5	---	< 0.5
Vinyl Chloride [µg/L]	< 0.2	---	< 0.2

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Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: N/A

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Skalar	ME-CA-[ENV]SFA-LAK-AN-009
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Dionex - solution	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003

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Parameter	Description	SGS Method Code
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site GW
LR Report : CA40053-APR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0163-APR23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	92	60	130	101	50	140	
Benzene	0.5	µg/L	<0.5			ND	30	95	60	130	103	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	93	60	130	99	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	94	60	130	104	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	97	50	140	105	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0135-APR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	100	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0070-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	91	75	125	
Ammonia by SFA - QCBatchID: SKA0088-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			2	10	102	90	110	97	75	125	
Ammonia by SFA - QCBatchID: SKA0101-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	100	75	125	
Anions by discrete analyzer - QCBatchID: DIO5027-APR23														
Chloride	1	mg/L	<1			2	20	105	80	120	111	75	125	
Sulphate	2	mg/L	<2			ND	20	108	80	120	112	75	125	
Anions by IC - QCBatchID: DIO0178-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			0	20	99	90	110	101	75	125	
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	99	90	110	107	75	125	
Anions by IC - QCBatchID: DIO0179-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			0	20	98	90	110	94	75	125	
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	98	90	110	99	75	125	
Anions by IC - QCBatchID: DIO0254-APR23														
Nitrite (as N)	0.03	mg/L	<0.03			19	20	98	90	110	102	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0010-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			7	30	95	70	130	NV	70	130	
Carbon by SFA - QCBatchID: SKA0080-APR23														
Dissolved Organic Carbon	1	mg/L	<1			ND	20	102	90	110	93	75	125	
Carbon by SFA - QCBatchID: SKA0115-APR23														
Dissolved Organic Carbon	1	mg/L	<1			1	20	101	90	110	97	75	125	

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Project : 191-06761-03-100-1003, Blandford-Blenheim Landfill Site GW
LR Report : CA40053-APR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Chemical Oxygen Demand - QCBatchID: EWL0118-APR23														
Chemical Oxygen Demand	8	mg/L	<8			ND	20	108	80	120	100	75	125	
Conductivity - QCBatchID: EWL0135-APR23														
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0012-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	100	80	120	110	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0040-APR23														
Arsenic (dissolved)	0.0002	mg/L	<0.0002			13	20	98	90	110	101	70	130	
Barium (dissolved)	0.00008	mg/L	<0.00002			3	20	96	90	110	74	70	130	
Boron (dissolved)	0.002	mg/L	<0.002			7	20	103	90	110	93	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003			1	20	99	90	110	102	70	130	
Calcium (dissolved)	0.01	mg/L	<0.01			1	20	99	90	110	91	70	130	
Chromium (dissolved)	0.00008	mg/L	<0.00008			5	20	98	90	110	116	70	130	
Copper (dissolved)	0.0002	mg/L	<0.0002			4	20	100	90	110	80	70	130	
Iron (dissolved)	0.007	mg/L	<0.007			2	20	97	90	110	100	70	130	
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	100	90	110	90	70	130	
Magnesium (dissolved)	0.001	mg/L	<0.001			4	20	99	90	110	73	70	130	
Manganese (dissolved)	0.00001	mg/L	<0.00001			2	20	102	90	110	77	70	130	
Potassium (dissolved)	0.009	mg/L	<0.009			0	20	100	90	110	85	70	130	
Sodium (dissolved)	0.01	mg/L	<0.01			2	20	105	90	110	89	70	130	
Zinc (dissolved)	0.002	mg/L	<0.002			0	20	98	90	110	73	70	130	
pH - QCBatchID: EWL0135-APR23														
pH	0.05	No unit	NA			3		100			NA			
Phenols by SFA - QCBatchID: SKA0061-APR23														
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	95	80	120	107	75	125	
Phosphorus by SFA - QCBatchID: SKA0091-APR23														
Phosphorus (total)	0.03	mg/L	<0.03			3	10	100	90	110	93	75	125	
Solids Analysis - QCBatchID: EWL0137-APR23														
Total Dissolved Solids	30	mg/L	<30			2	20	101	80	120	NA			
Suspended Solids - QCBatchID: EWL0119-APR23														
Total Suspended Solids	2	mg/L	< 2			2	10	101	90	110	NA			
Suspended Solids - QCBatchID: EWL0127-APR23														
Total Suspended Solids	2	mg/L	< 2			4	10	107	90	110	NA			
Total Nitrogen - QCBatchID: SKA0086-APR23														
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			1	10	100	90	110	100	75	125	
Total Nitrogen - QCBatchID: SKA0104-APR23														
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	100	75	125	
Total Nitrogen - QCBatchID: SKA0118-APR23														
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	99	75	125	

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Project : 191-06761-03-100-1003,
Thamesford Landfill Site GW

17-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

55 King Street, Suite 700
St. Catharines, ON
L2R 3H5, Canada

Phone: 905-687-1771 x 240
Fax:

Date Rec. : 05 April 2023
LR Report: **CA40054-APR23**
Reference: 191-06761-03-100-1003,
Albert Sierstsema

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: TF-MW1	8: TF-MW2
Sample Date & Time					05-Apr-23 09:30	05-Apr-23 10:00
Temp Upon Receipt [@ London Lab °C]	***	***	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***	***	***
BOD5 [mg/L]	06-Apr-23	13:58	11-Apr-23	12:09	< 4	< 4
TSS [mg/L]	10-Apr-23	07:48	11-Apr-23	12:36	1240	1580
Alkalinity [mg/L as CaCO3]	10-Apr-23	15:23	12-Apr-23	11:22	231	348
pH [No unit]	10-Apr-23	15:23	12-Apr-23	11:22	8.07	7.94
Conductivity [uS/cm]	10-Apr-23	15:23	12-Apr-23	11:22	472	746
TDS [mg/L]	10-Apr-23	15:55	11-Apr-23	14:01	289	469
COD [mg/L]	10-Apr-23	07:46	11-Apr-23	12:09	< 8	9
TKN [as N mg/L]	11-Apr-23	09:53	14-Apr-23	15:37	0.15	0.19
NH3+NH4 [as N mg/L]	10-Apr-23	21:24	11-Apr-23	10:24	0.04	0.04
Total P [mg/L]	11-Apr-23	14:23	13-Apr-23	07:52	0.60	0.95
4AAP-Phenolics [mg/L]	06-Apr-23	10:47	10-Apr-23	11:51	0.002	0.002
SO4 [mg/L]	12-Apr-23	07:36	12-Apr-23	19:17	24	67
Cl [mg/L]	12-Apr-23	07:38	12-Apr-23	19:17	16	29
NO2 [as N mg/L]	11-Apr-23	13:32	12-Apr-23	06:42	< 0.03	< 0.03
NO3 [as N mg/L]	11-Apr-23	13:32	12-Apr-23	06:42	< 0.06	< 0.06
DOC [mg/L]	11-Apr-23	15:34	12-Apr-23	08:49	2	2
Hg (diss) [mg/L]	12-Apr-23	10:23	13-Apr-23	06:41	< 0.00001	< 0.00001
As (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	< 0.0002	0.0004
Ba (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	0.0280	0.0842
B (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	0.011	0.029
Ca (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	68.8	110
Cd (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	< 0.000003	0.000004
Cr (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	0.00020	< 0.00008
Cu (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	0.0080	0.0031
Fe (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	< 0.007	< 0.007
K (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	0.579	1.44
Mg (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:17	9.16	30.4
Mn (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.00020	0.0201
Na (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	22.9	10.8
Pb (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	< 0.00009	< 0.00009
Zn (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	< 0.002	0.002
Benzene [ug/L]	10-Apr-23	16:56	11-Apr-23	17:24	< 0.5	< 0.5

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Project : 191-06761-03-100-1003, Thamesford Landfill Site GW
LR Report : CA40054-APR23

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: TF-MW1	8: TF-MW2
1,4-Dichlorobenzene [µg/L]	10-Apr-23	16:56	11-Apr-23	17:24	< 0.5	< 0.5
Dichloromethane [µg/L]	10-Apr-23	16:56	11-Apr-23	17:24	< 0.5	< 0.5
Toluene [ug/L]	10-Apr-23	16:56	11-Apr-23	17:24	< 0.5	< 0.5
Vinyl Chloride [µg/L]	10-Apr-23	16:56	11-Apr-23	17:24	< 0.2	< 0.2

Analysis	9: TF-MW3	10: GWDUP2	11: Trip Blank
Sample Date & Time	05-Apr-23 11:00	05-Apr-23	05-Apr-23
Temp Upon Receipt [@ London Lab °C]	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***
BOD5 [mg/L]	< 4	< 4	---
TSS [mg/L]	14300	16000	---
Alkalinity [mg/L as CaCO3]	296	288	---
pH [No unit]	7.99	8.03	---
Conductivity [uS/cm]	757	726	---
TDS [mg/L]	451	469	---
COD [mg/L]	< 8	< 8	---
TKN [as N mg/L]	< 0.05	< 0.05	---
NH3+NH4 [as N mg/L]	< 0.04	0.04	---
Total P [mg/L]	< 0.03	< 0.03	---
4AAP-Phenolics [mg/L]	< 0.002	< 0.002	---
SO4 [mg/L]	82	80	---
Cl [mg/L]	38	37	---
NO2 [as N mg/L]	< 0.03	< 0.03	---
NO3 [as N mg/L]	0.09	0.09	---
DOC [mg/L]	1	2	---
Hg (diss) [mg/L]	< 0.00001	< 0.00001	---
As (diss) [mg/L]	0.0004	0.0003	---
Ba (diss) [mg/L]	0.0977	0.0982	---
B (diss) [mg/L]	0.024	0.028	---
Ca (diss) [mg/L]	99.3	99.4	---
Cd (diss) [mg/L]	< 0.000003	0.000006	---
Cr (diss) [mg/L]	0.00013	0.00011	---
Cu (diss) [mg/L]	0.0041	0.0027	---
Fe (diss) [mg/L]	< 0.007	< 0.007	---
K (diss) [mg/L]	1.68	1.65	---
Mg (diss) [mg/L]	31.1	30.8	---
Mn (diss) [mg/L]	0.00924	0.00859	---
Na (diss) [mg/L]	26.4	26.7	---
Pb (diss) [mg/L]	< 0.00009	< 0.00009	---
Zn (diss) [mg/L]	< 0.002	< 0.002	---
Benzene [ug/L]	< 0.5	---	< 0.5
1,4-Dichlorobenzene [µg/L]	< 0.5	---	< 0.5
Dichloromethane [µg/L]	< 0.5	---	< 0.5
Toluene [ug/L]	< 0.5	---	< 0.5
Vinyl Chloride [µg/L]	< 0.2	---	< 0.2

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: N/A

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LR Report : CA40054-APR23

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Skalar	ME-CA-[ENV]SFA-LAK-AN-009
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

Brad Moore Hon. B.Sc
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003301706

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Project : 191-06761-03-100-1003, Thamesford Landfill Site GW
LR Report : CA10054-APR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0120-APR23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	96	60	130	95	50	140	
Benzene	0.5	ug/L	<0.5			ND	30	99	60	130	99	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	96	60	130	97	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	98	60	130	100	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	100	50	140	98	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0135-APR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	100	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0070-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	91	75	125	
Anions by discrete analyzer - QCBatchID: DIO5034-APR23														
Chloride	1	mg/L	<1			ND	20	100	80	120	108	75	125	
Sulphate	2	mg/L	<2			ND	20	106	80	120	108	75	125	
Anions by IC - QCBatchID: DIO0209-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	99	90	110	101	75	125	
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	96	90	110	97	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0010-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			7	30	95	70	130	NV	70	130	
Carbon by SFA - QCBatchID: SKA0080-APR23														
Dissolved Organic Carbon	1	mg/L	<1			ND	20	102	90	110	93	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0118-APR23														
Chemical Oxygen Demand	8	mg/L	<8			ND	20	108	80	120	100	75	125	
Conductivity - QCBatchID: EWL0135-APR23														
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0012-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	100	80	120	110	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0040-APR23														
Arsenic (dissolved)	0.0002	mg/L	<0.0002			13	20	98	90	110	101	70	130	
Barium (dissolved)	0.00008	mg/L	<0.00002			3	20	96	90	110	74	70	130	
Boron (dissolved)	0.002	mg/L	<0.002			7	20	103	90	110	93	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003			1	20	99	90	110	102	70	130	

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Project : 191-06761-03-100-1003, Thamesford Landfill Site GW
LR Report : CA10054-APR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Calcium (dissolved)	0.01	mg/L	<0.01			1	20	99	90	110	91	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			5	20	98	90	110	116	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			4	20	100	90	110	80	70	130
Iron (dissolved)	0.007	mg/L	<0.007			2	20	97	90	110	100	70	130
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	100	90	110	90	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			4	20	99	90	110	73	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			2	20	102	90	110	77	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			0	20	100	90	110	85	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			2	20	105	90	110	89	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			0	20	98	90	110	73	70	130
pH - QCBatchID: EWL0135-APR23													
pH	0.05	No unit	NA			3		100			NA		
Phenols by SFA - QCBatchID: SKA0061-APR23													
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	95	80	120	107	75	125
Phosphorus by SFA - QCBatchID: SKA0091-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			3	10	100	90	110	93	75	125
Solids Analysis - QCBatchID: EWL0137-APR23													
Total Dissolved Solids	30	mg/L	<30			2	20	101	80	120	NA		
Suspended Solids - QCBatchID: EWL0119-APR23													
Total Suspended Solids	2	mg/L	< 2			2	10	101	90	110	NA		
Total Nitrogen - QCBatchID: SKA0086-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			1	10	100	90	110	100	75	125
Total Nitrogen - QCBatchID: SKA0118-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	99	75	125

SGS Canada Inc.
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : 191-06761-03-100-1003,
Otterville Landfill Site GW

17-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10
Windsor, ON
N8W 5V7, Canada

Phone: 905-687-1771 x 240
Fax:

Date Rec. : 05 April 2023
LR Report: **CA40055-APR23**
Reference: 191-06761-03-100-1003,
Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: OT-MW1	8: OT-MW2	9: OT-MW3
Sample Date & Time					04-Apr-23	04-Apr-23 14:30	04-Apr-23
Temp Upon Receipt [@ London Lab °C]	***	***	***	***	***	***	***
Temp Upon Receipt [@ Lakefield Lab °C]	***	***	***	***	***	***	***
BOD5 [mg/L]	06-Apr-23	13:58	11-Apr-23	12:10	< 4	< 4	< 4
TSS [mg/L]	10-Apr-23	07:48	11-Apr-23	12:36	8760	2640	3300
Alkalinity [mg/L as CaCO3]	10-Apr-23	15:23	12-Apr-23	11:23	232	244	303
pH [No unit]	10-Apr-23	15:23	12-Apr-23	11:23	7.91	8.03	7.94
Conductivity [uS/cm]	10-Apr-23	15:23	12-Apr-23	11:23	584	479	1430
TDS [mg/L]	10-Apr-23	15:55	11-Apr-23	14:01	371	274	843
COD [mg/L]	10-Apr-23	07:46	11-Apr-23	12:10	< 8	< 8	< 8
TKN [as N mg/L]	11-Apr-23	09:53	13-Apr-23	14:07	0.86	0.36	< 0.05
NH3+NH4 [as N mg/L]	10-Apr-23	21:24	11-Apr-23	10:25	0.05	0.04	< 0.04
Total P [mg/L]	11-Apr-23	14:23	13-Apr-23	07:52	0.80	1.50	1.96
4AAP-Phenolics [mg/L]	06-Apr-23	10:47	10-Apr-23	11:51	< 0.002	< 0.002	< 0.002
SO4 [mg/L]	11-Apr-23	07:32	12-Apr-23	17:44	35	10	56
Cl [mg/L]	11-Apr-23	07:34	12-Apr-23	17:44	23	14	320
NO2 [as N mg/L]	10-Apr-23	17:03	12-Apr-23	10:45	< 0.03	< 0.03	< 0.03
NO3 [as N mg/L]	10-Apr-23	17:03	12-Apr-23	10:45	8.73	1.81	0.60
DOC [mg/L]	11-Apr-23	15:34	12-Apr-23	08:49	1	1	2
Hg (diss) [mg/L]	12-Apr-23	10:23	13-Apr-23	06:42	< 0.00001	< 0.00001	< 0.00001
As (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.0004	< 0.0002	0.0009
Ba (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.0614	0.0237	0.397
B (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.037	0.015	0.019
Ca (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	91.8	88.6	133
Cd (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.000012	0.000006	0.000013
Cr (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.00070	0.00054	0.00020
Cu (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.0044	0.0114	0.0173
Fe (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.008	0.018	0.021
K (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	1.11	0.841	2.42
Mg (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	17.8	12.6	43.6
Mn (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.0149	0.00304	0.257
Na (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	3.34	4.68	150
Pb (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	< 0.00009	< 0.00009	< 0.00009

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Project : 191-06761-03-100-1003, Otterville Landfill Site GW
LR Report : CA40055-APR23

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	7: OT-MW1	8: OT-MW2	9: OT-MW3
Zn (diss) [mg/L]	14-Apr-23	09:00	17-Apr-23	10:18	0.002	0.002	< 0.002
Benzene [ug/L]	11-Apr-23	12:04	12-Apr-23	12:08	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	11-Apr-23	12:04	12-Apr-23	12:08	< 0.5	< 0.5	< 0.5
Dichloromethane [µg/L]	11-Apr-23	12:04	12-Apr-23	12:08	< 0.5	< 0.5	< 0.5
Toluene [ug/L]	11-Apr-23	12:04	12-Apr-23	12:08	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	11-Apr-23	12:04	12-Apr-23	12:08	< 0.2	< 0.2	< 0.2

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: N/A

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - drinking water to MDL	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Skalar	ME-CA-[ENV]SFA-LAK-AN-009
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005

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LR Report : CA40055-APR23

Parameter	Description	SGS Method Code
Total Kjeldahl Nitrogen (N)	Tot. kjeldahl Nitrogen by Skalar - drinking water	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

Brad Moore Hon. B.Sc
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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Project : 191-06761-03-100-1003, Otterville Landfill Site GW
LR Report : CA10055-APR23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0134-APR23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	90	60	130	100	50	140	
Benzene	0.5	ug/L	<0.5			ND	30	94	60	130	104	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	90	60	130	98	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	92	60	130	104	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	95	50	140	102	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0135-APR23														
Alkalinity	2	mg/L as Ca	< 2			1	20	100	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0070-APR23														
Ammonia+Ammonium (N)	0.04	mg/L	<0.04			0	10	100	90	110	91	75	125	
Anions by discrete analyzer - QCBatchID: DIO5027-APR23														
Chloride	1	mg/L	<1			2	20	105	80	120	111	75	125	
Sulphate	2	mg/L	<2			ND	20	108	80	120	112	75	125	
Anions by IC - QCBatchID: DIO0178-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			0	20	99	90	110	101	75	125	
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	99	90	110	107	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0010-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			7	30	95	70	130	NV	70	130	
Carbon by SFA - QCBatchID: SKA0080-APR23														
Dissolved Organic Carbon	1	mg/L	<1			ND	20	102	90	110	93	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0118-APR23														
Chemical Oxygen Demand	8	mg/L	<8			ND	20	108	80	120	100	75	125	
Conductivity - QCBatchID: EWL0135-APR23														
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0012-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	100	80	120	110	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0040-APR23														
Arsenic (dissolved)	0.0002	mg/L	<0.0002			13	20	98	90	110	101	70	130	
Barium (dissolved)	0.00008	mg/L	<0.00002			3	20	96	90	110	74	70	130	
Boron (dissolved)	0.002	mg/L	<0.002			7	20	103	90	110	93	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003			1	20	99	90	110	102	70	130	

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Project : 191-06761-03-100-1003, Otterville Landfill Site GW
LR Report : CA10055-APR23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Calcium (dissolved)	0.01	mg/L	<0.01			1	20	99	90	110	91	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			5	20	98	90	110	116	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			4	20	100	90	110	80	70	130
Iron (dissolved)	0.007	mg/L	<0.007			2	20	97	90	110	100	70	130
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	100	90	110	90	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			4	20	99	90	110	73	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			2	20	102	90	110	77	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			0	20	100	90	110	85	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			2	20	105	90	110	89	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			0	20	98	90	110	73	70	130
pH - QCBatchID: EWL0135-APR23													
pH	0.05	No unit	NA			3		100			NA		
Phenols by SFA - QCBatchID: SKA0061-APR23													
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	95	80	120	107	75	125
Phosphorus by SFA - QCBatchID: SKA0091-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			3	10	100	90	110	93	75	125
Solids Analysis - QCBatchID: EWL0137-APR23													
Total Dissolved Solids	30	mg/L	<30			2	20	101	80	120	NA		
Suspended Solids - QCBatchID: EWL0119-APR23													
Total Suspended Solids	2	mg/L	< 2			2	10	101	90	110	NA		
Total Nitrogen - QCBatchID: SKA0086-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			1	10	100	90	110	100	75	125
Total Nitrogen - QCBatchID: SKA0104-APR23													
Total Kjeldahl Nitrogen (N)	0.05	mg/L	<0.05			0	10	100	90	110	100	75	125

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Project : 191-06761-03-100-1003

27-April-2023

WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10, Windsor
Canada, N8W 5V7
Phone: 905-687-1771 x 240, Fax:

Date Rec. : 17 April 2023
LR Report: **CA40193-APR23**
Reference: 191-06761-03, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: RL	6: GH-P1
Sample Date & Time						17-Apr-23 12:45
Temp Upon Receipt [°C]	***	***	***	***	***	***
BOD5 [mg/L]	18-Apr-23	16:53	24-Apr-23	12:50	2	4
pH [No unit]	18-Apr-23	08:28	20-Apr-23	10:11	0.05	7.88
Conductivity [uS/cm]	18-Apr-23	08:28	20-Apr-23	10:11	2	458
Alkalinity [mg/L as CaCO3]	18-Apr-23	08:28	20-Apr-23	10:11	2	266
TDS [mg/L]	18-Apr-23	08:46	20-Apr-23	09:10	30	246
COD [mg/L]	18-Apr-23	17:35	24-Apr-23	13:05	8	11
DOC [mg/L]	19-Apr-23	15:32	20-Apr-23	16:08	1.0	1.1
Cl [mg/L]	24-Apr-23	12:54	24-Apr-23	14:56	1	5
SO4 [mg/L]	24-Apr-23	12:51	24-Apr-23	14:56	2	10
NO2 [as N mg/L]	21-Apr-23	06:58	27-Apr-23	09:58	0.03	< 0.03
NO3 [as N mg/L]	21-Apr-23	06:58	27-Apr-23	09:58	0.06	< 0.06
NO2+NO3 [as N mg/L]	21-Apr-23	06:58	27-Apr-23	09:58	0.06	< 0.06
NH3+NH4 [as N mg/L]	20-Apr-23	17:24	21-Apr-23	14:16	0.1	0.3
TKN [as N mg/L]	20-Apr-23	17:05	24-Apr-23	10:05	0.5	0.7
TSS [mg/L]	18-Apr-23	13:56	19-Apr-23	14:17	2	7
4AAP-Phenolics [mg/L]	17-Apr-23	08:12	18-Apr-23	09:10	0.002	< 0.002
Total P [mg/L]	20-Apr-23	15:37	21-Apr-23	13:11	0.03	< 0.03
Hg (diss) [mg/L]	18-Apr-23	21:32	19-Apr-23	16:41	1e-005	< 0.00001
Ca (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.01	56.9
Mg (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.001	22.8
Na (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.01	14.1
K (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.009	1.19
As (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.0002	0.0052
Ba (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	2e-005	0.138
B (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	---	0.057

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0003313372

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Project : 191-06761-03-100-1003

LR Report : **CA40193-APR23**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: RL	6: GH-P1
Cd (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.0001	0.000005
Cr (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.003	0.00033
Cu (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.001	0.0047
Fe (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	---	1.88
Pb (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	1e-005	< 0.001
Mn (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	---	0.032
Zn (diss) [mg/L]	22-Apr-23	17:57	24-Apr-23	14:14	0.002	0.003
Benzene [mg/L]	22-Apr-23	08:21	24-Apr-23	11:28	0.5	< 0.0005
1,4-Dichlorobenzene [mg/L]	22-Apr-23	08:21	24-Apr-23	11:28	0.5	< 0.0005
Dichloromethane [mg/L]	22-Apr-23	08:21	24-Apr-23	11:28	0.5	< 0.0005
Toluene [mg/L]	22-Apr-23	08:21	24-Apr-23	11:28	0.5	< 0.0005
Vinyl Chloride [mg/L]	22-Apr-23	08:21	24-Apr-23	11:28	0.2	< 0.0002

Temperature of Sample upon Receipt: 11 degrees C

BOD spike low, accepting results based off all other qc

Method Descriptions

Parameter	Description	SGS Method Code
1,4-Dichlorobenzene	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
4AAP-Phenolics	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
Alkalinity	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
Ammonia+Ammonium (N)	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007
Arsenic (dissolved)	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Barium (dissolved)	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Benzene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Biochemical Oxygen Demand (BOD5)	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
Boron (dissolved)	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Cadmium (dissolved)	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Calcium (dissolved)	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Chemical Oxygen Demand	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
Chloride	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Chromium (dissolved)	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Conductivity	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
Copper (dissolved)	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Dichloromethane	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Dissolved Organic Carbon	DOC by Combustion/Oxidation	ME-CA-[ENV]EWL-LAK-AN-023
Iron (dissolved)	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Lead (dissolved)	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Magnesium (dissolved)	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Manganese (dissolved)	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Mercury (dissolved)	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
Nitrate (as N)	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrate + Nitrite (as N)	Total Nitrate/Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
Nitrite (as N)	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001

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Project : 191-06761-03-100-1003

LR Report : **CA40193-APR23**

Parameter	Description	SGS Method Code
pH	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
Phosphorus (total)	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
Potassium (dissolved)	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sodium (dissolved)	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
Sulphate	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
Toluene	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
Total Dissolved Solids	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
Total Kjeldahl Nitrogen	Tot. kjeldahl Nitrogen by Skalar	ME-CA-[ENV]SFA-LAK-AN-002
Total Suspended Solids	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
Vinyl Chloride	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
Zinc (dissolved)	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

Brad Moore Hon. B.Sc
Project Specialist,
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Project : 191-06761-03-100-1003
LR Report : **CA40193-APR23**

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0340-APR23														
1,4-Dichlorobenzene	0.0005	mg/L	<0.0005			ND	30	89	60	130	105	50	140	
Benzene	0.0005	mg/L	<0.0005			ND	30	91	60	130	112	50	140	
Dichloromethane	0.0005	mg/L	<0.0005			ND	30	89	60	130	107	50	140	
Toluene	0.0005	mg/L	<0.0005			ND	30	90	60	130	108	50	140	
Vinyl Chloride	0.0002	mg/L	<0.0002			ND	30	97	50	140	119	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0310-APR23														
Alkalinity	2	mg/L as Ca	< 2			0	20	96	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0185-APR23														
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			1	10	99	90	110	99	75	125	
Anions by discrete analyzer - QCBatchID: DIO5084-APR23														
Chloride	1	mg/L	<1			11	20	103	80	120	97	75	125	
Sulphate	2	mg/L	<2			2	20	109	80	120	90	75	125	
Anions by IC - QCBatchID: DIO0472-APR23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	104	90	110	107	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	101	90	110	95	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0030-APR23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			3	30	93	70	130	57	70	130	
Carbon by Combustion/Oxidation - QCBatchID: EWL0359-APR23														
Dissolved Organic Carbon	1.0	mg/L	<1.0			0	20	101	90	110	104	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0331-APR23														
Chemical Oxygen Demand	8	mg/L	<8			0	20	108	80	120	111	75	125	
Conductivity - QCBatchID: EWL0310-APR23														
Conductivity	2	uS/cm	< 2			0	20	99	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0026-APR23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	90	80	120	114	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0118-APR23														
Arsenic (dissolved)	0.0002	mg/L	<0.0002			11	20	105	90	110	124	70	130	
Barium (dissolved)	0.00008	mg/L	<0.00008			8	20	104	90	110	105	70	130	
Cadmium (dissolved)	0.000003	mg/L	<0.000003			15	20	103	90	110	117	70	130	

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Project : 191-06761-03-100-1003

LR Report : **CA40193-APR23**

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Calcium (dissolved)	0.01	mg/L	<0.01			7	20	100	90	110	102	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			ND	20	108	90	110	91	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			5	20	101	90	110	107	70	130
Iron (dissolved)	0.01	mg/L	<0.007			12	20	101	90	110	100	70	130
Lead (dissolved)	0.001	mg/L	<0.00009			ND	20	101	90	110	101	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			7	20	98	90	110	102	70	130
Manganese (dissolved)	0.002	mg/L	<0.00001			2	20	106	90	110	107	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			10	20	101	90	110	106	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			6	20	101	90	110	106	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			ND	20	103	90	110	106	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0187-APR23													
Boron (dissolved)	0.002	mg/L	<0.002			3	20	98	90	110	95	70	130
pH - QCBatchID: EWL0310-APR23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0141-APR23													
4AAP-Phenolics	0.002	mg/L	<0.002			ND	10	95	80	120	109	75	125
Phosphorus by SFA - QCBatchID: SKA0184-APR23													
Phosphorus (total)	0.03	mg/L	<0.03			2	10	100	90	110	96	75	125
Solids Analysis - QCBatchID: EWL0313-APR23													
Total Dissolved Solids	30	mg/L	<30			1	20	93	80	120	NA		
Suspended Solids - QCBatchID: EWL0324-APR23													
Total Suspended Solids	2	mg/L	< 2			4	10	90	90	110	NA		
Total Nitrogen - QCBatchID: SKA0192-APR23													
Total Kjeldahl Nitrogen	0.5	as N mg/L	<0.5			1	10	98	90	110	96	75	125

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WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10, Windsor
Canada, N8W 5V7
Phone: 905-687-1771 x 240, Fax:

Project : 191-06761-100-1003, Tillsonburg Landfill Site - SW

27-October-2023

Date Rec. : 18 October 2023
LR Report: **CA40144-OCT23**
Reference: PO#:191-06761-100-1003, Albert Siertsema

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: Client Limits	7: SW1	8: SW2	9: SW3	10: SW4	11: SW5
Sample Date & Time					17-Oct-23 14:20	17-Oct-23 13:30	17-Oct-23 14:00	17-Oct-23 12:45	17-Oct-23 13:00
Temp Upon Receipt [°C]	***	***	***	***	***	***	***	***	***
BOD5 [mg/L]	19-Oct-23	24-Oct-23	2	---	< 4	< 4	6	< 4	< 4
pH [No unit]	20-Oct-23	25-Oct-23	0.05	---	8.13	8.21	7.72	8.10	8.07
Conductivity [uS/cm]	20-Oct-23	25-Oct-23	2	---	695	700	819	975	785
TDS [mg/L]	21-Oct-23	24-Oct-23	30	---	429	394	537	620	406
TSS [mg/L]	20-Oct-23	25-Oct-23	2	---	8	11	6	42	27
Hardness [mg/L as CaCO3]	24-Oct-23	25-Oct-23	0.05	---	288	286	417	485	340
Alkalinity [mg/L as CaCO3]	20-Oct-23	25-Oct-23	2	---	226	224	399	506	305
Cl [mg/L]	27-Oct-23	27-Oct-23	1	---	53	55	18	19	53
SO4 [mg/L]	27-Oct-23	27-Oct-23	2	---	48	48	15	8	41
NO2 [as N mg/L]	21-Oct-23	25-Oct-23	0.03	---	< 0.03	< 0.03	0.22	0.04	< 0.03
NO3 [as N mg/L]	21-Oct-23	25-Oct-23	0.06	---	4.89	4.96	6.94	3.55	0.11
NO2+NO3 [as N mg/L]	21-Oct-23	25-Oct-23	0.06	---	4.89	4.96	7.16	3.59	0.11
NH3+NH4 [as N mg/L]	20-Oct-23	23-Oct-23	0.1	---	< 0.1	< 0.1	< 0.1	2.3	< 0.1
TKN [as N mg/L]	21-Oct-23	23-Oct-23	0.5	---	< 0.5	< 0.5	< 0.5	2.4	0.5

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SGS Canada Inc.
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Project : 191-06761-100-1003, Tillsonburg Landfill Site - SW
LR Report : CA40144-OCT23

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: RL	6: Client Limits	7: SW1	8: SW2	9: SW3	10: SW4	11: SW5
4AAP-Phenolics [mg/L]	20-Oct-23	23-Oct-23	0.001	---	< 0.001	0.001	0.002	< 0.001	< 0.001
Hg (diss) [mg/L]	24-Oct-23	25-Oct-23	0.0000	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
P (tot) [mg/L]	24-Oct-23	25-Oct-23	0.003	---	0.054	0.057	0.015	0.007	0.037
COD [mg/L]	20-Oct-23	24-Oct-23	8	---	< 8	9	12	21	< 8
As (tot) [mg/L]	24-Oct-23	25-Oct-23	0.002	0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001
Ba (tot) [mg/L]	24-Oct-23	25-Oct-23	0.002	0.002	0.045	0.045	0.032	0.099	0.140
B (tot) [mg/L]	24-Oct-23	25-Oct-23	0.002	---	0.037	0.038	0.014	0.370	0.177
Cd (tot) [mg/L]	24-Oct-23	25-Oct-23	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Cr (tot) [mg/L]	24-Oct-23	25-Oct-23	0.003	0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
Cu (tot) [mg/L]	24-Oct-23	25-Oct-23	0.001	0.001	0.003	0.002	0.002	0.002	0.002
Fe (tot) [mg/L]	24-Oct-23	25-Oct-23	0.01	0.01	0.18	0.20	0.13	2.10	0.89
Zn (tot) [mg/L]	24-Oct-23	25-Oct-23	0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Pb (tot) [mg/L]	24-Oct-23	25-Oct-23	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzene [ug/L]	20-Oct-23	23-Oct-23	0.5	---	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene [µg/L]	20-Oct-23	23-Oct-23	0.5	---	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane [µg/L]	20-Oct-23	23-Oct-23	0.5	---	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene [ug/L]	20-Oct-23	23-Oct-23	0.5	---	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride [µg/L]	20-Oct-23	23-Oct-23	0.2	---	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Analysis	12: SWDUP	13: Trip Blank
Sample Date & Time	17-Oct-23	17-Oct-23
Temp Upon Receipt [°C]	***	***
BOD5 [mg/L]	< 4	---
pH [No unit]	8.29	---
Conductivity [uS/cm]	696	---
TDS [mg/L]	411	---
TSS [mg/L]	8	---
Hardness [mg/L as CaCO3]	278	---

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Analysis	12: SWDUP	13: Trip Blank
Alkalinity [mg/L as CaCO3]	226	---
Cl [mg/L]	53	---
SO4 [mg/L]	47	---
NO2 [as N mg/L]	< 0.03	---
NO3 [as N mg/L]	4.89	---
NO2+NO3 [as N mg/L]	4.89	---
NH3+NH4 [as N mg/L]	< 0.1	---
TKN [as N mg/L]	< 0.5	---
4AAP-Phenolics [mg/L]	< 0.001	---
Hg (diss) [mg/L]	< 0.0001	---
P (tot) [mg/L]	0.051	---
COD [mg/L]	18	---
As (tot) [mg/L]	< 0.001	---
Ba (tot) [mg/L]	0.043	---
B (tot) [mg/L]	0.038	---
Cd (tot) [mg/L]	< 0.0001	---
Cr (tot) [mg/L]	< 0.003	---
Cu (tot) [mg/L]	0.002	---
Fe (tot) [mg/L]	0.18	---
Zn (tot) [mg/L]	< 0.005	---
Pb (tot) [mg/L]	< 0.001	---
Benzene [ug/L]	---	< 0.5
1,4-Dichlorobenzene [µg/L]	---	< 0.5
Dichloromethane [µg/L]	---	< 0.5
Toluene [ug/L]	---	< 0.5
Vinyl Chloride [µg/L]	---	< 0.2

PWQO - Provincial Water Quality Objectives
Limits based on MOE PIBS 3303E publication July 1994 reprinted February 1999
a PWQO limit based on pH >6.5-9.0 (at pH 4.5-5.5 PWQO = 15ug/L, pH >5.5-6.5 PWQO 10% above background levels in geological area.
b PWQO limit based on Hardness <75 mg/L (For Hardness >75 mg/L PWQO = 1100 ug/L)
c PWQO limit based on Hardness 0-100 mg/L(For Hardness >100 mg/L PWQO = 0.5 ug/L)
d PWQO limit based on Cr VI (PWQO limit for Cr III = 8.9 ug/L)

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e PWQO limit based on Hardness 0-20 (For Hardness >20 mg/L PWQO = 5 ug/L)
f PWQO limit based on Hardness <30 (For Hardness 30-80 PWQO = 3 ug/L, & >80 PWQO=5)

Temperature of Sample upon Receipt: 3 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Phenol Dup within RL, therefore data is acceptable
BOD spike is low, accepted based on all other QC

Method Descriptions

Units	Description	SGS Method Code
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	phenol by Skalar - surface waters	ME-CA-[ENV]SFA-LAK-AN-006
mg/L as CaCO3	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
as N mg/L	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007
mg/L	Asby ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ba by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
mg/L	B by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cd by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
mg/L	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
mg/L	Cr by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
uS/cm	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Cu by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L as CaCO3	Hardness (CaCO3) by ICP-MS	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Fe by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Pb by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
mg/L	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Total Nitrate/Nitrite by Ion Chromatograph	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
No unit	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	P by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
ug/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
as N mg/L	Tot. kjeldahl Nitrogen by Skalar	ME-CA-[ENV]SFA-LAK-AN-002
mg/L	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
ug/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004

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Units	Description	SGS Method Code
mg/L	Zn by ICP-MS solution	ME-CA-[ENV]SPE-LAK-AN-006

Jill Campbell, B.Sc.,GISAS
Project Specialist,
Environment, Health & Safety

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Project : 191-06761-100-1003, Tillsonburg Landfill Site - SW
LR Report : CA40144-OCT23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0354-OCT23														
1,4-Dichlorobenzene	0.5	ug/L	<0.5			ND	30	94	60	130	100	50	140	
Benzene	0.5	ug/L	<0.5			ND	30	93	60	130	99	50	140	
Dichloromethane	0.5	ug/L	<0.5			ND	30	90	60	130	100	50	140	
Toluene	0.5	ug/L	<0.5			ND	30	95	60	130	99	50	140	
Vinyl Chloride	0.2	ug/L	<0.2			ND	30	87	50	140	94	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0501-OCT23														
Alkalinity	2	mg/L as Ca	< 2			0	20	104	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0178-OCT23														
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			0	10	99	90	110	98	75	125	
Anions by discrete analyzer - QCBatchID: DIO5085-OCT23														
Chloride	1	mg/L	<1			5	20	101	80	120	106	75	125	
Sulphate	2	mg/L	<2			ND	20	102	80	120	100	75	125	
Anions by IC - QCBatchID: DIO0585-OCT23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	100	90	110	100	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	98	90	110	102	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0038-OCT23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			14	30	103	70	130	69	70	130	
Chemical Oxygen Demand - QCBatchID: EWL0476-OCT23														
Chemical Oxygen Demand	8	mg/L	<8			0	20	94	80	120	95	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0477-OCT23														
Chemical Oxygen Demand	8	mg/L	<8			6	20	116	80	120	101	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0525-OCT23														
Chemical Oxygen Demand	8	mg/L	<8			11	20	94	80	120	105	75	125	
Conductivity - QCBatchID: EWL0501-OCT23														
Conductivity	2	uS/cm	< 2			0	20	96	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0045-OCT23														
Mercury (dissolved)	0.0001	mg/L	< 0.00001			ND	20	93	80	120	98	70	130	
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0197-OCT23														
Arsenic (total)	0.001	mg/L	<0.0002			2	20	99	90	110	101	70	130	

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Project : 191-06761-100-1003, Tillsonburg Landfill Site - SW
LR Report : CA40144-OCT23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Barium (total)	0.002	mg/L	<0.00008			2	20	101	90	110	102	70	130	
Boron (total)	0.002	mg/L	<0.002			3	20	98	90	110	92	70	130	
Cadmium (total)	0.0001	mg/L	<0.000003			12	20	103	90	110	93	70	130	
Chromium (total)	0.003	mg/L	<0.00008			8	20	102	90	110	97	70	130	
Copper (total)	0.001	mg/L	<0.0002			3	20	102	90	110	101	70	130	
Iron (total)	0.01	mg/L	<0.007			6	20	95	90	110	77	70	130	
Lead (total)	0.001	mg/L	<0.00009			4	20	107	90	110	100	70	130	
Phosphorus (total)	0.003	mg/L	<0.003			6	20	99	90	110	NV	70	130	
Zinc (total)	0.005	mg/L	<0.002			4	20	101	90	110	122	70	130	
pH - QCBatchID: EWL0501-OCT23														
pH	0.05	No unit	NA			0		100			NA			
Phenols by SFA - QCBatchID: SKA0185-OCT23														
4AAP-Phenolics	0.001	mg/L	<0.001			13	10	103	80	120	104	75	125	
Solids Analysis - QCBatchID: EWL0510-OCT23														
Total Dissolved Solids	30	mg/L	<30			4	20	106	80	120	NA			
Suspended Solids - QCBatchID: EWL0499-OCT23														
Total Suspended Solids	2	mg/L	< 2			3	10	101	90	110	NA			
Suspended Solids - QCBatchID: EWL0524-OCT23														
Total Suspended Solids	2	mg/L	< 2			0	10	95	90	110	NA			
Suspended Solids - QCBatchID: EWL0564-OCT23														
Total Suspended Solids	2	mg/L	< 2			1	10	94	90	110	NA			
Total Nitrogen - QCBatchID: SKA0180-OCT23														
Total Kjeldahl Nitrogen	0.5	as N mg/L	<0.5			ND	10	101	90	110	108	75	125	

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Project : 191-06761-03-100-1003, Otterville Landfill Site - GW

30-October-2023

WSP Canada Inc.
Attn : Albert Siertsema

1821 Provincial Road, Unit 10, Windsor
Canada, N8W 5V7
Phone: 905-687-1771 x 240, Fax:

Date Rec. : 18 October 2023
LR Report: **CA40145-OCT23**
Reference: PO#:191-06761-03-100-1003, Albert Siertsema

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: RL	6: Client Limits	7: GW1
Sample Date & Time							17-Oct-23 10:00
Temp Upon Receipt [°C]	***	***	***	***	***	***	***
BOD5 [mg/L]	19-Oct-23	17:19	24-Oct-23	11:33	2	---	< 4
pH [No unit]	20-Oct-23	17:10	25-Oct-23	09:28	0.05	---	7.93
Conductivity [uS/cm]	20-Oct-23	17:10	25-Oct-23	09:28	2	---	698
Alkalinity [mg/L as CaCO3]	20-Oct-23	17:10	25-Oct-23	09:28	2	---	293
TDS [mg/L]	24-Oct-23	12:56	26-Oct-23	13:49	30	---	343
COD [mg/L]	20-Oct-23	08:53	24-Oct-23	11:33	8	---	12
DOC [mg/L]	23-Oct-23	14:15	24-Oct-23	15:05	1.0	---	1.1
Cl [mg/L]	30-Oct-23	13:01	30-Oct-23	16:06	1	---	22
SO4 [mg/L]	30-Oct-23	12:59	30-Oct-23	16:06	2	---	34
NO2 [as N mg/L]	22-Oct-23	17:22	26-Oct-23	17:29	0.03	---	< 0.03
NO3 [as N mg/L]	22-Oct-23	17:22	26-Oct-23	17:29	0.06	---	9.24
NO2+NO3 [as N mg/L]	22-Oct-23	17:22	26-Oct-23	17:29	0.06	---	9.24
NH3+NH4 [as N mg/L]	21-Oct-23	14:29	24-Oct-23	11:29	0.1	---	< 0.1
TKN [as N mg/L]	21-Oct-23	14:27	23-Oct-23	13:10	0.5	---	< 0.5
TSS [mg/L]	24-Oct-23	13:50	26-Oct-23	15:58	2	---	291000
4AAP-Phenolics [mg/L]	20-Oct-23	16:21	23-Oct-23	12:42	0.002	---	< 0.002
Total P [mg/L]	21-Oct-23	14:26	24-Oct-23	13:10	0.03	---	1.52
Hg (diss) [mg/L]	24-Oct-23	10:17	26-Oct-23	16:11	1e-005	0.0001	< 0.00001
Ca (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:11	0.01	---	130
Mg (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:32	0.001	---	20.4
Na (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.01	---	3.56
K (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.009	---	1.01
As (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.0002	0.001	0.0004
Ba (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	2e-005	0.002	0.0575
B (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	---	---	0.016
Cd (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.0001	0.0001	0.000007
Cr (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.003	0.003	0.00077

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Project : 191-06761-03-100-1003, Otterville Landfill Site - GW
LR Report : CA40145-OCT23

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: RL	6: Client Limits	7: GW1
Cu (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.001	0.001	0.0026
Fe (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	---	0.01	< 0.01
Pb (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	1e-005	0.001	< 0.001
Mn (diss) [mg/L]	25-Oct-23	14:45	30-Oct-23	11:52	---	0.002	0.003
Zn (diss) [mg/L]	25-Oct-23	14:45	26-Oct-23	16:12	0.002	0.005	< 0.002
Benzene [mg/L]	20-Oct-23	14:51	23-Oct-23	12:33	0.5	---	< 0.0005
1,4-Dichlorobenzene [mg/L]	20-Oct-23	14:51	23-Oct-23	12:33	0.5	---	< 0.0005
Dichloromethane [mg/L]	20-Oct-23	14:51	23-Oct-23	12:33	0.5	---	< 0.0005
Toluene [mg/L]	20-Oct-23	14:51	23-Oct-23	12:33	0.5	---	0.0005
Vinyl Chloride [mg/L]	20-Oct-23	14:51	23-Oct-23	12:33	0.2	---	< 0.0002

Analysis	8: GW2	9: GW3	10: GW Dup
Sample Date & Time	17-Oct-23 11:00	17-Oct-23 11:30	17-Oct-23
Temp Upon Receipt [°C]	***	***	***
BOD5 [mg/L]	< 4	7	5
pH [No unit]	7.97	8.01	7.99
Conductivity [uS/cm]	1320	454	1390
Alkalinity [mg/L as CaCO3]	309	233	314
TDS [mg/L]	726	217	763
COD [mg/L]	8	20	18
DOC [mg/L]	1.4	6.7	3.1
Cl [mg/L]	5	180	200
SO4 [mg/L]	6	50	50
NO2 [as N mg/L]	< 0.03	< 0.03	< 0.03
NO3 [as N mg/L]	0.39	1.77	1.77
NO2+NO3 [as N mg/L]	0.39	1.77	1.77
NH3+NH4 [as N mg/L]	< 0.1	1.3	2.0
TKN [as N mg/L]	< 0.5	2.1	2.2
TSS [mg/L]	77600	66700	44600
4AAP-Phenolics [mg/L]	< 0.002	0.022	0.022
Total P [mg/L]	1.74	0.04	2.54
Hg (diss) [mg/L]	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	86.0	116	116
Mg (diss) [mg/L]	11.5	32.5	30.8
Na (diss) [mg/L]	3.51	57.4	56.3
K (diss) [mg/L]	0.564	2.19	2.22
As (diss) [mg/L]	< 0.0002	0.0013	0.0012
Ba (diss) [mg/L]	0.0164	0.289	0.293
B (diss) [mg/L]	0.021	0.023	0.008
Cd (diss) [mg/L]	0.000004	< 0.000003	< 0.000003
Cr (diss) [mg/L]	0.00085	0.00020	0.00023
Cu (diss) [mg/L]	0.0035	0.0008	0.0008

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LR Report : CA40145-OCT23

Analysis	8: GW2	9: GW3	10: GW Dup
Fe (diss) [mg/L]	< 0.01	0.09	0.09
Pb (diss) [mg/L]	< 0.001	< 0.001	< 0.001
Mn (diss) [mg/L]	< 0.002	0.065	0.066
Zn (diss) [mg/L]	0.002	< 0.002	< 0.002
Benzene [mg/L]	< 0.0005	< 0.0005	< 0.0005
1,4-Dichlorobenzene [mg/L]	< 0.0005	< 0.0005	< 0.0005
Dichloromethane [mg/L]	< 0.0005	< 0.0005	< 0.0005
Toluene [mg/L]	< 0.0005	< 0.0005	< 0.0005
Vinyl Chloride [mg/L]	< 0.0002	< 0.0002	< 0.0002

Temperature of Sample upon Receipt: 3 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

BOD spike low, accepted based on all other QC

Method Descriptions

Units	Description	SGS Method Code
mg/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	phenol by Skalar -solution	ME-CA-[ENV]SFA-LAK-AN-006
mg/L as CaCO3	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
as N mg/L	NH3+NH4 by Skalar - solution	ME-CA-[ENV]SFA-LAK-AN-007
mg/L	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Biochemical Oxygen Demand (BOD5)	ME-CA-[ENV]EWL-LAK-AN-007
mg/L	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Chemical Oxygen Demand	ME-CA-[ENV]EWL-LAK-AN-009
mg/L	Chloride by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
mg/L	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
uS/cm	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	DOC by Combustion/Oxidation	ME-CA-[ENV]EWL-LAK-AN-023
mg/L	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
mg/L	Nitrate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Total Nitrate/Nitrite by Ion Chromatograph	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Nitrite by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
No unit	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Total Phos. By Skalar - complete digestion	ME-CA-[ENV]SFA-LAK-AN-003
mg/L	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sulphate by discrete colourmetric analysis	ME-CA-[ENV]EWL-LAK-AN-026
mg/L	VOC wtr - BTEX	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Total Dissolved Solids by Gravimetric	ME-CA-[ENV]EWL-LAK-AN-005
as N mg/L	Tot. kjeldahl Nitrogen by Skalar	ME-CA-[ENV]SFA-LAK-AN-002
mg/L	Total Suspended Solids	ME-CA-[ENV]EWL-LAK-AN-004
mg/L	VOC wtr	ME-CA-[ENV]GC-LAK-AN-004
mg/L	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

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Project : 191-06761-03-100-1003, Otterville Landfill Site - GW
LR Report : CA40145-OCT23

Maarit Wolfe, Hon.B.Sc
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003517407

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Project : 191-06761-03-100-1003, Otterville Landfill Site - GW
LR Report : CA40145-OCT23

Quality Control Report

Organic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Volatile Organics - QCBatchID: GCM0354-OCT23														
1,4-Dichlorobenzene	0.0005	mg/L	<0.0005			ND	30	94	60	130	100	50	140	
Benzene	0.0005	mg/L	<0.0005			ND	30	93	60	130	99	50	140	
Dichloromethane	0.0005	mg/L	<0.0005			ND	30	90	60	130	100	50	140	
Toluene	0.0005	mg/L	<0.0005			ND	30	95	60	130	99	50	140	
Vinyl Chloride	0.0002	mg/L	<0.0002			ND	30	87	50	140	94	50	140	

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Alkalinity - QCBatchID: EWL0501-OCT23														
Alkalinity	2	mg/L as Ca	< 2			0	20	104	80	120	NA			
Ammonia by SFA - QCBatchID: SKA0188-OCT23														
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			0	10	99	90	110	90	75	125	
Ammonia by SFA - QCBatchID: SKA0197-OCT23														
Ammonia+Ammonium (N)	0.1	as N mg/L	<0.1			2	10	101	90	110	109	75	125	
Anions by discrete analyzer - QCBatchID: DIO5095-OCT23														
Chloride	1	mg/L	<1			0	20	102	80	120	85	75	125	
Sulphate	2	mg/L	<2			0	20	105	80	120	111	75	125	
Anions by IC - QCBatchID: DIO0592-OCT23														
Nitrate (as N)	0.06	mg/L	<0.06			ND	20	101	90	110	100	75	125	
Nitrate + Nitrite (as N)	0.06	mg/L	<0.06			NA		NA			NA			
Nitrite (as N)	0.03	mg/L	<0.03			ND	20	98	90	110	101	75	125	
Biochemical Oxygen Demand - QCBatchID: BOD0038-OCT23														
Biochemical Oxygen Demand (BOD5)	2	mg/L	< 2			14	30	103	70	130	69	70	130	
Carbon by Combustion/Oxidation - QCBatchID: EWL0543-OCT23														
Dissolved Organic Carbon	1.0	mg/L	<1.0			ND	20	101	90	110	99	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0475-OCT23														
Chemical Oxygen Demand	8	mg/L	<8			7	20	98	80	120	106	75	125	
Chemical Oxygen Demand - QCBatchID: EWL0477-OCT23														
Chemical Oxygen Demand	8	mg/L	<8			6	20	116	80	120	101	75	125	
Conductivity - QCBatchID: EWL0501-OCT23														
Conductivity	2	uS/cm	< 2			0	20	96	90	110	NA			
Mercury by CVAAS - QCBatchID: EHG0045-OCT23														
Mercury (dissolved)	0.00001	mg/L	< 0.00001			ND	20	93	80	120	98	70	130	

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Project : 191-06761-03-100-1003, Otterville Landfill Site - GW
LR Report : CA40145-OCT23

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0183-OCT23													
Arsenic (dissolved)	0.0002	mg/L	<0.0002			0	20	98	90	110	105	70	130
Barium (dissolved)	0.00008	mg/L	<0.00008			1	20	103	90	110	103	70	130
Boron (dissolved)	0.002	mg/L	<0.002			3	20	91	90	110	104	70	130
Cadmium (dissolved)	0.000003	mg/L	<0.000003			ND	20	99	90	110	99	70	130
Calcium (dissolved)	0.01	mg/L	<0.01			2	20	92	90	110	102	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			11	20	100	90	110	107	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			10	20	97	90	110	99	70	130
Iron (dissolved)	0.01	mg/L	<0.007			3	20	93	90	110	82	70	130
Lead (dissolved)	0.001	mg/L	<0.00009			ND	20	97	90	110	97	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			2	20	105	90	110	102	70	130
Manganese (dissolved)	0.002	mg/L	<0.00001			1	20	102	90	110	86	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			1	20	109	90	110	102	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			1	20	101	90	110	99	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			ND	20	97	90	110	111	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0263-OCT23													
Manganese (dissolved)	0.002	mg/L	<0.00001			1	20	96	90	110	111	70	130
pH - QCBatchID: EWL0501-OCT23													
pH	0.05	No unit	NA			0		100			NA		
Phenols by SFA - QCBatchID: SKA0185-OCT23													
4AAP-Phenolics	0.002	mg/L	<0.002			13	10	103	80	120	104	75	125
Phosphorus by SFA - QCBatchID: SKA0189-OCT23													
Phosphorus (total)	0.03	mg/L	<0.03			4	10	100	90	110	83	75	125
Phosphorus by SFA - QCBatchID: SKA0199-OCT23													
Phosphorus (total)	0.03	mg/L	<0.03			7	10	99	90	110	93	75	125
Solids Analysis - QCBatchID: EWL0565-OCT23													
Total Dissolved Solids	30	mg/L	<30			1	20	100	80	120	NA		
Suspended Solids - QCBatchID: EWL0578-OCT23													
Total Suspended Solids	2	mg/L	< 2			0	10	103	90	110	NA		
Suspended Solids - QCBatchID: EWL0632-OCT23													
Total Suspended Solids	2	mg/L	< 2			1	10	97	90	110	NA		
Total Nitrogen - QCBatchID: SKA0184-OCT23													
Total Kjeldahl Nitrogen	0.5	as N mg/L	<0.5			ND	10	100	90	110	79	75	125