Hydrogeological Study Report

Norwood Municipal Water Supply

D.M. Wills Project Number 23-7549



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Partners in Engineering, Planning and Environmental Services
Peterborough

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Prepared for:
The Corporation of the Township of Asphodel-Norwood

Submissions Summary

Submission No.	Submission Title	Date of Release	Submissions Summary
1	Hydrogeological Study Report	November 17, 2026	Draft Submission for Township Review
2	Hydrogeological Study Report	November 19, 2026	Final Submission to Township

This report / proposal has been formatted considering the requirements of the Accessibility for Ontarians with Disabilities Act.

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Executive Summary

D.M. Wills Associates Limited (Wills) was retained by the Township of Asphodel-Norwood (Township) to conduct a hydrogeological study (Study) to assess whether the Village of Norwood municipal aquifer can sustain projected water demands through 2047. The Study supports a Permit to Take Water (PTTW) amendment for increased capacity and includes a Groundwater Under the Direct Influence of Surface Water (GUDI) assessment, undertaken in response to Ministry of Environment, Conservation and Parks (MECP) recommendations, to evaluate the potential for Mill Pond surface water to influence the municipal supply.

This report summarizes the results of Wills' 2021/2022 hydrogeological investigation together with the results of the 2024–2026 field program, including installation of Mill Pond monitoring wells and Ouse River piezometers, streamflow and karst mapping, hydraulic conductivity testing, and a 72-hour pumping test on the new Municipal Well (Well 5). These data were incorporated into an updated numerical groundwater model used to evaluate aquifer performance and GUDI status.

The Study considered both the Municipal Well Field area as well as the Mill Pond, Ouse River, and the Waste Disposal Site (WDS) north of Mill Pond, as well as the installation of new monitoring wells northeast of the WDS which significantly changed the interpretation of groundwater flow in the surficial deposits overlying bedrock.

New Well 5 was subjected to a 72-hour pumping test from which aquifer parameters were derived. These, along with aquifer parameters derived from previous well testing, were used to build a new groundwater model based on UTM coordinates.

The results of the modelling were a series of 25-year well capture zones from municipal wells pumping at various rates, the current estimated rate of 1,237 m³/d with Well 1B, 2, and 4 pumping, 1965 m³/d (the current PTTW rate) with different combinations of wells pumping, and 3,152 m³/d, the projected year 2047 rate with various wells pumping.

The 2026 numerical model indicates that the Norwood municipal water supply is not GUDI at the existing PTTW rates. Under the proposed primary duty-well configuration (Well 4 at 1,300 m³/d and Well 5 at 1,852 m³/d), 25-year capture zones remain west of the Mill Pond footprint, supporting a non-GUDI conclusion through the projected 2047 maximum-day demand of 3,152 m³/d.

Under the existing PTTW (1,965 m³/d), the projected maximum-day demand is expected to reach approximately 80% of the permitted rate (approximately 1,572 m³/d) between 2031 and 2032. Consistent with common MECP practice for municipal systems, it is recommended that planning for a PTTW amendment be initiated no later than when sustained water takings approach this 80% threshold.

The original 2023–2024 scope of work contemplated a planning horizon to 2043 and testing of both new Well 5 and new Well 6. The horizon has been extended to 2047, and Well 6 was deferred due to budget constraints (only Well 5 was installed and tested). Temporary higher-rate operation of the secondary/standby wells (Wells 1b and 2) can

meet maximum-day demand only through approximately 2042 and produces capture zones that encroach slightly into the Mill Pond footprint. Because such operation would be short-term and would typically occur at rates below the maximum-day values (which already include a peaking factor), the associated GUDI risk is considered low. Continuous long-term operation at the anticipated 2047 demand without Well 5 (or an equivalent) is not recommended; installation of Well 6 remains a recommended future measure for improved redundancy.

Modelling indicates that Wells 4 and 5 are suitable as the primary duty wells. The Township may elect either of the following operational approaches, both of which are supportable by the modelling:

- Permit Wells 4 and 5 as the sole duty wells, with Wells 1b and 2 designated as standby wells; or
- Permit all four wells as duty wells, with Wells 1b and 2 rotated into service at substantially lower rates to maintain well condition and operational readiness (their permitted maximum rates would remain at 788 m^3/day to accommodate contingency use).

It is recommended that Well 3 be abandoned in accordance with Ontario Regulation 903, as amended. The routine groundwater quality sampling program for the Municipal Wellfield should be updated to include iron, manganese, aluminum, and sodium as parameters. If sodium concentrations exceed 20 mg/L, the required notifications must be submitted to the Medical Officer of Health and residents must be informed of the elevated sodium in drinking water to protect the health of individuals on sodium restricted diets.

The Source Water Protection Plan must be updated to incorporate the 2026 model and the addition of Well 5. The technical work (including the 2026 model and this report) should be submitted to the Trent Conservation Coalition (TCC) through Otonabee Conservation for review, comment, and approval.

A long-term Monitoring Plan and a Contingency Plan will be developed as the next phase of the approved scope of work, once the Township has reviewed and is in agreement with the findings of this report. The Monitoring Plan will assess potential effects on the local ecosystem; the Contingency Plan will establish trigger mechanisms (based on baseline groundwater quality and availability) and mitigation measures, including protocols for either standby or low-rate rotation of Wells 1b and 2 and for temporary higher-rate contingency operation.

Wills will prepare and submit the PTTW amendment application to the MECP on behalf of the Township, following the Township's approval of this report, and receipt of the TCC Section 48 Notice of Complete Submission for the updated Source Water Protection Plan.

The Township may wish to consider the addition of filtration to the water treatment system. Detailed design drawings showing the connection of Well 5 to the Water Treatment Plan will be required to support the necessary Drinking Water Works Permit application.

1.0 Introduction

D.M. Wills Associates Limited (Wills) was retained by the Township of Asphodel-Norwood (Township) to conduct a hydrogeological study (Study) to assess whether the Village of Norwood (Village) municipal aquifer can sustain projected water demands through 2047. The Study supports a Permit to Take Water (PTTW) amendment for increased capacity and includes a Groundwater Under the Direct Influence of Surface Water (GUDI) assessment, undertaken in response to Ministry of Environment, Conservation and Parks (MECP) recommendations, to evaluate the potential for Mill Pond surface water to influence the municipal supply.

This report summarizes the results of Wills' 2021/2022 hydrogeological investigation (2022 Investigation) together with the results of the 2024–2026 field program, including installation of Mill Pond monitoring wells and Ouse River piezometers, streamflow and karst mapping, hydraulic conductivity testing, and a 72-hour pumping test on the new municipal well (Well 5). These data were incorporated into an updated numerical groundwater model used to evaluate aquifer performance and GUDI status. The Municipal Wellfield (Wells 1b, Well 2, Well 3, Well 4, and Well 5) is shown on **Figure 1**.

The original scope of work, developed in 2023–2024, contemplated a 20-year planning horizon to 2043 and the construction and testing of both new Well 5 and new Well 6. The planning horizon has since been extended to 2047 to reflect the elapsed time between preparation of the original proposals and commencement of the field program. In addition, budget constraints led the Township to proceed only with the installation and testing of Well 5; Well 6 was deferred. This report therefore evaluates aquifer capacity and GUDI status on the basis of the wells that were constructed and tested, with particular attention to the ability of Wells 4 and 5 to meet projected 2047 demand and to the implications of temporary contingency operation of the remaining wells.

2.0 Scope of Work

Wills' approved scope of work for the Study included the following:

- Three drive-point piezometers were installed within the Ouse River embankments upstream and downstream of Mill Pond on October 23, 2024.
- Three nested monitoring wells (one shallow and one deep at each location) were installed in the substrate of Mill Pond via barge drilling by Walker Drilling Ltd. from November 13–19, 2024.
- Technical oversight and field data collection during the 72-hour pumping test conducted on Well 5 by G. Hart & Sons Well Drilling Ltd. (G. Hart) from December 2–5, 2024.
    - Turbidity, pH, ORP (Oxidation-Reduction Potential), specific conductance, dissolved oxygen, and temperature readings of the pumped groundwater were digitally recorded every 15 minutes for the duration of the pumping test.

  - Groundwater samples were collected from Well 5 at the 1-hour, 34-hour, and 72-hour mark of the pumping test. These samples were submitted to SGS Canada (SGS) in Lakefield under chain of custody procedure and analysed for general chemical, physical, and biological parameter concentrations.
  - A groundwater sample was collected at the 1-hour and the 72-hour marks of the pumping test, submitted to the York-Durham Regional Environmental Laboratory under chain of custody procedure, and analysed for cryptosporidium, giardia, and PBADs (Photosynthetic Pigment Bearing Algae and Diatoms).
  - Water levels were digitally recorded in Well 5 for the duration of the pumping test to 90 % recovery.
    - Confirmatory manual measurements were recorded by G. Hart.
  - Water levels were digitally monitored in the existing groundwater monitoring network (monitoring wells installed in 2021), Mill Pond monitoring wells, and Ouse River piezometers – collectively referred to herein as the Observation Wells. The Observation Well locations, including the location of the Northern and Southern Parcel (referenced herein) are shown on **Figure 2**.
  - Confirmatory manual water levels were measured throughout the 72-hr pumping test in all Observation Wells.
  - Groundwater samples were collected from the Observation Wells prior to and during the 72-hour pumping test on Well 5 to assess groundwater quality. The samples were submitted to SGS under chain of custody procedure and analysed for general chemical, physical, and biological parameter concentrations.
  - Surface water samples were collected from three locations within Mill Pond, submitted to SGS under chain of custody procedures, and analysed for general chemical, physical, and biological parameter concentrations. The surface water sampling locations are shown on **Figure 3**.
- Karst features were identified and mapped along the Ouse River, including the presence and location of losing stream (surface water disappearing into bedrock) and gaining stream (groundwater emerging into the stream) conditions from fall 2024 to fall 2025. Identified karst features are shown on **Figure 3**.
- Streambed profiles and flow characteristics were assessed at transect locations upstream of losing stream and downstream of gaining stream conditions and the Mill Pond Weir in spring, summer, and fall of 2026.
- Hydraulic conductivity (K) testing was conducted in the Mill Pond monitoring wells on June 19, 2026, to assess the hydraulic properties of the pond substrate.
- A revised groundwater model for the Village's water supply system was prepared, incorporating the new field data.
- This Hydrogeological Assessment Report was prepared to present the field investigation results and revised modelling results.

3.0 Hydrogeological Setting

3.1 Subsurface Profile

Borehole logs for the investigation locations discussed below are included in **Appendix A**.

3.1.1 Southern Parcel

During Wills' 2022 Investigation, six boreholes (MW21-05, MW21-07, MW21-08, MW21-09, MW21-10, and BH21-11) were advanced on the crest of the Norwood esker and completed as monitoring wells. All boreholes advanced on the Southern Parcel were terminated due to practical refusal in cobble/boulder material at depths ranging from 15.9 to 30.7 metres below ground (mbg). With the exception of BH21-11 (terminated at 15.9 mbg), all boreholes were assumed to have been terminated proximal to the bedrock-overburden contact based on Wills' review of the MECP Water Well Records for the municipal wells and corresponding bedrock elevations.

The stratigraphy of the Southern Parcel generally includes a thin layer of silty sand topsoil, underlain by sand with varying amounts of silt, gravel, and cobbles/boulders, and ranged in composition from silty sand (MW21-10 and BH21-11) to gravelly sand (MW21-09) with cobbles. The sand generally contained some silt and trace amounts of clay.

Gravel was encountered in all boreholes and was the predominant soil type found on the Southern Parcel. The gravel was found to be interbedded with sand, and was described as containing trace sand, to sand and gravel. This material generally contained trace to some silt, and trace amounts of clay (generally less than 4%). Cobble/boulder material was frequently encountered in the gravel units, and the content was observed to increase with depth (general coarsening downwards).

Nine laboratory particle size distribution analyses were completed on samples of the gravel material. The results are summarized in **Table 1** on the basis of the Unified Soil Classification System (USCS). Note that cobble/boulder material is not reflected in the particle size distributions, and the presence of this material was determined based on observations made during the drilling activities (e.g. grinding augers and recovery of freshly broken rock fragments).

Table 1 – Summary of Particle Size Distribution for Southern Parcel

Location ID	Sample No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
MW21-05	SS-10	40	46	11	3
MW21-05	SS-15	3	83	11	3
MW21-07	SS-12	44	40	13	3
MW21-08	SS-6	57	28	12	3
MW21-08	SS-9	45	35	16	4
MW21-09	ST-4A	81	18	< 1	< 1
MW21-09	ST-9	56	30	11	3
MW21-10	ST-7B	34	38	22	6
MW21-10	ST-10	53	35	7	5

3.1.2 Northern Parcel

During Wills' 2022 Investigation, five boreholes (MW21-01, MW21-02, MW21-03, MW21-04, and MW21-06) were advanced. MW21-01 through MW21-04 were located on the Northern Parcel, while MW21-06 was advanced directly adjacent to Mill Pond. All boreholes were completed as monitoring wells. The boreholes were terminated at depths ranging from 8.3 to 17.5 mbg due to practical refusal on cobble/boulder material and were assumed to be proximal to the bedrock-overburden contact. The stratigraphy of the Northern Parcel generally includes a thin layer of silty sand topsoil, underlain by sand. Sand material was encountered beneath the topsoil at all borehole locations on the Northern Parcel, including adjacent to Mill Pond. The sand was found to be variably interbedded with gravel, and generally contained some silt, trace amounts of gravel and clay, and occasional cobbles/boulders. The sand contained interbeds of fine to coarse grained fractions and was generally described as silty within the lower two metres prior to borehole termination. Cobble/boulder content was found to increase proximal to the termination depth.

Six laboratory particle size distribution analyses were completed on samples of the sand material. The results are summarized in **Table 2** on the basis of the USCS.

Table 2 – Summary of Particle Size Distribution for Northern Parcel

Location ID	Sample No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
MW21-01	SS-5	0	61	35	4
MW21-02	SS-11B	0	70	25	5
MW21-03	SS-7	3	76	17	4
MW21-03	SS-11	4	70	22	4
MW21-04	SS-8A	3	83	11	3
MW21-06	SS-7	3	76	17	4

3.2 Groundwater Aquifer

The municipal water supply aquifer is an esker deposit that is unconfined and is limited in width but much longer in length. Glaciolacustrine deposits to the north of the esker form part of the aquifer complex. Methods have been designed to determine if the flow to the municipal wells during the pumping test was horizontally radial and whether the aquifer appears to be infinite acting. These conditions are met for the Norwood aquifer except in a few cases where noted.

The aquifer is not homogeneous, isotropic and of uniform thickness. In the area of the municipal well field, the aquifer shows northeast-southwest trending permeability zones with high permeability core deposits and lower permeability flank deposits. Therefore, it is not homogeneous or isotropic (similar characteristics in terms of grain size and aquifer parameters in all directions) and the aquifer itself is of variable thickness. However, the contrast in homogeneity and anisotropy is minor compared to deposits that are interbedded or bounded by aquitards of much lower permeable material. The saturated portion of the aquifer is also relatively constant at 7 to 10 m thick.

3.3 Surface Water Features

Local surface water features include the Ouse River and Mill Pond. North of the Municipal Wellfield the Ouse River flows south to the southeast through a presumed glacial drainage channel that transects the Norwood Esker at Mill Pond. The southwest tip of Mill Pond is approximately 395 metres (m) from Well 5, the closest Municipal Well. Northwest of Mill Pond, the Ouse River flows through karst features including losing and gaining stream conditions. Southeast of Mill Pond, the Ouse River is accompanied by flows from an unnamed surface water feature located east of Highway 7.

Flow velocity and stream profiles were measured at select losing stream and gaining stream locations in the Ouse River. The investigation locations and local surface water features are shown on **Figure 3**. The results of the investigation is further discussed in **Section 4.3**.

4.0 Field Investigation

4.1 Mill Pond Monitoring Well Installations

During Wills' 2024 investigation, three nested monitoring well locations (MW24-01-I&II, MW24-02-I&-II, MW24-03-I&-II), each consisting of one shallow and one deep well, were advanced into the substrate of Mill Pond. The boreholes were terminated at depths ranging from 4.45 to 8.00 mbg due to practical refusal on presumed bedrock. The stratigraphy underlying Mill Pond generally includes a thick layer of organic material underlain by sand with varying gravel and silt content.

Six laboratory particle size distribution analyses were completed on samples of the sand material. The results are summarized in **Table 3** on the basis of the USCS. Note that the analytical results for sample MW24-01 SS-1 do not include the organic fraction, as this material is removed from the sample prior to the testing. The organic content represented a high percentage of the sample composition. Borehole logs are included in **Appendix A** and Certificates of Analysis for the physical soil testing results are included in **Appendix B**.

Table 3 – Summary of Particle Size Distribution - Mill Pond Monitoring Wells

Location ID	Sample No.	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
MW24-01	SS-1	0	46	48	6
MW24-01	SS-4B	43	37	15	5
MW24-02	SS5B	0	74	24	2
MW24-02	SS5A	0	88	9	3
MW24-03	SS-3	0	77	18	5
MW24-03	SS-5	0	77	21	2

4.2 Norwood Waste Disposal Site Monitoring Well Installations

Two nested monitoring wells were installed under separate assignment for the Norwood Waste Disposal Site (WDS) environmental monitoring program in June 2025. The two nested monitoring wells MW25-01-1&II and MW25-02-I&II (one overburden and one bedrock) are located on Township-owned property, east of the WDS.

MW25-02 is northeast of MW25-01. The ground elevation of MW25-01 is 212.27 metres above sea level (masl) and MW25-02 is 216.87 masl. MW25-01 has 10.65 m of sand and gravel with thin layers of sandy gravel and sand and gravel till over bedrock which was encountered at an elevation of 201.62 masl. At MW25-01 0.65 m of weathered limestone bedrock overlies competent limestone. The screen for the deep monitoring well is within bedrock with a static water level of 203.22 masl. This is within the sand and gravel deposits.

MW25-02 has 11.90 m of sand and gravel to gravel overlying limestone bedrock. The shallow monitoring well screen within the basal sand and gravel layer was dry at the time of drilling in June 2025 and was dry on a subsequent monitoring event in June 2026. The deep monitoring well within the limestone bedrock reported a static water level of 203.88 masl, which is below the bedrock surface. Subsequent monitoring in June 2026 confirmed this result.

Based on the results from these two nested monitoring wells, the esker deposits become dry at some point between MW25-01 and MW25-02. Groundwater sinks below the bedrock surface underlying the esker between and northeast of these monitoring wells. The monitoring well locations are shown on **Figure 4** and the borehole logs are included in **Appendix A**.

4.3 Ouse River Flow Measurements

Two stream profile and flow velocity monitoring locations were selected within the Ouse River upstream from Mill Pond, denoted as Station A and Station B. Station A is located upstream from a losing stream location and Station B is located downstream from a gaining stream location. Stream profiles were geodetically surveyed on March 30, 2026. Stream velocity was measured at both stations on March 30, May 12, and October 2, 2026, using a Global Water FP111 flow probe alongside head measurements recorded at the Mill Pond weir. Velocity data was collected at five points across each transect. Surveyed channel depths were used to create a cross section associated with each flow measurement. Cross sections were summed to assess the total flow rate at each station. To calculate weir flow rates, the formula for flow over a broad crested weir was used alongside surveyed width and head data. The locations of the transects and weir can be seen on **Figure 3**. Stream velocity testing results are summarized in **Table 4**.

Table 4 – Ouse River Stream Velocity

Station ID	March 30 (m^3/sec)	May 12, 2026 (m^3/sec)	October 2, 2026 (m^3/sec)
Station A	2.73	1.25	0.12
Station B	2.47	1.00	Minimal to no flow
Mill Pond Weir	1.86	1.40	-

"-"denotes no measurements taken

4.4 Mill Pond Hydraulic Conductivity Testing

The hydraulic conductivity (K) of the organic substrate beneath Mill Pond was assessed via rising head tests (K-tests) conducted on June 19, 2026. Three temporary monitoring wells were installed in the organic substrate. Each well consisted of a screen installed entirely in organic substrate, with riser casing extending to approximately 0.5 m above the surface water level of Mill Pond. Solinst Leveloggers were installed in each monitoring well before the installation of a submersible pump. The monitoring wells were pumped to approximately one meter below the static water level, and manual water levels were measured during recovery to static conditions. The results were analyzed using the Hvorslev method to estimate the K-value range of the organic substrate. The

K-test results are summarized in **Table 5**. Supporting data analysis is included in **Appendix C,** and K-test locations are shown on **Figure 5**.

Table 5 – Mill Pond Substrate Hydraulic Conductivity Testing

K-Test Identifier	Installation Depth (mbg)	Screened Interval (mbg)	Hydraulic Conductivity Range (m/sec)
Location #1	2.01	1.10 – 2.01	$6.84X10^{-6}$ – $5.54X10^{-6}$
Location #2	2.87	1.84 – 2.87	$9.48X10^{-5}$ – $8.48X10^{-5}$
Location #3	3.45	1.95 – 3.45	$1.13X10^{-4}$ – $5.82X10^{-5}$

4.5 Observation Well Groundwater Quality and Mill Pond Surface Water Quality

Water samples were collected from selected Observation Wells and Mill Pond prior to the Well 5 pumping test on November 26–27, 2024 and following the pumping test on December 11–12, 2024. Surface water samples were collected on December 4, 2024. Various parameters exceeded the Ontario Drinking Water Quality Standards (ODWQS) for groundwater and surface water. The exceedances are summarized in **Table 6** and **Table 7** respectively. The detailed groundwater and surface water quality results are included in **Appendix D**, and the Laboratory Certificates of Analysis are included in **Appendix E**.

Table 6 – Observation Wells Groundwater ODWQS Exceedances

Groundwater Sampling Date	Parameter	Locations exceeding ODWQS
November 26–27, 2024	Total Coliform	MW21-01, MW21-02, MW21-03, MW21-04, MW21-06, MW21-07, MW21-08, MW24-01-II, MW24-02-II, MW24-03-I
	E. coli	MW21-01, MW21-02, MW21-03, MW21-04, MW21-06, MW24-02-II, MW24-03-I, MW24-01-II
	Hardness	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-07, MW21-08, MW21-09, MW21-10, MW24-01-II, MW24-02-II, MW24-03-I
	Aluminum	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-08, MW21-09, MW24-01-II, MW24-02-II, MW24-03-I
	Iron	MW21-01, MW21-02, MW21-04, MW21-05, MW21-06, MW21-08, MW21-09, MW24-01-II, MW24-02-II, MW24-03-I
	Manganese	MW21-01, MW21-02, MW21-04, MW21-05, MW21-06, MW24-01-II, MW24-02-II, MW24-03-I
	Sodium	MW21-01, MW21-02, MW21-05, MW21-07, MW21-08, MW21-09, MW21-10, MW24-01-II, MW24-02-II
	Colour	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-07, MW21-08, MW21-09, MW21-10, MW24-01-II, MW24-02-II, MW24-03-I
	Turbidity	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-07, MW21-08, MW21-09, MW24-01-II, MW24-02-II, MW24-03-I
	Organic Nitrogen	MW24-01-II, MW24-02-II, MW24-03-I, MW21-05
	Dissolved Organic Carbon	MW24-02-II, MW24-03-I
	Lead	MW24-01-II, MW24-02-II
December 11–12, 2024	Total Coliform	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-07, MW21-08, MW21-09, MW21-10, MW24-03-I, MW24-03-II,
	E. coli	MW21-01. MW21-02, MW21-04, MW21-05, MW21-06, MW24-03-II
	Alkalinity	MW21-04, MW21-06

	Hardness	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-07, MW21-08, MW21-09, MW21-10, MW24-03-I, MW24-03-II
	Aluminum	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-09, MW21-10, MW24-03-I, MW24-03-II
	Iron	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06 MW21-08, MW21-09, MW21-10, MW24-03-I, MW24-03-II
	Manganese	MW21-01, MW21-02, MW21-03, MW21-04, MW21-05, MW21-06, MW21-09, MW24-03-I, MW24-03-II
	Sodium	MW21-01, MW21-02, MW21-05, MW21-07, MW21-08, MW21-09, MW21-10, MW24-03-II
	Colour	MW21-01, MW21-03, MW21-04, MW21-05, MW21-06, MW24-03-I, MW24-03-II
	Turbidity	MW21-01, MW21-03, MW21-04, MW21-05, MW21-06, MW21-08, MW21-09, MW21-10, MW24-03-I, MW24-03-II
	Organic Nitrogen	MW21-04, MW24-03-I, MW24-03-II
	Dissolved Organic Carbon	MW24-03-I, MW24-03-II
	Lead	MW21-06

Table 7 – Mill Pond Surface Water PWQO Exceedances

Surface Water Sampling Date	Parameter	Locations exceeding PWQO
December 4, 2024	Total Coliform	SW1, SW2, SW3
	E. coli	SW2, SW3
	Organic Nitrogen	SW1, SW2, SW3
	Dissolved Organic Carbon	SW1, SW2, SW3
	Hardness	SW1, SW2, SW3
	Colour	SW1, SW2, SW3

Most of the parameters that exceeded the ODWQS are aesthetic objectives.

The Township may consider the inclusion of additional parameters to the existing routine water quality analysis for the municipal water supply system, including:

- Sodium, manganese, iron, and aluminum.

4.6 Well 5 72-Hour Pumping Test

A 72-hour pumping test was conducted on Well 5 from December 2–5, 2024, at a constant rate of 1,853 m^3/day. During the pumping test, water levels were digitally recorded in Well 5 and the Observation Wells. Confirmatory manual water levels were measured by Wills in the Observation Wells and by the G. Hart in Well 5. Observation Wells included:

- A variety of monitoring wells installed to support the 2021 pumping tests on Municipal Wells 1b, 2, 3, and 4.
- Nested monitoring wells installed in Mill Pond to determine the characteristics of the Mill Pond substrate and for monitoring during the pumping test.
- Drive-point piezometers installed at the edge of Mill Pond and on the Ouse River upstream of Mill Pond.

The Well 5 pumping test Observation Well locations are shown on **Figure 2**.

The water levels recorded in the Observation Wells and Well 5 during the pumping test, along with the average pumping rate and aquifer characteristics obtained from the well logs, were used to assess aquifer parameters. It is assumed that the aquifer is unconfined.

The assumptions for the various methods of aquifer analysis of an unconfined aquifer include:

- Homogeneous and isotropic aquifer of infinite extent. Homogeneous and isotropic means uniform material texture (in the Norwood Esker case) in terms of percent of silt, sand, clay, and gravel, the same transmissivity and storage factors throughout the aquifer, with a constant horizontal aquifer thickness. Isotropic means consistent aquifer properties in both horizontal and vertical directions.
- Only one pumping well operating in the aquifer with a constant pumping rate.
- Infinitesimally small pumping well diameter.
- The well screen penetrates the entire saturated portion of the aquifer.
- The hydraulic head in the entire aquifer prior to pumping is uniform (i.e., at the same elevation).

These assumptions do not strictly hold. However, most of the assumptions are a close enough reflection of reality that the variations will have little effect on the results. It must be stressed that this is not unusual; there are no ‘perfect’ aquifers.

The pumping test data was analyzed using a method called the composite plot of all results which uses the Cooper-Jacob straight-line method for analysis where all results for a particular pumping test are plotted on the same semi-log chart. This approach has three important advantages:

- It assists in identifying those responses (drawdown versus time) that are significantly different from the main group of responses, that is, the outliers.
- The aim of the aquifer testing using pumping tests is to obtain representative average transmissivity and storage parameters which can be used in a groundwater model for predictive purposes.
- A pumping test is not conducted to characterize the details of the subsurface; rather, it is conducted to estimate the "representative bulk-average" transmissivity of a particular hydrostratigraphic unit. The strength of the Cooper-Jacob composite analysis is to identify the portion of the response that is representative of bulk-average radial flow which can be extracted from the data for the aquifer. A representative transmissivity can be estimated using this method.

The composite semi-log plot for Well 5 and the monitoring wells on top of the esker in the vicinity of Well 5 is shown on **Figure 6**. The late time data (straight-line portion) form parallel lines indicating similar transmissivity values which is interpreted as the bulk-average transmissivity. The spaced late time data approximating a straight-line yield different estimates of the storage coefficient.

During the pumping test, water levels in monitoring wells located northwest of the esker took much longer to respond than the monitoring wells on top of the esker. This may indicate that the monitoring wells are located in a different aquifer or in a portion of the aquifer that has significantly different aquifer parameters than the monitoring wells located on top of the esker. The monitoring wells on top of the esker primarily tap an aquifer consisting of predominantly gravel with lesser amounts of sand and minor to trace silt and clay. The monitoring wells northwest of the esker tap an aquifer consisting mainly of sand with minor amounts of gravel, silt and clay. This is consistent with the geological conceptual model of a high energy (of deposition) core of the esker flanked by lower energy deposits.

The composite plot for the Well 5 pumping test (Figure 6) shows that the slopes of the late-time data for all the Observation Wells and pumping well on top of the esker are almost identical, but the curves are offset. The slopes indicate a geometric mean of transmissivity (T) of all wells on top of the esker of 849 m^2/d. **Figure 6** shows only the determination of one value of T which is 865 m^2/d. Estimates of the storage coefficient (S) vary over a wider range indicating a more complex structure of the subsurface than assumed for the Theis model. The hydraulic conductivity is the transmissivity divided by the saturated aquifer thickness. For the T value obtained from the composite plot, the K value is 849/7.14 = 119 m/day.

Only two of the four monitoring wells located northwest of the esker produced curves that could be analyzed by any method of aquifer analysis due to the delay in

response of water levels during the pumping test and limited drawdown after three days pumping. The transmissivity and hydraulic conductivity of MW21-02 is 495 m^2/d and 69.3 m/d respectively. The transmissivity and hydraulic conductivity of MW21-04 is 697 m^2/d and 97.6 m/d respectively. The aquifer parameters for the monitoring wells on top of the esker and northwest of the esker derived from the Well 5 pumping test (conducted at a constant rate of 1853.30 m^3/day) are summarized in **Table 8** and **Table 9** respectively.

Table 8 – Well 5 Pumping Test Aquifer Parameters – On Top of Esker

Monitoring Location	Transmissivity (m^2/d)	Well 5 Aquifer Saturated Thickness (m)	Hydraulic Conductivity (m/d)	Maximum Drawdown (m)	Specific Yield (dimensionless)
Well 5	895	7.14	125	0.9-1.00	NA
MW21-05	885	-	124	0.34	3.26E-02
MW21-07	863	-	121	0.40	4.44E-02
MW21-08	840	-	118	0.44	7.39E-02
MW21-09	829	-	116	0.50	2.18E-01
MW21-10	827	-	116	0.51	NA
Geometric Mean	849	-	119	-	6.94E-02

Table 9 – Well 5 Pumping Test Aquifer Parameters – Northwest of Esker

Monitoring Location	Transmissivity (m^2/d)	Well 5 Aquifer Saturated Thickness (m)	Hydraulic Conductivity (m/d)	Maximum Drawdown (m)	Specific Yield (dimensionless)
MW21-04	697	7.14	97.6	0.07	2.13E-02
MW21-02	495	7.14	69.3	0.17	1.32E-01
GEOMEAN	587	-	82	-	5.31E-02

It can be seen by reviewing the data in **Table 8** and **Table 9,** and as presented on **Figure 6**, that there are slight variations in drawdown response of adjacent measurements (the drawdown response is not an exact straight line). These variations in the drawdown response are most likely due to the influence of nearby municipal wells which cycled on and off during the pumping test. These variations make assessing the slopes of the drawdown vs t/r^2 line a challenge. The resulting T values found in monitoring wells on top of the esker vary from 895 to 827 m^2/d. This is considered a reasonable range of values. Transmissivity is aquifer saturated thickness

times hydraulic conductivity. The hydraulic conductivity of the aquifer in the area of the top of the esker varies from 116 to 125 m/d with a geometric mean of 119 m/d.

MW21-06 located on the eastern shore of Mill Pond, did not respond to the pumping test. Mill Pond monitoring wells also did not respond to the pumping test. Drive-point piezometers, installed along the Ouse River northwest and southeast of Mill Pond, did not respond to the pumping test except for Piezo24-02 which appeared to have a limited drawdown or a change in water level likely influenced by natural causes. Piezo24-02 is discussed further below.

In the monitoring wells northwest of Well 5, aquifer saturated thickness before pumping Well 5 started varied from 4.5 to 6.9 m. Drilling encountered sand in all monitoring wells except MW21-03 which encountered sand to the middle of the well screen with 1 m of sand and gravel underlying the sand.

The monitoring wells northwest of the esker showed limited drawdown during the pumping test so that the derived aquifer parameters were rough estimates at best because of the lack of late time data. It is apparent that the drawdown response at MW21-01 to MW21-04 evolves more slowly and is attenuated compared to the response of the monitoring wells on top of the esker. From this observation and confirmation from the well logs that the material encountered during drilling of the monitoring wells northwest of the esker is predominantly sand rather than gravel, it is obvious that the transmissivity of the aquifer northwest of the esker is significantly less than the material underlying the crest of the esker.

4.6.1 Well 5 Groundwater Quality

Groundwater samples were collected from Well 5 at the 1-hr, 34-hr, and 72-hr marks of the pumping test. Additional groundwater samples were collected at the 1-hr and 72-hr mark for analysis of cryptosporidium, giardia, and PBADs. Groundwater quality generally met the ODWQS except for hardness, sodium, and colour. Laboratory results indicate that cryptosporidium, giardia, and PBADs were not present in the Well 5 groundwater. The detailed groundwater quality results for Well 5 are included in **Appendix D**, and the Laboratory Certificates of Analysis are included in **Appendix E**.

Due to the sodium concentration exceeding 20 mg/L, this parameter should be added to the routine analytical parameter list for the water supply. Sodium concentrations exceeding 20 mg/L require notification to the Medical Officer of Health and residents must be informed of the elevated sodium in drinking water to protect the health of individuals on sodium restricted diets.

5.0 Pumping Test Discussion

Pumping tests are the primary means of estimating the large-scale storage and transmissive properties of an aquifer for site-characterization investigations. Most analyses of pumping-induced drawdown are performed using either the Theis log-log curve-matching procedure (or variants) or the Cooper-Jacob semi-log method. These two procedures provide dissimilar estimates in nonuniform aquifers due to their

emphasis on properties in different portions of an aquifer. The log-log curve-matching approach heavily weights the properties of local material around the pumping well, while the semi-log procedure emphasizes the properties of material within the front of the cone of depression remote from the pumping well. The different emphasis of the two procedures results in log-log parameters being more appropriate for estimating pumping-well drawdown, while semi-log parameters are better for estimating well yield and for providing aquifer parameters for the computer model. The magnitude of the difference between parameters estimated by the two approaches is a function of the degree of aquifer nonuniformity and the distance between the observation and pumping wells.

In the approach used to estimate aquifer parameters of the aquifer, the slope of the straight-line portion of the semi-log plot, i.e., the change of drawdown during a certain interval of time, is the quantity used to calculate transmissivity. As discussed above, this change in drawdown is a function of the transmissivity of material in the front of the cone of depression. Therefore, the estimated transmissivity is independent of the material between the inner radius of the cone front and the pumping well. This is one of the major strengths of the semi-log technique; after just a short duration of pumping, the calculated transmissivity is independent of any material of anomalous properties in the vicinity of the pumping well, of a well skin created during drilling or development, and of any well losses.

The general conclusion resulting from this analysis is that the further an observation well is from the pumping well, the less the drawdown is impacted by the properties of material in the immediate vicinity of the observation well. The semi-log storativity; however, will still be dependent on the material between the observation well and the front of the cone of depression. This dependence will lessen as the observation well increases in distance from the pumping well. In general, aquifer parameters determined from drawdown at observation wells located at a considerable distance from the pumping well should only be very weakly dependent on analytical methodology.

When an estimate of well yield is the focus of an investigation, the semi-log analysis, with its emphasis on the properties at the front of the cone of depression, is clearly the preferred approach.

5.1 Well 5 Pumping Test interpretation

The drawdown data was assembled on multiple semi-log composite plots. The minor variation of the subsurface in Norwood is evident when comparing the individual time-drawdown records on composite plots from the Well 5 pumping test and separate composite plots for the Well 3 and Well 4 pumping tests.

The majority of monitoring wells for all pumping tests respond in a similar manner as shown by the same slope on the semi-log plots. Monitoring wells northwest of the esker, MW21-01 to MW21-04, could be seen as outliers, perhaps in a different aquifer, or more likely, that the response in the monitoring wells evolves more slowly due to a gradation from predominantly sand and gravel to sand from the

centerline of the esker northwest to the lower land where MW21-01 to MW21-04 are located.

The drawdown versus time in each of the monitoring wells for pumping tests on Well 3 and Well 4 are shown on **Figure 7** and **Figure 8**, respectively. The late time series of points for each monitoring well have a nearly identical slope. The drawdown responses with similar slopes on the semi-log composite plot are used to estimate a representative "bulk" transmissivity with the Cooper-Jacob straight-line analysis. Therefore, our analysis is explicitly consistent with the underlying assumption that the transmissivity is uniform.

Table 10 shows the derived aquifer properties for the Well 4 pumping test analyzed in a similar way to those of the Well 5 pumping test. **Table 11** shows the aquifer parameters derived from the pumping test on Well 3 using the same methodology.

Table 10 – Well 4 Pumping Test Aquifer Parameters – Coopper-Jacob

Monitoring Location	Transmissivity (m^2/d)	Well 4 Saturated Thickness (m)	K (m/d)	K (m/sec)	Specific Yield
Monitoring Wells On Top of Esker					
MW21-05	1199	9.93	120.7	1.40E-03	1.20E-01
MW21-07	1025	9.93	103.2	1.19E-03	-
MW21-08	1386	9.93	139.6	1.62E-03	3.20E-01
MW21-09	1191	9.93	119.9	1.39E-03	2.10E-02
MW21-10	1004	9.93	101.1	1.17E-03	-
Well 4 P Well 3 OBS	1318	9.93	132.7	1.54E-03	-
Well 4 P Well 4 OBS	1382	9.93	139.2	1.61E-03	-
GEOMEAN	1206	-	121	1.41E-03	-

Table 11 – Well 3 Pumping Test Aquifer Parameters – Cooper-Jacob

Monitoring Location	Transmissivity (m^2/d)	Well 4 Saturated Thickness (m)	K (m/d)	K (m/sec)	Specific Yield
Monitoring Wells On Top of Esker					
Well 4 OBS	1106	9.93	111.4	1.29E-03	2.70E-01
MW21-08	1026	8.35	122.9	3.82E-02	2.50E-01
MW21-10	987	8.35	118.2	1.37E-03	2.10E-02
MW21-09	1050	8.35	125.7	1.46E-03	1.11E-01
MW21-07	942	8.35	112.8	1.31E-03	1.21E-01
MW21-05	1324	8.35	158.6	1.84E-03	5.40E-02
GEOMEAN	1066	-	124	2.48E-03	-

A comparison aquifer analysis results from the three pumping tests is provided in **Table 12**.

Table 12 – Well 3, Well 4, and Well 5 Aquifer Analysis Comparison

Monitoring Location	Pumping Test K Value (m/d)		
	Well 3	Well 4	Well 5
MW21-05	159	121	124
MW21-07	113	103	121
MW21-08	123	140	118
MW21-09	126	120	116
MW21-10	118	101	116
geomean	120		

The maximum drawdowns at the end of the pumping period for each pumping test along with the distance of the Observation Well from the pumping well are summarized in **Table 13** through **Table 15**. The maximum overall drawdown for each pumping test occurs in the pumping well with decreasing drawdowns in Observation Wells at increasing distances from the pumping well.

Table 13 – Maximum Observed Drawdown Well 4 Pumping Test

Monitoring Well	Max. Observed Drawdown (m)	Distance from Well 4 (m)
Well 4	0.55	0.11
MW21-07	0.31	19.1
MW21-08	0.28	24.8
Well 3	-	32.9
MW21-09	0.26	61.6
MW21-05	0.26	62.6
MW21-10	0.26	106.5
Well 2	0.10	125.6.0
MW21-04	0.03	134.4
MW21-03	0.04	153.9
Well 1B	0.08	161.4
MW21-02	0.10	177.5
MW21-01	0.04	303.0
MW21-06	0.0	696.1

"-" Not measured

Table 14 – Maximum Observed Drawdown Well 3 Pumping Test

Monitoring Well	Max. Observed Drawdown (m)	Distance from Well 4 (m)
Well 3	2.11	0.11
Well 4	0.23	32.9
MW21-08	0.28	33.7
MW21-09	0.26	38.9
MW21-07	0.21	51.7
MW21-10	0.26	76.1
MW21-05	0.26	89.5
Well 2	0.1	93.3
Well 1B	0.08	128.6
MW21-04	0.04	142.1
MW21-03	0.05	145.4
MW21-02	0.1	162.9
MW21-01	0.03	275.6
MW21-06	0.0	655.7

Table 15 – Maximum Observed Drawdown Well 4 Pumping Test

Monitoring Well	Max. Observed Drawdown (m)	Distance from Well 4 (m)
Well 5	1.0	0.13
MW21-07	0.4	115.8
MW21-08	0.44	83.1
Well 3	-	68.0
MW21-09	0.50	40.1
MW21-05	0.34	156.0
MW21-10	0.51	9.8
Well 2	-	62.8
Well 4	-	95.7
MW21-04	0.07	147.7
MW21-03	0.07	117.0
Well 1B	-	80.1
MW21-02	0.07	119.3
MW21-01	0.05	209.5
MW21-06	0.0	599.5
Piezo24-02	0.05	793.2

"-" Not measured

5.2 Assessment of the Composite Plot Interpretation

The interpretation of Well 3, Well 4, and Well 5 pumping tests results adopted an alternative approach towards the interpretation of the results from the Well 5 pumping test after analyzing the results using the log-log approach. The composite plot method is less involved than the analysis of the individual time-drawdown records. However, in this exercise the Well 3, Well 4, and Well 5 pumping test interpretations of aquifer results based on the Theis model were carried out. Because of the excessive spread of the transmissivity results from the methods involved in using the Theis model, this composite plot method was added to gain an additional perspective on the entire aquifer and from the three pumping tests. In spite of the simplicity of the approach, our analysis has several important aspects that are missing from the original analysis:

- The data has been considered simultaneously.
- The drawdown records that appear to be representative of the bulk response of the aquifer, and those that appear to be outliers have been identified.

- A single estimate of the bulk transmissivity for the aquifer has been determined and is approximately consistent with the Cooper-Jacob late time, straight-line analysis for the individual monitoring wells.

The geologic logs for the monitoring wells are shown in simplified form on the cross sections. Cross section A-A' follows the crest of the esker from the area of MW21-05 through MW21-10 to MW21-06 just east of Mill Pond. Cross section B-B' spans the esker from MW21-04 through MW21-10 to Well 1b. It can be seen from inspection of Cross Section A-A' that there are no distinct strata that can be distinguished by different textures between the monitoring wells. The aquifer is unconfined having no overlying low permeability aquitard and the texture, consisting of various amounts of silt, clay, sand and gravel, is variable. Sand and gravel are the predominant materials and varying amounts of silt are present in the monitoring wells. Clay is generally present in trace amounts.

Cross-Section B-B', perpendicular to the crest of the esker, shows the predominantly sand and gravel texture in the core of the esker. The deposits northwest of the esker, as illustrated by MW21-04 on the cross section and by the borehole logs, are predominantly sand and the aquifer northwest of the esker is less permeable than the deposits underlying the esker. The cross sections are included in **Appendix F**.

The plot for Piezo24-02, located on the banks of the Ouse River approximately 0.2 km west of Mill Pond, is discussed below. Piezo24-02 encountered 1.03 m of silty sand muck with high organic content with some gravel and occasional cobbles. The hydraulic conductivity of the material surrounding the piezometer is considerably less than the hydraulic conductivity of the sand and gravel within the esker. Piezo24-02 is approximately 793 m from Well 5 and west of the esker. MW21-06, approximately 600 m from Well 5, showed no response to Well 5 pumping and it appears to be located in the centre of the esker although the aquifer thickness is significantly less than further south. This lack of response could have been influenced by Mill Pond which likely had a damping effect on the water level in the monitoring well.

The response of drawdown versus time in Piezo24-02 does not have the same slope as the other monitoring wells and Well 5. The drawdown response begins much earlier in the pumping test than do the responses of the other monitoring wells. Therefore, it is more likely that the drawdown response in Piezo24-02 occurs due to fluctuating water levels in the nearby Ouse River.

The three nested monitoring wells installed in Mill Pond encountered 1.7 to 2.55 m (average 1.98 m) of silty organic deposits underlain by sand on top of bedrock. The hydraulic conductivity of the organic deposits range from 7.8 m/d to 0.5 m with a geometric mean of 3.1 m/d. It can be assumed that the vertical hydraulic conductivity is 10% of this value (0.31 m/d). Vertical downward movement of contaminated pond water will be slow with this kind of material and the low vertical hydraulic gradient.

5.3 Conceptual Model

Formulating a conceptual model of the geology and hydrogeology of a proposed modelling project is the most important precursor to constructing the numerical model. Previous modelling exercises for the Municipal Wellfield involved the construction of a conceptual model. Each subsequent model involved a thorough review of previous conceptual models and the inclusion of new data. Details for the development of the 2026 Conceptual Model are included in **Appendix G**.

5.4 Discussion of Modelling Results

The incorporation of new data into the 2026 groundwater numerical model produced results that calibrated well. The simulated groundwater elevations are within acceptable limits in comparison to the observed average water levels.

The statistics of model fit are summarized in **Table 16** and the simulated versus observed average water levels at model targets (monitoring wells) is summarized in **Table 17**.

Table 16 – Statistics of 2026 Model Fit

Statistic	Value
Residual Mean	- 0.07
Absolute Residual Mean	0.35
Root Mean Squared Error	0.46
Normalized Root Mean Squared (NRMS)	6.5%
Minimum Residual	-1.07
Maximum Residual	1.15

Residual mean - a measure of the average residual value (difference between the simulated and observed values at an Observation Well.
Absolute residual mean - measures the average magnitude of the residuals and provides a better indication of calibration than the residual mean.
Root mean squared (RMS) error - the square root of the sum of the residuals squared.
normalized root mean square is the RMS divided by the maximum difference in the observed head values. The *Normalized Root Mean Squared (NRMS)* is expressed as a percentage, and is a more representative measure of the fit than the RMS as it accounts for the scale of the potential range of data values. A NRMS is considered good if it is less than 10%.

Table 17 – Model Simulated Water Level Elevations Vs. Observed Water Level

Monitoring Well	Observed Water Level Elevation (masl)	Simulated Water Level Elevation (masl)	Residual (m)	Location
MW25-02-1	203.88	204.92	1.04	In esker northeast of WDS
MW25-01-1	203.22	203.82	0.6	In esker east of WDS
MW24-01-1	200.38	200.46	0.08	North end of Mill Pond
MW24-02-II	200.34	200.44	0.10	West part of Mill Pond
MW24-03-II	200.30	199.26	1.04	Centre of Mill Pond
MW21-06	199.68	198.65	1.03	On east Shore of Mill Pond just south of outlet
MW21-01	197.68	197.85	0.17	North of Well 5 below esker
MW21-02	197.42	197.78	0.36	Northwest of Well 5 below esker
MW21-03	198.06	197.68	0.38	Northwest of Well 5 below esker
MW21-04	198.09	197.63	0.46	West of Well 5 below esker
MW21-10	197.58	197.37	0.21	Northeast of Well 5 Top of Esker
Well 5	196.84	197.35	0.51	Top of esker
Well 2	197.19	197.23	0.04	Southeast of Well 5 Side of Esker
Well 1b	197.30	197.26	0.04	East of Well 5 Side of Esker
MW21-09	196.99	197.34	0.35	Southwest of Well 5 Top of Esker
MW21-08	196.97	197.27	0.3	Southwest of Well 5, Northeast of Well 4 Top of Esker
Well 3	196.88	197.25	0.37	East of Well 4 Top of Esker
MW21-07	196.99	197.21	0.22	South of Well 4 Top of Esker
MW21-05	196.96	197.19	0.23	South of Well 4 Top of Esker

Note: Water levels from Wells 1b, 2 and 3 are estimates from historical information

To determine the origin of the groundwater pumped by the municipal wells, the particle tracking model, MODPATH, was coupled to the output from the MODFLOW model. To determine capture zones of well pumping, particles are placed in concentric circles in and around the grid cell in which the well is located. After MODFLOW has solved the groundwater flow regime, MODPATH is run with particles tracked in a reverse direction. These particles were then tracked backwards to their point of origin as groundwater (from recharge, river, or wetland infiltration). The pathline traces of the mass of particles constitute the capture zone of the well pumping at a specific rate.

Previous models had backward tracking pathlines travelling northeast along the Norwood Esker in the direction of Havelock. However, the pathlines in the 2026 model with Well 5 pumping at the current PTTW rate (1,965 m^3/d) were diverted in a northerly direction generally parallel to Regional Road 40 and did not pass under Mill Pond, but west of it.

The change in the capture zone between earlier models and the 2026 model can be explained by a modification of the conceptual geological model supported by recently collected data that includes:

- New nested monitoring wells MW25-01 and MW25-02 were installed in 2025. While MW25-01 showed static water levels in the surficial deposits, MW25-02 showed water levels below the bedrock surface and dry conditions in the overlying sand and gravel of the esker. The 2026 groundwater model results in dry conditions in the sand and gravel at and northeast of MW25-02 with a static water level in the bedrock. Therefore, on an average basis, groundwater flow at the location of this monitoring well is within the bedrock and backward tracking pathlines in the esker deposits from the area of the municipal wells cannot migrate past the location of MW25-02.
- Forward tracking pathlines placed in the surficial sand and gravel esker deposits and weathered bedrock northeast of Mill Pond tracked southwest and flowed east of Mill Pond and into the Ouse River south of Mill Pond. The deep buried bedrock valley east of Highway 7 and Mill Pond is the main influence for the groundwater flow in this area channeling the water from the north to the Ouse River south of Mill Pond.

The map of the bedrock surface shows a deep south trending bedrock valley beginning just east of Highway 7 where it crosses the Asphodel 10th Line. A cross section through the area from west of Highway 7 east through the bedrock valley shows the elevation of the bedrock varies from a high of 220 masl in the west where the Ouse River west of Mill Pond makes a right-angle turn to the southeast to 201 masl in the east over a distance of approximately 800-900 m. This valley appears to be presently occupied by the pond east of Mill Pond. This bedrock valley likely influences groundwater flow and directs that flow from the esker to the north to east of Mill Pond and from there south into the Ouse River as is flows south of Mill Pond roughly parallel to the trend of the esker.

Site inspections for the presence of karst features was carried out in 2025. Disappearing and emerging streams were encountered on the Ouse River west and south of the WDS

before the Ouse River enters Mill Pond. It is likely that karst features are common and extensive in the area. A possible scenario could involve karst features in the bedrock extending from southwest of Well 4 to northeast of the WDS. High flow conditions in the karst features in the bedrock under the ice during the last warming phase of the last ice age could be the reason the esker formed in this location. The high K encountered in Well 4 could be due to the presence of enlarged fractures and/or a conductive weathered zone at the bedrock surface in addition to the permeable sand and gravel.

Pathlines are always perpendicular to groundwater contours and the groundwater contours follow a relatively tight concave curve centered on the Ouse River south of Mill Pond.

5.5 Projected Water Demands and 2026 Model Pumping Rates

Different pumping rates were run for different combinations of municipal wells. The modelled pumping rates include:

- Existing pumping rate - 1,273 m^3/d
- The current PTTW rate - 1,965 m^3/d
- The proposed PTTW rate for the year 2047 - 3,152 m^3/d

Projected maximum-day water demands for the Village through 2047 are presented in **Table 18**. These values were developed as part of Wills' Water Treatment Servicing Capacity Review (Wills' Project No. 24-20238) and subsequent updates prepared in collaboration with the Township. The projections are based on a residential per capita average annual daily demand of 366 L/person/day, a maximum-day peaking factor of 1.61 (both derived from historical water treatment plant flow data), and anticipated population growth associated with approved and planned development. The resulting maximum-day demands form the basis for the pumping rates evaluated in the 2026 model.

Table 18 – Norwood Water Supply Projected Maximum Water Demand

Year	Population	Peaking Factor	Residential Water Demand (L/s)	Total		
				L/sec	m^3/day	m^3/year
2025	2100	1.61	14.3	14.3	1237	451k
2026	2100	1.61	14.3	14.3	1237	451k
2027	2160	1.61	14.7	14.7	1272	464k
2028	2220	1.61	15.1	15.1	1308	477k
2029	2280	1.61	15.5	15.5	1343	490k
2030	2440	1.61	16.6	16.6	1437	525k
2031	2600	1.61	17.7	17.7	1531	559k
2032	2875	1.61	19.6	19.6	1693	618k
2033	3075	1.61	21.0	21.0	1811	661k
2034	3275	1.61	22.3	22.3	1929	704k
2035	3547	1.61	24.2	24.2	2089	763k
2036	3819	1.61	26.0	26.0	2249	821k
2037	3991	1.61	27.2	27.2	2351	858k
2038	4163	1.61	28.4	28.4	2452	895k
2039	4335	1.61	29.6	29.6	2553	932k
2040	4507	1.61	30.7	30.7	2655	969k
2041	4679	1.61	31.9	31.9	2756	1006k
2042	4851	1.61	33.1	33.1	2857	1043k
2043	5023	1.61	34.2	34.2	2959	1080k
2044	5195	1.61	35.4	35.4	3060	1117k
2045	5267	1.61	35.9	35.9	3102	1132k
2046	5339	1.61	36.4	36.4	3145	1148k
2047	5352	1.61	36.5	36.5	3152	1151k

The 25-year capture zones were generated in a steady-state model (MODFLOW + MODPATH) with the various municipal wells pumping continuously. In reality, none of the wells pump continuously but are cycled on and off automatically in response to the water level in the water tower. The capture zones all extend to approximately to the same northern end point. As the cumulative pumping rate increases the width of the capture zone increases, as expected.

Figure 9 through **Figure 14** show the 25-year capture zones for various combinations of wells pumping at various pumping rates. **Table 19** summarizes the parameters for each figure.

Table 19 – 25-Year Capture Zone Scenarios

Figure Number	Municipal Wells Pumping	Pumping Rates (m^3/day)	Capture Zone Proximity to Mill Pond
Figure 9	Well 1b Well 2 Well 4	424.33 each, total of 1,273	130 m West of Mill Pond
Figure 10	Well 1b Well 2 Well 4 Well 5	491.25 each, total of 1,965	70 m West of Mill Pond
Figure 11	Well 1b Well 2 Well 4	655 each, total of 1,965	65 m west of Mill Pond
Figure 12	Well 1b Well 2 Well 4 Well 5	788 each, total of 3,152	10 m within Mill Pond
Figure 13	Well 5	3,152	15 m west of Mill Pond
Figure 14	Well 4 Well 5	1,300 1,852 total of 3,152	13 m west of Mill Pond

The capture zones (consisting of pathlines resulting from the MODPATH model) go from the municipal wells in a direction more or less north and to the west of Mill Pond.

The remaining combinations of municipal wells pumping even at the highest rate had the eastern extent of their capture zones approximately 70-80 m west of Mill Pond.

A model run with Well 4 and 5 pumping (at 1,300 and 1,852 m^3/d respectively for a total of 3,152 m^3/d) and with forward tracking particles placed in Mill Pond showed that the majority of groundwater flow from Mill Pond bypasses the municipal wells to the east and flows to the Ouse River south of Mill Pond. This is shown on **Figure 15**.

A model run with Wells 1b, 2, 4, and 5 pumping each at 788 m^3/d for a total of 3,152 m^3/d and with forward tracking particles placed in Mill Pond showed that groundwater flow from Mill Pond is to the Ouse River south of Mill Pond except for one pathline moving to Well 2. This is shown on **Figure 16**.

The models indicated that the pathline which flowed from Mill Pond to the municipal wells took approximately 130 days with an average velocity of 4.08 m/day.

As another check on model parameters the parameters used in the model can be used in an analytical equation for groundwater velocity. The average K along this pathline is approximately 125 m/d. The average horizontal hydraulic gradient "i" is (200.43-196.42)/530 m = 0.0076 m/m. Groundwater velocity is calculated using $v=Ki/n_e$ where n_e is effective (connected) porosity and i is the horizontal hydraulic gradient. This gives $v=(125x0.0076)/ne = 0.95/n_e$. The average velocity calculated above is 4.08 m/d. Inserting this value into the equation $v=Ki/n_e$ gives a n_e value of 0.23. This is approximately the same as the value used in the model (0.25) confirming that the model parameters K and n_e are a reasonable representation of reality.

Modelling indicates that Wells 4 and 5 should be used as duty wells, with Wells 1b and Well 2 used as backup wells. The Township may elect to permit Wells 4 and 5 as the sole duty wells with Wells 1b and 2 designated as standby, or, consistent with current operational practice, permit all four wells as duty wells while rotating Wells 1b and 2 into service at substantially lower rates to maintain well condition. Both approaches are supportable by the modelling.

It should be stressed that groundwater models are only as good as the data with which they are constructed. Unknown geological factors, especially the role of karst in affecting well yields, could produce capture zones which are different from the ones presented. Continual groundwater and surface water monitoring are essential as is the continuing rehabilitation of the WDS north of Mill Pond so as to truncate the migration of contaminants into Mill Pond.

6.0 GUDI Assessment Summary

Based on the results of Wills field investigation, laboratory results, and updated modelling, it is not anticipated that the Municipal Water Supply would be considered GUDI at the existing PTTW rates or under the proposed primary duty-well configuration (Well 4 at 1,300 m³/d and Well 5 at 1,852 m³/d) through the projected 2047 maximum-day demand.

Recommended PTTW rates and the implications of temporary higher-rate contingency operation of the secondary/standby wells are discussed in **Section 7.0** and **Section 7.1**.

7.0 Permit to Take Water Rates

The existing PTTW is included in **Appendix H** and is summarized in **Table 20**.

Table 20 – Existing PTTW Rates

Source	Source Type	Max. Taken per Minute (L/m³)	Max Number of Hours per Day	Max Taken per Day (L/m³)	Max Number of Days/Year
Well 1b	Drilled Well	455/0.46	24	655,000/655	365
Well 2	Drilled Well	455/0.46	24	655,000/655	365
Well 3	Drilled Well	455/0.46	24	655,000/655	365
Well 4	Drilled Well	455/0.46	24	655,000/655	365
Total Maximum Takings per Day (L/m3)				**1,965,000/1,965**	

The proposed PTTW rates are summarized in **Table 21** based on the results of the 2026 model, anticipated future water demand of the Village, and well capacities.

Table 21 – Proposed PTTW Rates

Source	Source Type	Purpose	Max. Taken per Minute (L/m³)	Max Number of Hours per Day	Max Taken per Day (L/m³)	Max Number of Days/Year
Well 1b	Drilled Well	Back up	547/0.55	24	788,000/788	365
Well 2	Drilled Well	Back up	547/0.55	24	788,000/788	365
Well 3	Drilled Well	Removed / Abandoned	-	-	-	-
Well 4	Drilled Well	Duty	903/0.90	24	1,300,000/1,300	365
Well 5	Drilled Well	Duty	1,286/1.29	24	1,852,000/1,852	365
Total Maximum Takings per Day (L/m3)					**3,152,000/3,152**	

7.1 Planning Horizon, Well 6 Deferral, and Contingency Considerations

The original scope of work (developed in 2023–2024) contemplated a 20-year planning horizon to 2043 and the construction and testing of both new Well 5 and new Well 6. Due to the time elapsed between proposal preparation and completion of field work, the planning horizon has been extended to 2047. In addition, budget constraints led the Township to proceed only with the installation and 72-hour testing of Well 5 at this time.

Under the proposed duty-well configuration (Well 4 at 1,300 m³/d and Well 5 at 1,852 m³/d), the 2026 model indicates that 25-year capture zones remain west of the Mill Pond footprint, supporting a non-GUDI conclusion through the 2047 maximum-day demand of 3,152 m³/d (**Table 18**).

If Well 5 were temporarily offline (e.g., for repairs or maintenance), the remaining wells could supply approximately 2,876 m³/d (Well 4 at 1,300 m³/d plus Wells 1b and 2 at 788 m³/d each). This rate would satisfy projected maximum-day demand only through approximately 2042. It is important to note that the demand figures presented in **Table 18** are maximum-day values that already incorporate a peaking factor; average-day demands are substantially lower. Model scenarios for the higher individual rate combination produce 25-year capture zones that encroach slightly into the Mill Pond footprint. However, because any such contingency operation would be of limited duration and would not be expected to occur continuously at maximum-day demand (likely occurring at rates closer to average-day demand), the associated GUDI risk is considered low. Continuous long-term operation at the 2047 maximum-day demand without Well 5 (or an equivalent additional well) is not recommended.

The deferral of Well 6 is therefore identified as a limitation on long-term system redundancy and on the robustness of non-GUDI conditions under extended contingency scenarios. Installation and testing of Well 6 (or an equivalent additional source) remains a recommended future measure should the Township wish to extend reliable, non-GUDI capacity beyond the mid-2040s, or to improve operational flexibility.

8.0 Conclusions and Recommendations

Based on Wills' Study, the principal conclusions and recommendations are as follows:

- The 2026 numerical model indicates that the Norwood municipal water supply is not considered Groundwater Under the Direct Influence of Surface Water (GUDI) at the existing Permit to Take Water (PTTW) rates. Under the proposed primary duty-well configuration (Well 4 at 1,300 m³/d and Well 5 at 1,852 m³/d), 25-year capture zones remain west of the Mill Pond footprint, supporting a non-GUDI conclusion through the projected 2047 maximum-day demand of 3,152 m³/d. This conclusion is subject to the data limitations and contingency considerations discussed in **Sections 5.5** and **7.1**.

- Under the existing PTTW (1,965 m³/d), the projected maximum-day demand is expected to reach approximately 80% of the permitted rate (approximately 1,572 m³/d) between 2031 and 2032.
    - Consistent with common MECP practice for municipal systems, it is recommended that planning for a PTTW amendment be initiated no later than when sustained water takings approach this 80% threshold.
    - The findings of this Study confirm that the aquifer and current Municipal Wellfield configuration can support the existing permitted rate on a non-GUDI basis to the early 2030's.
- The original 2023–2024 scope of work contemplated a planning horizon to 2043 and testing of both new Well 5 and new Well 6. The horizon has been extended to 2047, and Well 6 was deferred due to budget constraints (only Well 5 was installed and tested). Temporary higher-rate operation of the secondary wells can meet maximum-day demand only through approximately 2042 and produces capture zones that encroach slightly into the Mill Pond footprint. Because such operation would be short-term and would typically occur at rates below the maximum-day values in **Table 18** (which already include a peaking factor), the associated GUDI risk is considered low. Continuous long-term operation at the 2047 demand without Well 5 (or an equivalent) is not recommended; installation of Well 6 remains a recommended future measure for improved redundancy.
- Modelling indicates that Wells 4 and 5 are suitable as the primary duty wells. The Township may elect either of the following operational approaches, both of which are supportable by the modelling:
    - Permit Wells 4 and 5 as the sole duty wells, with Wells 1b and 2 designated as standby wells; or
    - Permit all four wells as duty wells, with Wells 1b and 2 rotated into service at substantially lower rates to maintain well condition and operational readiness (their permitted maximum rates would remain at the proposed 788 m³/day to accommodate contingency use).
- It is recommended that Well 3 be abandoned in accordance with Ontario Regulation 903, as amended.
- The routine groundwater quality sampling program for the Municipal Wellfield should be updated to include iron, manganese, aluminum, and sodium as parameters.
    - If sodium concentrations exceed 20 mg/L the required notifications must be submitted to the Medical Officer of Health and residents must be informed of the elevated sodium in drinking water to protect the health of individuals on sodium restricted diets.
- The Source Water Protection Plan must be updated to incorporate the 2026 model and the addition of Well 5. The technical work (including the 2026 model and this report) should be submitted to the Trent Conservation Coalition (TCC) through Otonabee Conservation for review, comment, and approval.

- A long-term Monitoring Plan and a Contingency Plan will be developed as the next phase of the approved scope of work, once the Township has reviewed and is in agreement with the findings of this report. The Monitoring Plan will assess potential effects on the local ecosystem; the Contingency Plan will establish trigger mechanisms (based on baseline groundwater quality and availability) and mitigation measures, including protocols for either standby or low-rate rotation of Wells 1b and 2 and for temporary higher-rate contingency operation.
- Wills will prepare and submit the PTTW amendment application to the MECP on behalf of the Township, following the Township's approval of this report, and receipt of the TCC Section 48 Notice of Complete Submission for the updated Source Water Protection Plan.
- The Township may wish to consider the addition of filtration to the water treatment system to address aesthetic parameters (iron, manganese, aluminum, colour, and turbidity).
- Detailed design drawings showing the connection of Well 5 to the Water Treatment Plan will be required to support the necessary Drinking Water Works Permit application.

9.0 Closing

We trust that the information contained in this report meets your needs at this time. Do not hesitate to contact the undersigned if you have any questions or concerns.

Respectfully Submitted,



Ian Ames, M.Sc., P.Geo.
Practice Area Lead, Earth Sciences



David Ruttan, B.A.Sc., P.Eng.
Senior Hydrogeologist/Senior Groundwater Modeller

IA/DR/jh

Statement of Limitations

This Hydrogeological Study Report has been prepared by D.M. Wills Associates Limited on behalf of the Corporation of the Township of Asphodel-Norwood to assess GUDI conditions for the Municipal Water Supply through updated hydrogeological modelling. The report was prepared for the exclusive use of the Township of Asphodel-Norwood. The report, which specifically includes all tables, figures and appendices, is based on data and information collected by D.M. Wills Associates Limited and is based solely on the conditions of the site at the time of the work, supplemented by historical information.

The conclusions and recommendations in this Report are based on available background documentation, discussions with applicable agencies and field investigations completed at the time of preparation. The assessment of environmental conditions and possible hazards at this site has been made using the results of physical measurements and chemical analyses of liquids from a limited number of locations. The site conditions between sampling locations have been inferred based on conditions observed at groundwater sampling locations. Conditions may vary from these sampled locations.

The groundwater configuration, direction of flow and capture zones developed from the groundwater model described in this report are considered to represent reasonable "theoretical" estimates based on the available data. There is uncertainty inherently associated with the forecasts produced by the groundwater model, stemming from limitations in the available subsurface information and related to variability in the overburden and bedrock properties (e.g., hydraulic conductivity, porosity) or uncertainties with the conceptual model (e.g., groundwater-surface water interactions, location of flow boundaries, recharge rates, direction of regional groundwater flow). It is the intention of D.M. Wills Associates Limited that the model results be used as a tool to predict groundwater flow rates, directions and capture zones based on specific well pumping rates for the purposes of this PTTW application process and not for any other purposes.

The Report is applicable only to the Project as described in the text, constructed substantially in accordance with the plans and details accompanying this submission. The services performed, as described in this report, were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this Hydrogeological Study Report, Norwood Municipal Water Supply, other than for review by applicable agencies, is the responsibility of such third parties. D.M. Wills Associates Limited accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or action taken based on using this Hydrogeological Study Report, Norwood Municipal Water Supply. D.M. Wills Associates Limited is not responsible for any changes made to the Hydrogeological Study Report, Norwood Municipal Water Supply which are not in

accordance with the design drawings. Any person(s) relying on the "as-constructed" Hydrogeological Study Report, Norwood Municipal Water Supply should confirm that the field conditions are in accordance with the design drawings.

D.M. Wills Associates Limited has relied in good faith on all information provided and does not accept responsibility for any deficiency, misstatements, or inaccuracies contained in the reports as a result of omissions, misinterpretation, or fraudulent acts of the persons contacted or errors or omissions in the reviewed documentation. Electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore authenticity of any electronic media versions of Wills' report should be verified.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, D.M. Wills Associates Limited should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

Figures



Legend

- Norwood Municipal Well Field
- Municipal Water Supply Well

Norwood Municipal Well Field

Village of Norwood, Ontario

WILLS

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Drawn by: L. TUTERS	Scale: 1:750 on 8.5"x11" (US Letter)
Checked: I. AMES	Date: October 8, 2026
Project No.: 7549	Drawing file No.: Figure 1



Legend

- Borehole/Monitoring Well (BH/MW)
- Drive-Point Piezometer (Piezo)
- Township Property Boundary

Observation Well Network
Well 5 Pumping Test

Village of Norwood, Ontario

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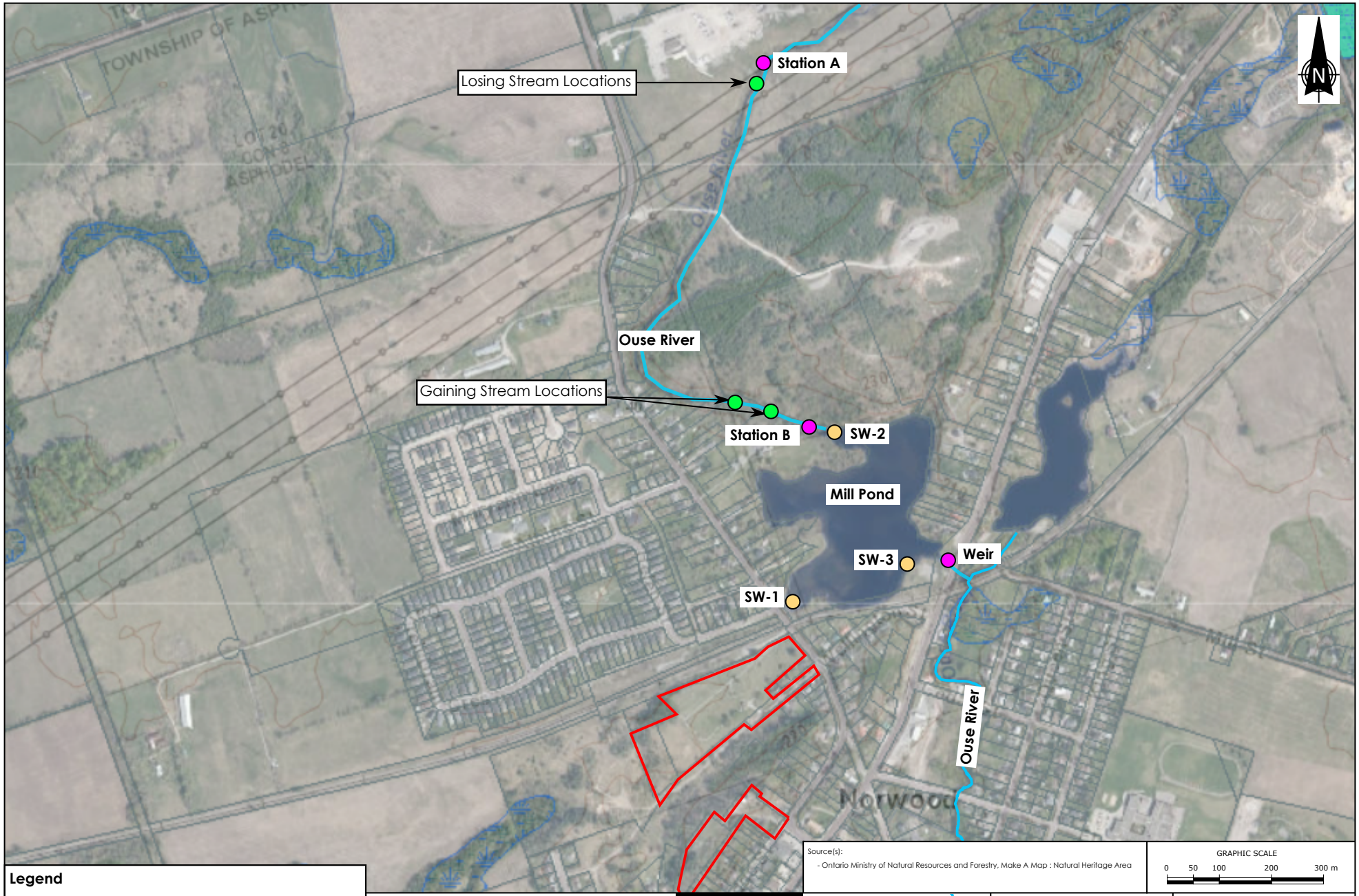
Project No.: 7549	Drawing file No.: Figure 2



Legend

- Township Property Boundary
- Unevaluated Wetland
- Surface Water Sampling Location
- Ouse River Flow Measurement and Profile Location
- Losing/Gaining Stream Karst Locations

Source(s):
- Ontario Ministry of Natural Resources and Forestry, Make A Map : Natural Heritage Area

GRAPHIC SCALE
0 50 100 200 300 m

Surface Water Features

Norwood, Ontario

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Checked: L. TUTERS	Date: July 14, 2026
Project No.: 7549	Drawing file No.: Figure 3



Legend

- Township Property Boundary
- Nested Waste Disposal Site Monitoring Wells (MW)

Source(s):
- Ontario Ministry of Natural Resources and Forestry, Make A Map : Natural Heritage Area

GRAPHIC SCALE
0 47.5 95 190 285 m

Waste Disposal Site Monitoring Wells Included in Modelling

Village of Norwood, Ontario

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Checked: I. AMES	Date: November 17, 2026
Project No.: 7549	Drawing file No.: Figure 4



Legend

- Township Property Boundary
- Mill Pond Hydraulic Conductivity Test Locations

Source(s):
- Ontario Ministry of Natural Resources and Forestry, Make A Map : Natural Heritage Area

GRAPHIC SCALE
0 47.5 95 190 285 m

Mill Pond Hydraulic Conductivity Test Locations

Village of Norwood, Ontario

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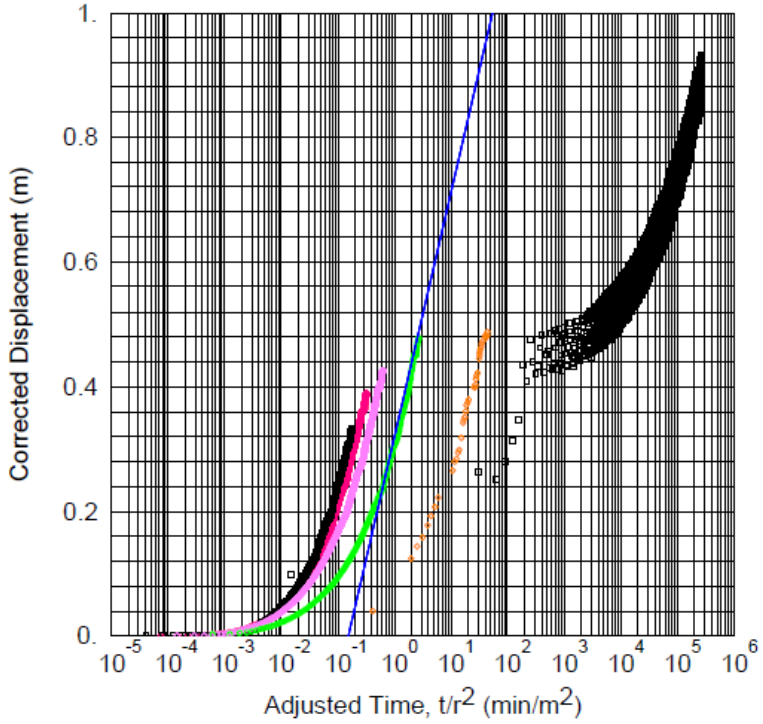
Project No.: 7549	Drawing file No.: Figure 5



WELL 5 P COMPOSITE

PROJECT INFORMATION

Company: D. M. WILLS
Client: NORWOOD
Project: 7549
Location: NORWOOD
Test Well: WELL 5
Test Date: DEC 2025

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

T = 865. m^2/day
S = 0.2086

AQUIFER DATA

Saturated Thickness: 7.14 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WELL 5	262455	4918741

Observation Wells

Well Name	X (m)	Y (m)
WELL 5	262455	4918741
MW21-07	262375.5	4918656.8
MW21-05	262369.6	4918610.4
MW21-08	262386.3	4918694.2
MW21-09	262418.7	4918724
MW21-10	262462.4	4918747.5

Legend

Well 5 72-Hour Pumping Test
Composite Semilog Plot

Village of Norwood, Ontario

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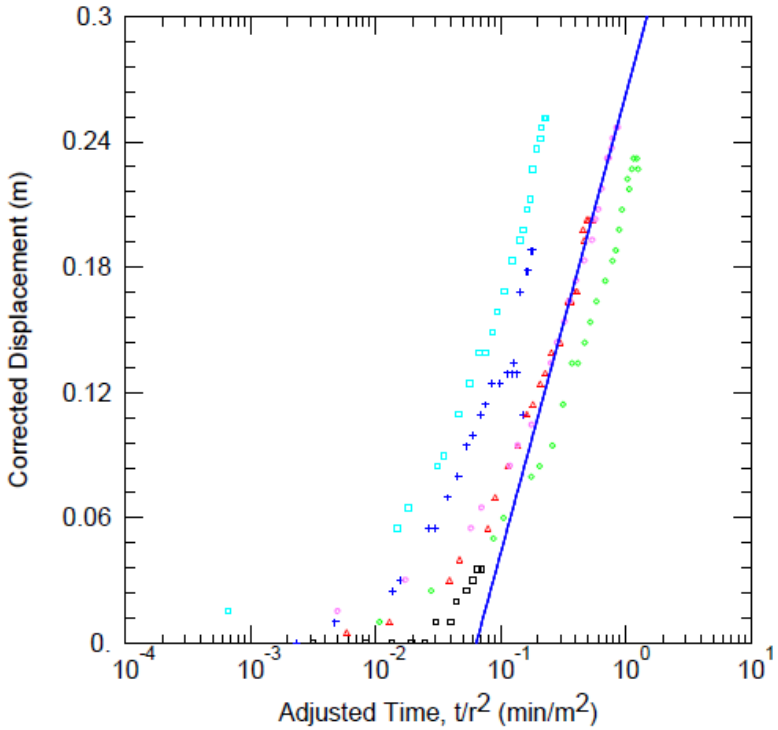
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 14, 2026
Project No.: 7549	Drawing file No.: Figure 6



WELL TEST ANALYSIS

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Date: 08/28/14 Time: 02:14:32

PROJECT INFORMATION

Company: WILLS
Client: NORWOOD
Project: 7128
Location: NORWOOD
Test Well: WELL 3 PUMPING TEST P WELL
Test Date: 2018

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob
T = 1284.9 m^2/day
S = 0.1286

AQUIFER DATA

Saturated Thickness: 9.4 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WELL 3	262418	4918684

Observation Wells

Well Name	X (m)	Y (m)
MW21-05	262369.6	4918610.4
MW21-07	262375.5	4918656.8
MW21-08	262386.3	4918694.2
MW21-09	262418.7	4918724
MW21-10	262462.4	4918747.5
MW21-04	262313.2	4918780.2

Legend

Well 3 Pumping Test
Composite Semilog Plot

Village of Norwood, Ontario

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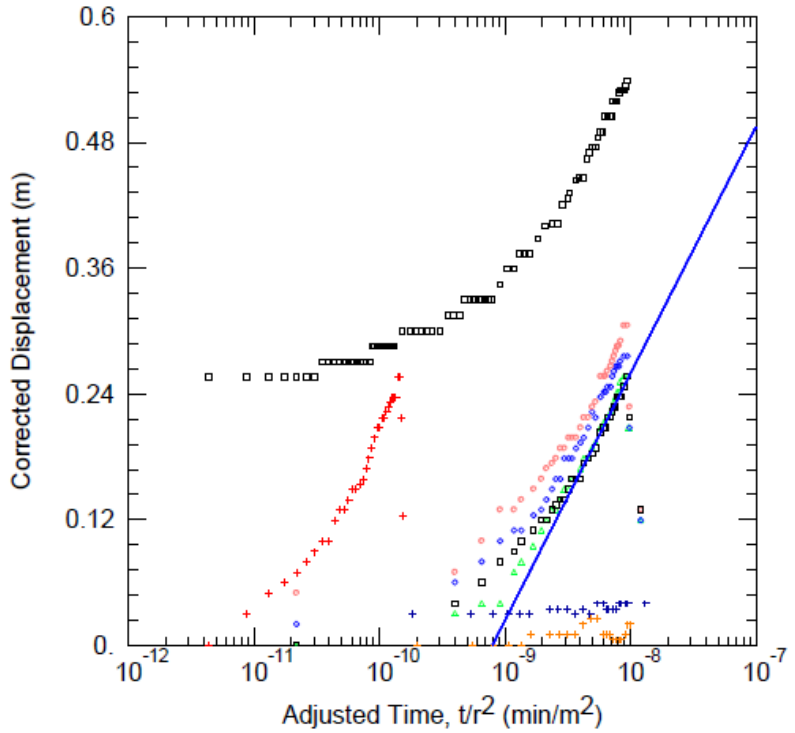
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 14, 2026
Project No.: 7549	Drawing file No.: Figure 7



WELL TEST ANALYSIS

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Date: 08/28/14 Time: 03:07:53

PROJECT INFORMATION

Company: WILLS
Client: NORWOOD
Project: 7128
Location: NORWOOD
Test Well: WELL 4 logger
Test Date: 12/07/21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

T = 1384.9 m^2/day
S = 1.721E-9

AQUIFER DATA

Saturated Thickness: 9.93 m

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WELL 4	262383	4918678

Observation Wells

Well Name	X (m)	Y (m)
MW21-10	740406.3	4918852.6
MW21-09	740364.3	4918826
MW21-08	740334.2	4918793.9
MW21-07	740326.1	4918755.9
MW21-05	740323.75	4918709.1
MW21-03	740309	4918921
MW21-04	740254.9	4918874.4
WELL 4	740326.1	4918755.9

Legend

Well 4 Pumping Test
Composite Semilog Plot

Village of Norwood, Ontario

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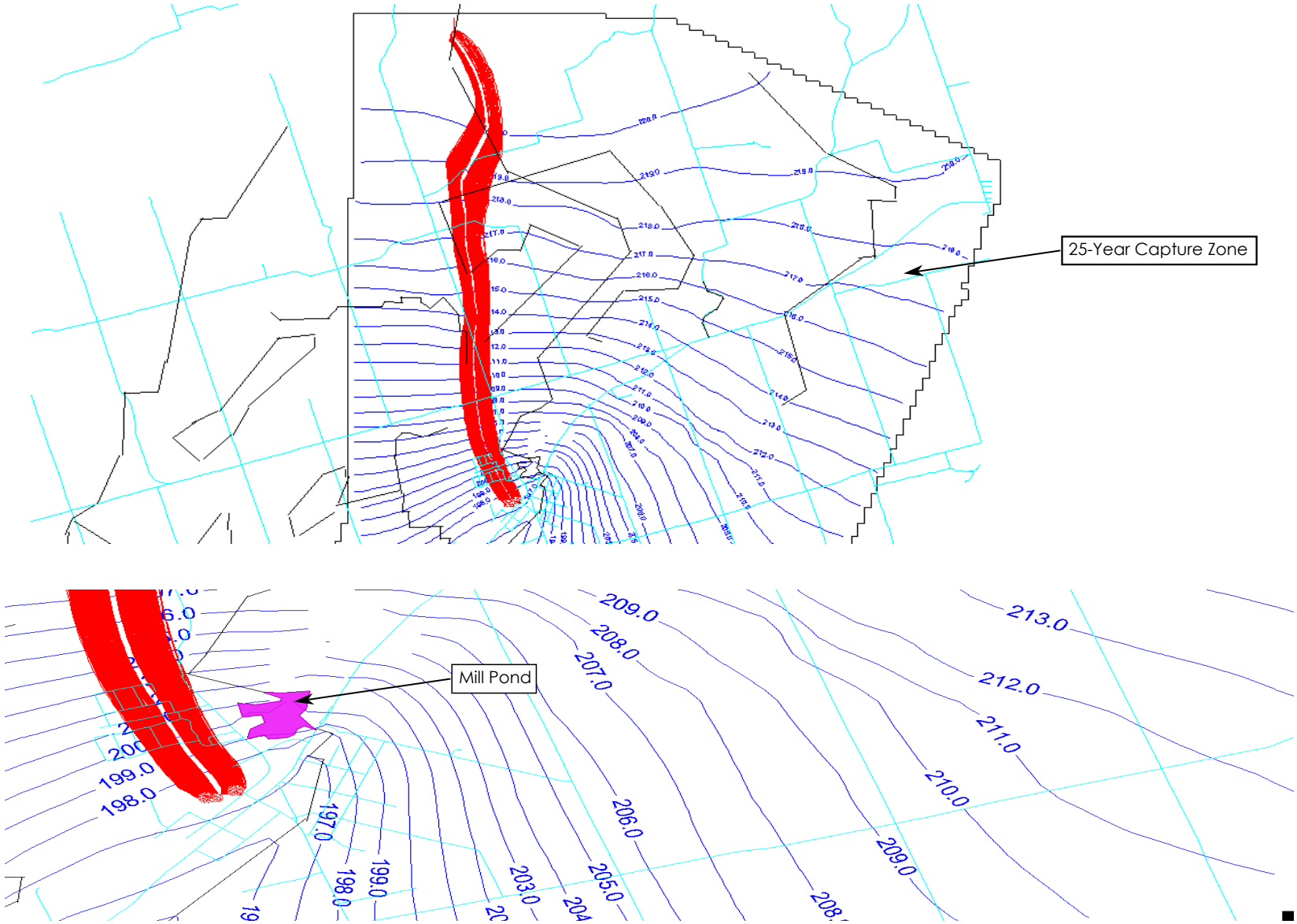
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 14, 2026
Project No.: 7549	Drawing file No.: Figure 7



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 1b, Well 2, Well 4
Pumping Rate of 1,273 m^3/day

Village of Norwood, Ontario

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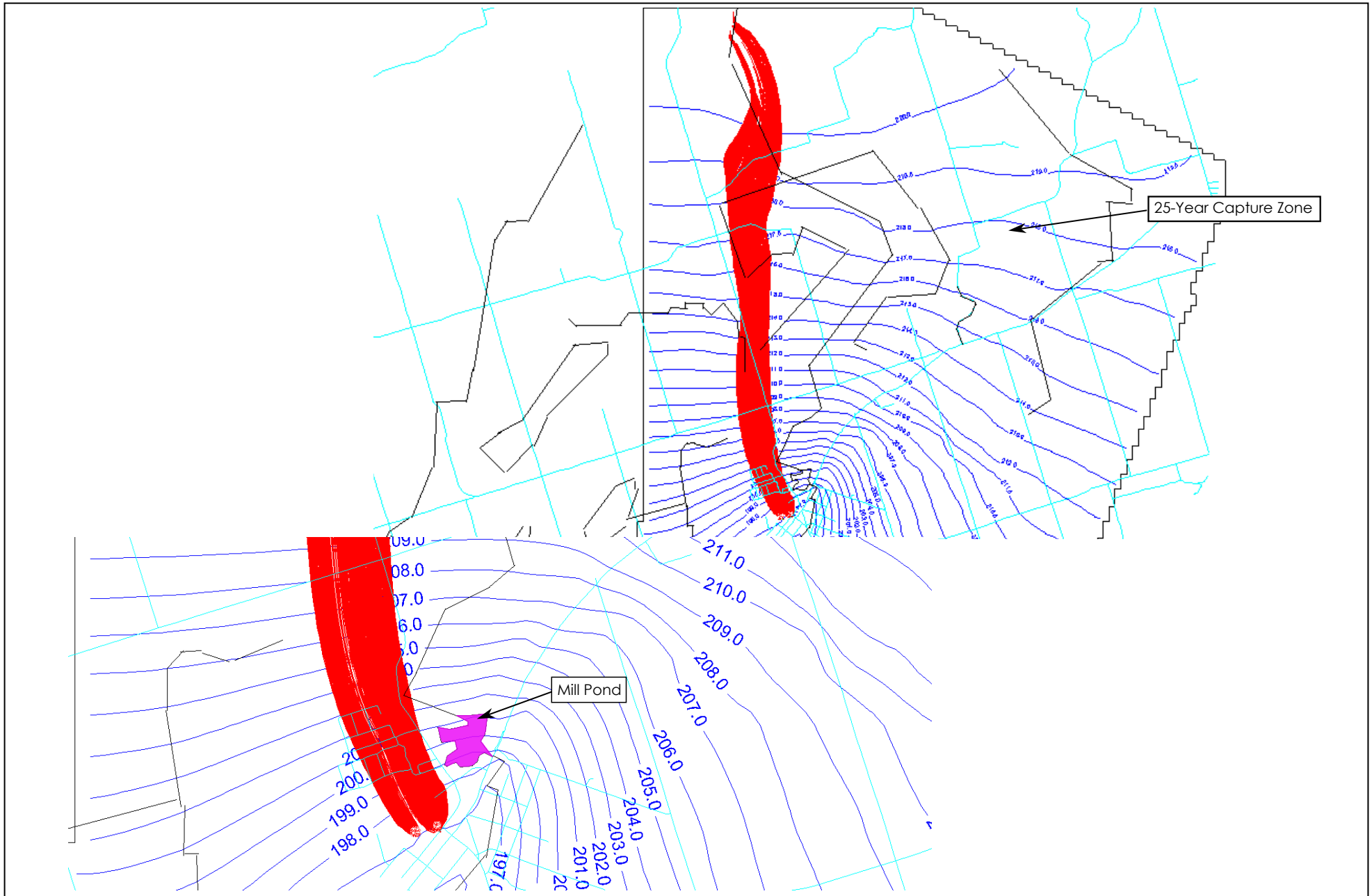
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 14, 2026
Project No.: 7549	Drawing file No.: Figure 9



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 1b, Well 2, Well 4, Well 5
Pumping Rate of 1,965 m^3/day

Village of Norwood, Ontario

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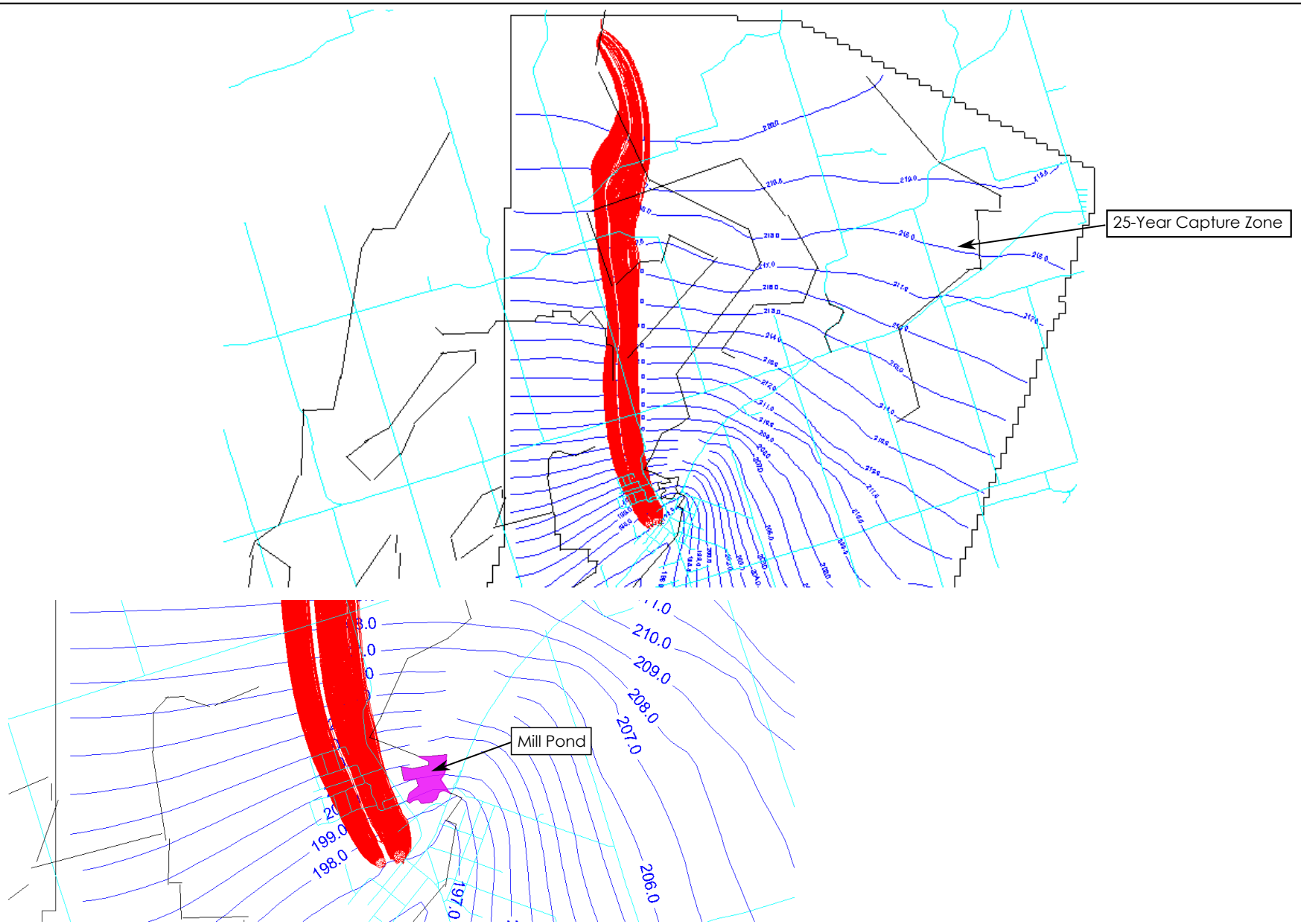
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 15, 2026
Project No.: 7549	Drawing file No.: Figure 10



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 1b, Well 2, Well 4
Pumping Rate of 1,965 m^3/day

Village of Norwood, Ontario

WILLS

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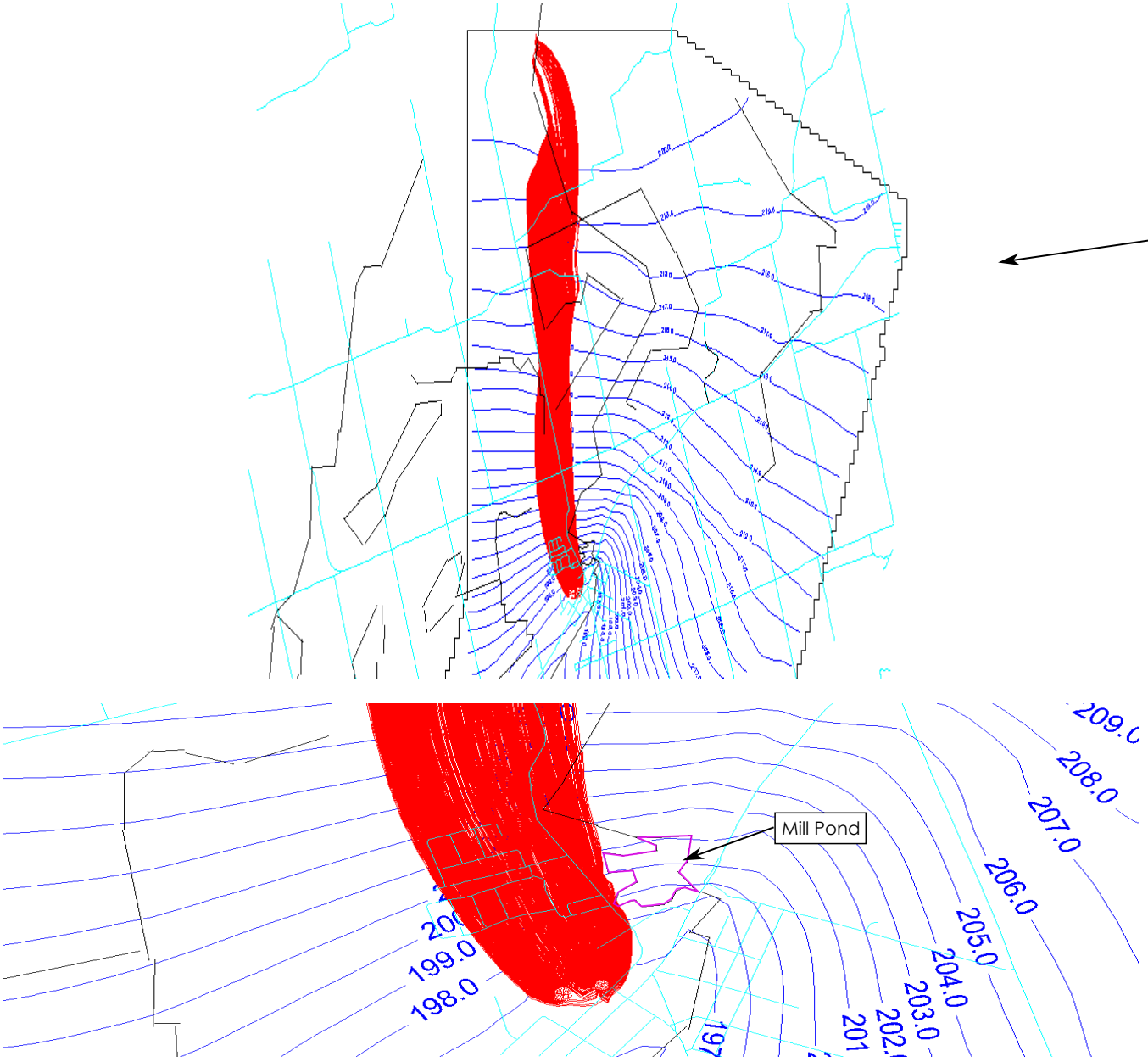
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 15, 2026
Project No.: 7549	Drawing file No.: Figure 11



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 1b, Well 2, Well 4, Well 5
Pumping Rate of 3,152 m^3/day

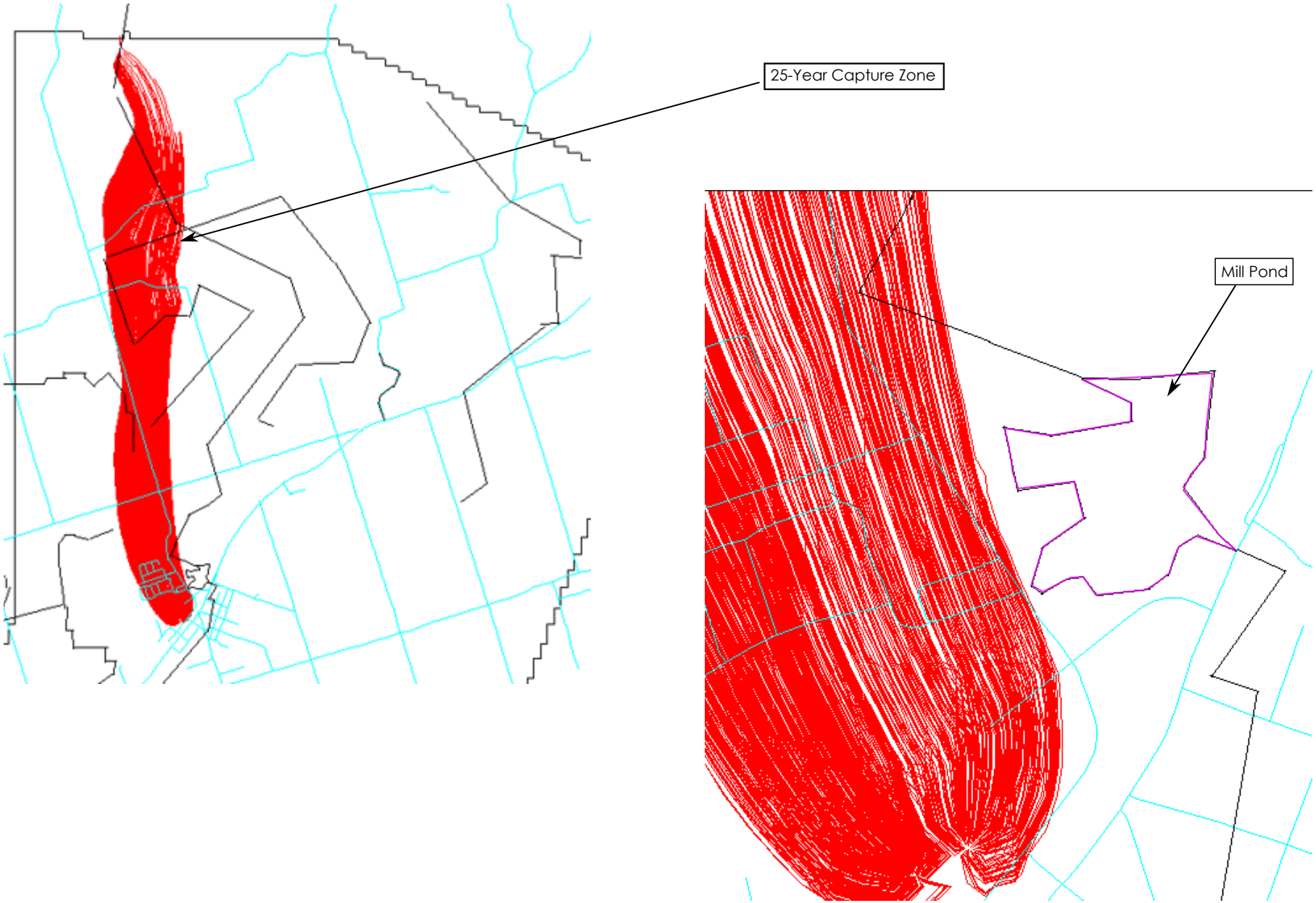
Village of Norwood, Ontario

WILLS

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
K9J 0B9

P. 705.742.2297
F. 705.748.9944
E. wills@dmwills.com

Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 15, 2026
Project No.: 7549	Drawing file No.: Figure 12



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 5 Pumping Rate of 3,152 m^3/day

Village of Norwood, Ontario

WILLS

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150 Jameson Drive
Peterborough, Ontario
K9J 0B9

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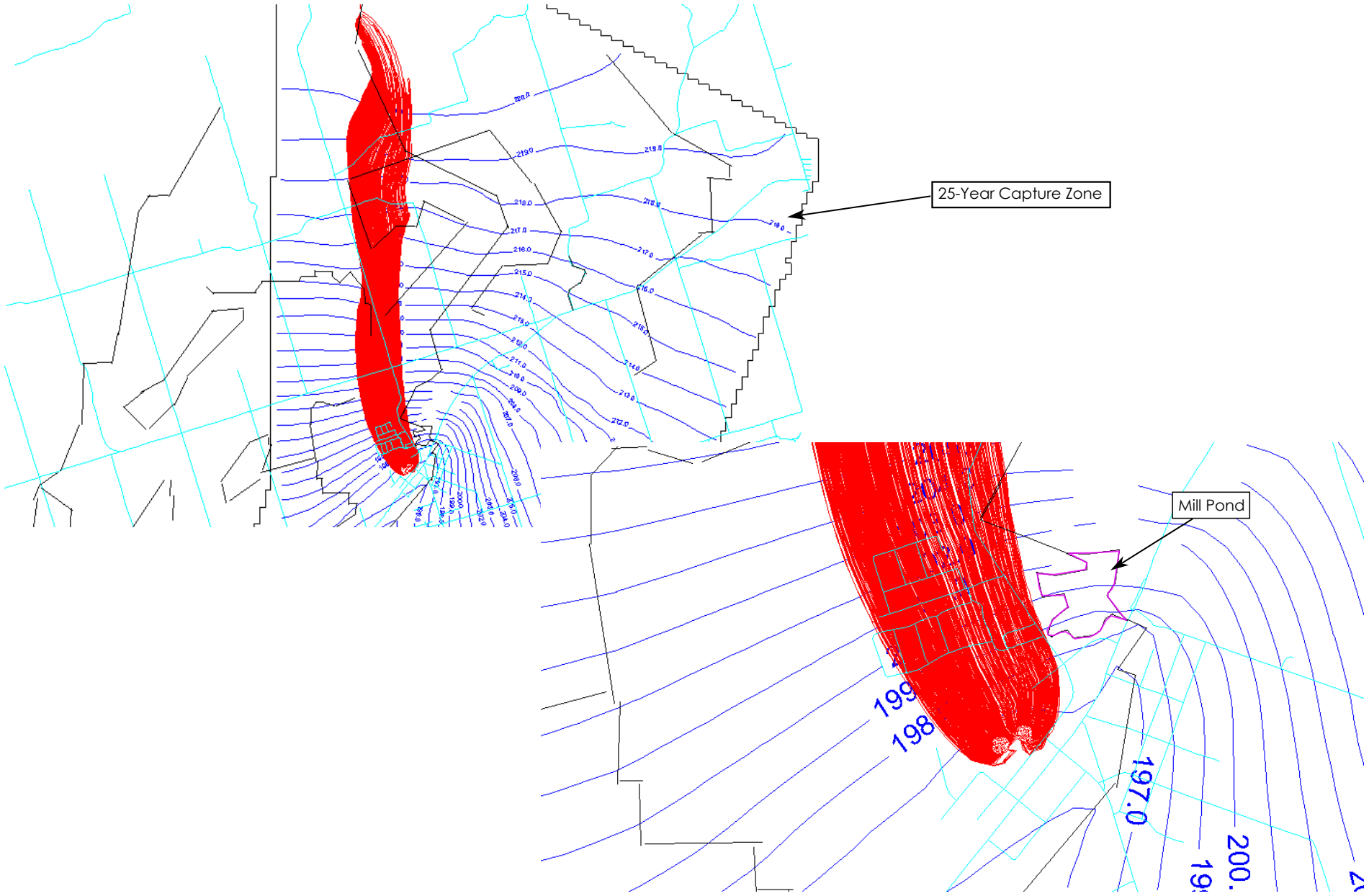
E. wills@dmwills.com

Drawn by: D. RUTTAN	Scale:
Checked:	Date: November 17, 2026
Project No.: 7549	Drawing file No.: Figure 13



Legend

- 25-Year Capture Zone Pathlines
- Mill Pond

Well 4 (1,300 m^3/day)
Well 5 (1,852 m^3/day)
Pumping Rate of 3,152 m^3/day
Village of Norwood, Ontario

WILLS

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
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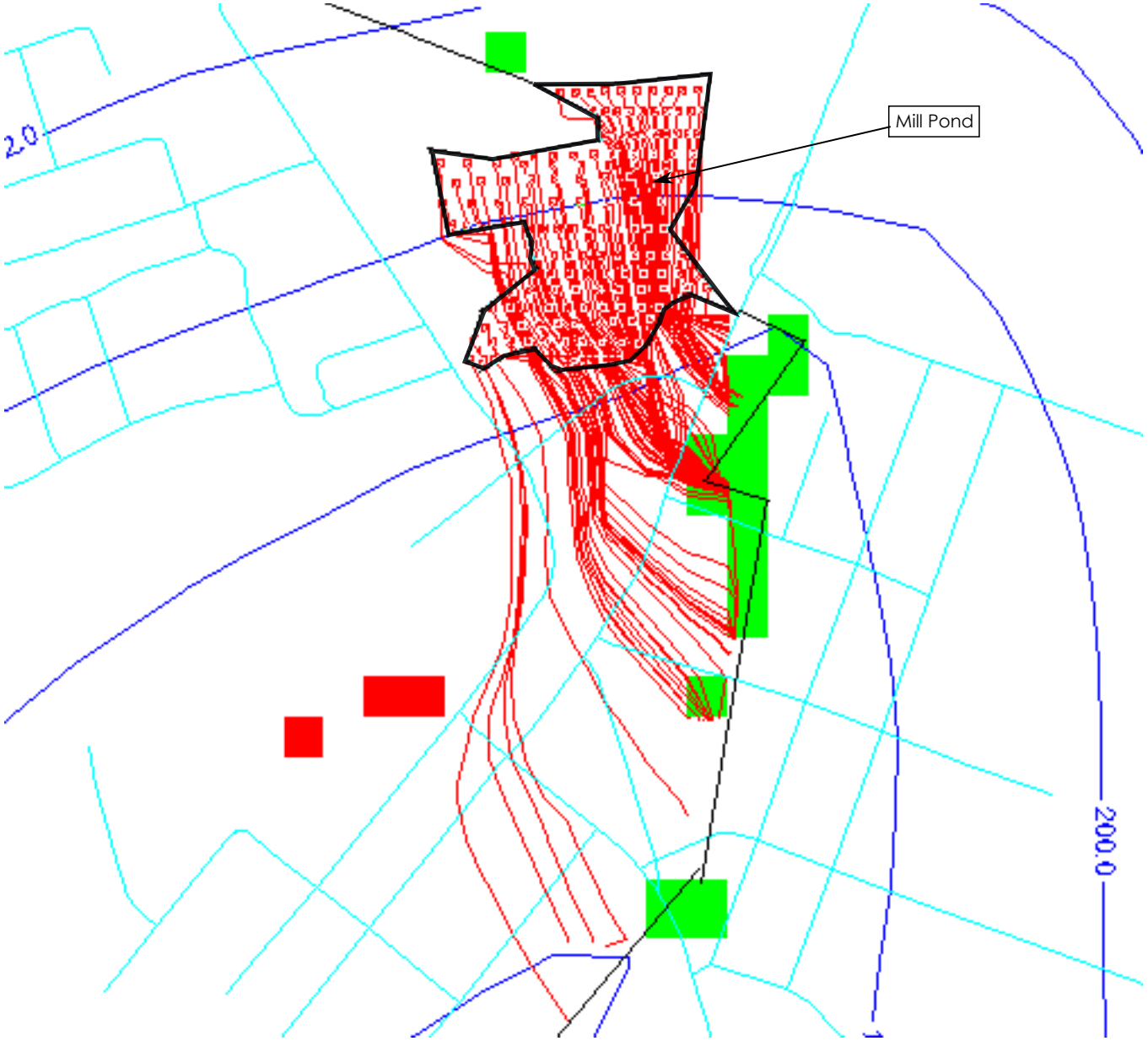
Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 15, 2026
Project No.: 7549	Drawing file No.: Figure 14



Legend

- Forward Tracking Particles
- Mill Pond

Mill Pond Forward Tracking Particles
Well 4 (1,300 m^3/day)
Well 5 (1,852 m^3/day)
Pumping Rate of 3,152 m^3/day
Village of Norwood, Ontario

WILLS

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
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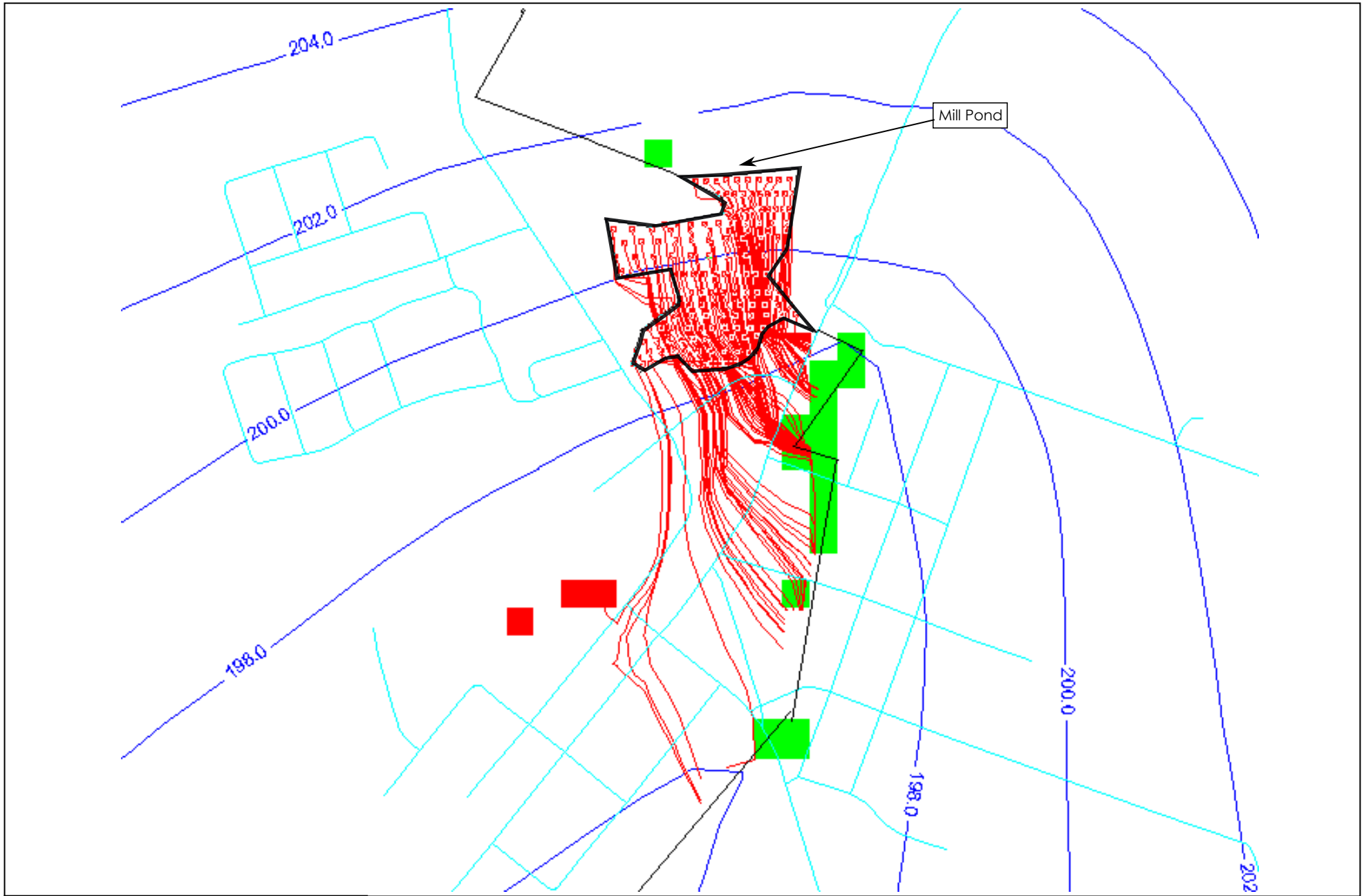
Drawn by: D. RUTTAN	Scale:
Checked:	Date: November 17, 2026
Project No.: 7549	Drawing file No.: Figure 15



Legend

- Forward Tracking Particles
- Mill Pond

Mill Pond Forward Tracking Particles
Well 1b, Well 2, Well 4, and Well 5
(788 m^3/day each)
Pumping Rate of 3,152 m^3/day
Village of Norwood, Ontario

WILLS

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
K9J 0B9

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Drawn by: D. RUTTAN	Scale:
Checked:	Date: October 19, 2026
Project No.: 7549	Drawing file No.: Figure 16

Appendix A

Borehole Logs

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

BORING NUMBER BH21-11

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/22/21 **COMPLETED** 11/23/21
UTM EASTING 262393.4256 **NORTHING** 4918639.4989
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 218.72 masl
DRILLING METHOD 8" Hollow Stem Auger/Mud Rotary with Split Spoons **GROUNDWATER LEVELS:**
LOGGED BY LT **CHECKED BY** IA **AT END OF DRILLING** ---
NOTES 8" Hollow Stem Auger 0.00 m to 1.50 m, Mud Rotary 1.50 m to 15.85 m **AFTER DRILLING** ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	GRAPHIC LOG		MATERIAL DESCRIPTION	
	SS-1	38	3		0.05	TOPSOIL: Dark brown silty sand topsoil, trace clay, rootlets, moist, loose	218.67
	SS-2	46	23			SILTY SAND: Brown silty sand, some gravel, trace clay, occasional cobble, moist, compact -trace gravel	
	SS-3	17	15		3.05	GRAVEL: Grey gravel, trace sand, trace silt, compact	215.67
5	SS-4	31	17				
	SS-5	31	23			-occasional cobble	
	SS-6	54	10			-coarse grained sand bed (upper 0.1 m of split spoon), some gravel, trace silt -some sand	
10	SS-7	48	13			-coarse sand and gravel, trace silt	
	SS-8	0	50+			-very dense	
	SS-9	40	50+			-boulder, compact	
	SS-10	38	50+		13.70	SAND: Grey brown sand (coarse to medium grained), trace to some silt, occasional cobble/boulder, very dense	205.02
15	SS-11	8	50+		15.85	-increasing cobble/boulder content	202.87
						Borehole terminated at 15.85 m in sand due to practical refusal on cobble/boulder material.	

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

WELL NUMBER MW21-01

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/15/21 **COMPLETED** 11/15/21
UTM EASTING 262542.5859 **NORTHING** 4918931.382
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 202.23 masl
DRILLING METHOD 8" Hollow Stem Auger with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.06 m / Elev 198.17 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	50	3	Static Water Level 3.75 mbg Dec 3/21 GSA SS-5: Gravel - 0% Sand - 61% Silt - 35% Clay - 4%		0.10 / 202.13 TOPSOIL: Dark brown silty sand topsoil, trace clay, moist, loose	Casing Top Elev: 203.27 (m) Casing Type: Monument Cement seal at surface
	SS-2	67	28			1.50 / 200.73 SILTY SAND: Medium brown silty sand, trace clay, moist, loose	
	SS-3	46	39			SAND: Brown sand, some silt, trace gravel, moist, dense -some gravel, occasional cobble	Bentonite hole plug seal
5	SS-4	75	25			-gravel and coarse sand, saturated, compact -trace gravel	
	SS-5	87	18			-interbedded coarse and fine grained sand, silty, no gravel	Quartz sand 1.52 m length 10 slot screen
	SS-6	100	46			8.10 / 194.13 8.25 / 193.98 GRAVEL AND SAND: Grey gravel and sand, trace silt, trace clay, abundant cobble/boulder, dense Borehole terminated at 8.25 m in gravel and sand due to practical refusal on cobble/boulder material.	

WELL NUMBER MW21-02

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/15/21 **COMPLETED** 11/16/21
UTM EASTING 262399.661 **NORTHING** 4918847.0905
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc.
GROUND ELEVATION 208.24 masl
DRILLING METHOD 8" Hollow Stem Auger/Mud Rotary with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES 8" Hollow Stem Auger to 6.10 m, Mud Rotary 6.10 m to 16.80 m
AFTER DRILLING 10.15 m / Elev 198.09 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	42	13			0.10 TOPSOIL: Dark brown silty sand topsoil, trace clay, moist, loose (208.14)	Casing Top Elev: 209.29 (m) Casing Type: Monument Cement seal at surface
	SS-2	62	12			1.50 (206.74) SAND: Brown sand, some gravel, trace silt, trace clay, occasional cobble, moist, compact	
	SS-3	44	27			SAND AND GRAVEL: Brown sand and gravel, some silt, trace clay, occasional cobble, moist, compact	
5	SS-4	67	22				
	SS-5	56	42				
	SS-6	40	28			7.80 (200.44)	Bentonite hole plug seal
	SS-7	46	25			SAND: Brown sand, some gravel, some silt, trace clay, occasional cobble/boulder -trace gravel	
10	SS-8	56	26	Static Water Level 10.15 mbg Dec 3/21			
	SS-9	75	26				
	SS-10	83	20				
				GSA SS-11b: Gravel - 0% Sand- 70% Silt-25% Clay-5%		-sandy gravel bed (0.2 m thick), dense -interbedded fine and coarse sand, silty, no gravel	1.52 m length 10 slot screen Quartz sand
15	SS-11	87	30				
	SS-12	29	50+			-very dense, increasing cobble/boulder content 16.80 (191.44) Borehole terminated at 16.80 m in sand due to practical refusal on cobble/boulder material.	

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

WELL NUMBER MW21-03

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/17/21 **COMPLETED** 11/17/21
UTM EASTING 262370.6982 **NORTHING** 4918822.6306
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 208.8 masl
DRILLING METHOD 6" Solid Stem Auger/Mud Rotary with Split Spoons **GROUNDWATER LEVELS:**
LOGGED BY LT **CHECKED BY** IA **AT END OF DRILLING** ---
NOTES 6" Solid Stem Auger to 4.60 m, Mud Rotary 4.60 m to 17.50 m **AFTER DRILLING** 9.99 m / Elev 198.81 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	29	14			0.08 TOPSOIL: Dark brown silty sand topsoil, trace clay, rootlets, moist, compact (208.72)	Casing Top Elev: 209.92 (m) Casing Type: Monument; Cement seal at surface
						1.50 (207.30) SAND AND GRAVEL: Brown sand and gravel, some silt, trace clay, occasional cobble, moist, compact	
	SS-2	65	8				
	SS-3	52	16			SAND: Brown sand (coarse grained), trace gravel, trace silt, trace clay, moist, loose	
5	SS-4	29	50+			4.60 (204.20) -medium grained sand, compact -some gravel, occasional cobble	
	SS-5	71	23			SANDY GRAVEL: Grey brown sandy gravel (coarse grained sand), trace silt, occasional cobble, very dense	
	SS-6	50	26			-fine grained sand over 0.15 m, compact	Bentonite hole plug seal
	SS-7	65	32	Static Water Level 9.99 mbg Dec 3/21		8.50 (200.30) SAND: Brown sand (medium grained), trace silt, trace clay, trace gravel, dense	
10	SS-8	77	41	GSA SS-7: Gravel - 3% Sand- 76% Silt-17% Clay-4%		-some silt	
	SS-9	58	19			-gravelly sand bed (0.2 m thick), compact	
	SS-10	69	21	GSA SS-11: Gravel - 4% Sand- 70% Silt-22% Clay-4%		-some gravel, occasional cobble/boulder	
15	SS-11	54	21			-silty, trace gravel -fine grained sand fraction	
	SS-12	35	50+			16.50 (192.30) SANDY GRAVEL: Grey sandy gravel, trace silt, trace clay, abundant cobble/boulder, very dense	Quartz sand 1.52 m length 10 slot screen
						17.50 (191.30) Borehole terminated at 17.50 m in sandy gravel due to practical refusal on cobble/boulder material.	

WELL NUMBER MW21-04

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/18/21 **COMPLETED** 11/18/21
UTM EASTING 262313.0887 **NORTHING** 4918780.278
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 202.57 masl
DRILLING METHOD 6" Solid Stem Auger/Mud Rotary with Split Spoons **GROUNDWATER LEVELS:**
LOGGED BY LT **CHECKED BY** IA **AT END OF DRILLING** ---
NOTES **AFTER DRILLING** 3.48 m / Elev 199.09 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	58	6			0.10 TOPSOIL: Dark brown silty sand topsoil, trace clay, rootlets, moist, compact (202.47)	Casing Top Elev: 203.58 (m) Casing Type: Monument Cement seal at surface
	SS-2	56	4			SAND: Brown sand (medium grained), trace silt, trace clay, trace gravel, occasional cobble/boulder, loose -fine textured sand fraction, no gravel -light brown	
	SS-3	77	6	Static Water Level 3.48 mbg Dec 3/21			
5	SS-4	79	11			-brown, coarse textured sand fraction, trace gravel, wet, compact	Bentonite hole plug seal
	SS-5	100	3			-loose	
	SS-6	100	11			-grey brown, compact	
10	SS-7	100	16	GSA SS-8A: Gravel - 3% Sand- 83% Silt-11% Clay-3%			
	SS-8	100	90			-some silt, increasing cobble/boulder content, very dense (191.07)	Quartz sand 1.52 m length 10 slot screen
						11.50 Borehole terminated at 11.50 m in sand due to practical refusal on cobble/boulder material.	

TESTING 7128 BOREHOLE LOGS.GPJ OVERBURDENBHLOGNVALUE.GDT 5/25/22

WELL NUMBER MW21-05

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/18/21 **COMPLETED** 11/21/21
UTM EASTING 262369.7851 **NORTHING** 4918610.3916
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 216.98 masl
DRILLING METHOD 8" Hollow Stem Auger/Mud Rotary with Split Spoons **GROUNDWATER LEVELS:**
LOGGED BY LT **CHECKED BY** IA **AT END OF DRILLING** ---
NOTES 8" Hollow Stem Auger to 7.60 m, Mud Rotary 7.60 m to 23.10 m **AFTER DRILLING** 19.64 m / Elev 197.34 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	58	3			0.30 (216.68) TOPSOIL: Dark brown silty sand topsoil, trace clay, rootlets, moist, loose	Casing Top Elev: 218.16 (m) Casing Type: Monument Cement seal at surface
	SS-2	58	53			SAND: Brown sand, some silt, trace gravel, trace clay, occasional cobble, very dense	
	SS-3	67	27			-grey brown medium grained sand fraction, some gravel, dense	
5	SS-4	44	51			-trace silt, very dense	
	SS-5	50	38			-fine grained sand fraction, increasing cobble content, dense	
	SS-6	58	50+			-trace gravel, very dense	
	SS-7	50	70			8.50 (208.48) SAND AND GRAVEL: Grey sand and gravel, trace silt, trace clay, occasional cobble, very dense	
10							Bentonite hole plug seal
	SS-8	17	50+				
	SS-9	58	37	GSA SS-10: Gravel - 40% Sand- 46% Silt-11% Clay-3%		-dense	
	SS-10	75	72			-very dense	
15						15.20 (201.78)	
	SS-11	73	60			SAND: Grey brown sand, some gravel to gravelly, trace silt, trace clay, occasional cobble, very dense	
	SS-12	99	65			-some silt	
						18.30 (198.68)	
	SS-13	42	50+	Static Water Level 19.63 mbg Dec 6/21		SANDY GRAVEL: Grey brown sandy gravel, some silt, trace clay, occasional cobble/boulder	
20	SS-14	75	113	GSA SS-15: Gravel - 3% Sand- 83% Silt-11% Clay-3%			
	SS-15	62	50+			-fine grained sand bed (0.3 m thick), some silt, trace clay, trace gravel -increasing cobble/boulder content, very dense	Quartz sand 1.52 m length 10 slot screen
						23.10 (193.88) Borehole terminated at 23.10 m in sandy gravel due to practical refusal on cobble/boulder material.	

WELL NUMBER MW21-06

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/30/21 **COMPLETED** 11/30/21
UTM EASTING 262838.8228 **NORTHING** 4919201.2321
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc.
GROUND ELEVATION 202.21 masl
DRILLING METHOD 8" Hollow Stem Auger with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.54 m / Elev 198.67 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	42	2			0.03 TOPSOIL: Dark brown silty sand topsoil, trace clay, moist, loose (202.18)	Casing Top Elev: 203.17 (m) Casing Type: Monument Cement seal at surface
	SS-2	25	4			SAND: Brown sand, some gravel, trace silt, moist, loose -some silt, occasional cobble	
	SS-3	58	14	Static Water Level 3.54 mbg Dec 3/21		3.70 (198.51)	
5	SS-4	96	8			4.55 SILTY SAND AND GRAVEL: Grey brown silty sand and gravel, wet, occasional cobble, compact (197.66)	Bentonite hole plug seal
	SS-5	56	16			SAND: Grey (coarse grained) sand, some gravel, some silt, trace clay, saturated, loose - occasional cobble, compact	
	SS-6	75	24	GSA SS-7: Gravel - 3% Sand- 76% Silt-17% Clay-4%			
10	SS-7	100	13			10.00 -trace gravel, silty (192.21)	Quartz sand 1.52 m length 10 slot screen
						Borehole terminated at 10.00 m on assumed bedrock.	

TESTING 7128 BOREHOLE LOGS.GPJ OVERBURDENBHLOGNVALUE.GDT 5/25/22

WELL NUMBER MW21-07

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/24/21 **COMPLETED** 11/26/21
UTM EASTING 262375.3874 **NORTHING** 4918656.8643
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 216.47 masl
DRILLING METHOD Mud Rotary with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 19.12 m / Elev 197.35 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
						Augered through 2.74 m thick drill pad (granular fill)	Casing Top Elev: 217.6 (m) Casing Type: Monument Cement seal at surface
						2.70 / 213.77	
	SS-1	38	68			GRAVEL: Grey brown gravel, some sand (coarse grained), trace silt, trace clay, very dense	
5	SS-2	54	16			sandy, some silt, compact	
	SS-3	42	48			-some sand, trace silt, occasional cobble, dense	
	SS-4	50	44				
	SS-5	33	40				
10						10.70 / 205.77	
	SS-6	58	23			SAND: Brown sand (fine grained), trace silt, trace clay, compact	
	SS-7	27	50+			12.20 / 204.27 GRAVEL AND SAND: Grey brown gravel and sand, some silt, trace clay, occasional cobble/boulder, very dense	Bentonite hole plug seal
15	SS-8	50	48			-dense	
	SS-9	46	87	Static Water Level 19.12 mbg Dec 3/21		-very dense	
20							
	SS-10	54	59				
25	SS-11	48	46			-dense -silty sand bed (0.05 m thick)	
	SS-12	96	50+	GSA SS-12: Gravel - 44% Sand- 40% Silt-13% Clay-3%		-increasing cobble/boulder content -very dense 27.80 / 188.67 Borehole terminated at 27.80 m in gravel and sand due to practical refusal on cobble/boulder material.	Quartz sand 1.52 m length 10 slot screen

TESTING 7128 BOREHOLE LOGS.GPJ OVERBURDENBHLOGNVALUE.GDT 5/25/22

WELL NUMBER MW21-08

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/26/21 **COMPLETED** 11/29/21
UTM EASTING 262386.2744 **NORTHING** 4918694.1027
DRILLING CONTRACTOR Canadian Environmental Drilling & Contractors Inc. **GROUND ELEVATION** 217.89 masl
DRILLING METHOD Mud Rotary with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 20.59 m / Elev 197.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	N VALUE	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
						Augered through 1.50 m thick drill pad (granular fill)	Casing Top Elev: 218.83 (m) Casing Type: Monument Cement seal at surface
						1.50 / 216.39	
	SS-1	75	26			1.60 / 216.29 — TOPSOIL: Dark brown silty sand topsoil, trace clay, rootlets, moist, compact	
						GRAVEL: Grey brown gravel, some sand, trace silt, trace clay, occasional cobble	
5	SS-2	23	14			-medium grained sand fraction	
	SS-3	42	19			-sand and gravel, coarse grained sand fraction	
10	SS-4	71	36			-sandy	Bentonite hole plug seal
						13.70 / 204.19	
	SS-5	62	36			GRAVELLY SAND: Grey brown gravelly sand, trace silt, trace clay, occasional cobble	
15				GSA SS-6: Gravel - 57% Sand- 28% Silt-12% Clay-3%			
	SS-6	58	53			16.70 / 201.19 — SANDY GRAVEL: Grey brown sandy gravel, some silt, trace clay, occasional cobble, very dense	
20	SS-7	54	80	Static Water Level 20.59 mbg Dec 6/21			
						22.90 / 194.99	
	SS-8	58	28			SAND: Brown sand (fine grained), trace silt, compact	
25				GSA SS-9: Gravel - 45% Sand- 35% Silt-16% Clay-4%			
						25.90 / 191.99	Quartz sand 1.52 m length 10 slot screen
	SS-9	42	50+			GRAVEL AND SAND: Grey brown gravel and sand, some silt, trace clay, occasional cobble/boulder, very dense	
						26.95 / 190.94	
						Borehole terminated at 26.95 m in gravel and sand due to practical refusal on cobble/boulder material.	

TESTING 7128 BOREHOLE LOGS.GPJ OVERBURDENBHLOGNVALUE.GDT 5/25/22

WELL NUMBER MW21-09

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 11/29/21 **COMPLETED** 12/1/21
UTM EASTING 262418.6275 **NORTHING** 4918723.8931
DRILLING CONTRACTOR Insitu Contractors Inc.
GROUND ELEVATION 216.54 masl
DRILLING METHOD Sonic Drilling with Continuous Sampling
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 19.20 m / Elev 197.34 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
					Casing Top Elev: 217.38 (m) Casing Type: Monument	
	ST-1	71			0.20 **TOPSOIL:** 216.34 Dark brown silty sand topsoil, trace clay, rootlets	Cement seal at surface
					SAND: 2.10 Brown sand, trace to some silt, trace clay 214.44 -some silt -trace silt, trace gravel	
	ST-2	60			**GRAVELLY SAND:** Grey brown gravelly sand, trace silt, trace clay, occasional cobble	
5					5.20 -trace gravel 211.34	
	ST-3	66			**GRAVEL:** Grey brown gravel, some sand, trace to some silt, trace clay, occasional cobble	
			GSA ST-4A: Gravel - 81% Sand- 18% Silt & Clay-1%		-trace silt, medium grained sand fraction	
10	ST-4	80				
	ST-5	100			-some silt -sandy	Bentonite hole plug seal
15	ST-6	100			-abundant cobbles -some sand	
	ST-7	80	Static Water Level 19.20 mbg Dec 2/21			
20					-coarse grained sand fraction	
	ST-8	85				
			GSA ST-9: Gravel - 56% Sand- 30% Silt-11% Clay-3%		-sandy	
25	ST-9	95				Quartz sand 1.52 m length 10 slot screen
					26.50 190.04 Borehole terminated at 26.50 m in sandy gravel due to practical refusal on cobble/boulder material.	

WELL NUMBER MW21-10

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer Capacity and Vulnerability
PROJECT NUMBER 21-7128
PROJECT LOCATION Norwood, Ontario
DATE STARTED 12/1/21 **COMPLETED** 12/2/21
UTM EASTING 262462.7064 **NORTHING** 4918747.46
DRILLING CONTRACTOR Insitu Contractors Inc.
GROUND ELEVATION 219.68 masl
DRILLING METHOD Sonic Drilling with Continuous Sampling
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING ---
NOTES
AFTER DRILLING 22.31 m / Elev 197.37 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
					Casing Top Elev: 220.61 (m) Casing Type: Monument	
					0.30 TOPSOIL: 219.38 0.70 Dark brown silty sand topsoil, trace clay, rootlets 218.98 SILTY SAND: Medium brown silty sand, trace clay	Cement seal at surface
	ST-1	80			GRAVEL AND SAND: Grey brown gravel and sand, trace to some silt, trace clay, occasional cobble -some silt, well graded sand fraction	
5	ST-2	70			-trace silt	
	ST-3	80			8.60 211.08	
					9.30 GRAVEL: 210.38 Grey gravel, trace sand, trace silt	
10	ST-4	80			SAND: Grey brown sand (interbedded fine and coarse grained), trace silt 11.60 -some gravel 208.08	
	ST-5	86			GRAVEL AND SAND: Grey brown gravel and sand, some silt, trace clay, occasional cobble/boulder	Bentonite hole plug seal
15	ST-6	90			-fine to medium grained sand fraction	
	ST-7	100	GSA ST-7B: Gravel - 34% Sand- 38% Silt - 22% Clay-6%		-sand and gravel, silty, well graded, sand fraction	
20					-trace silt, coarse grained sand fraction	
	ST-8	57	Static Water Level 22.31 mbg Dec 6/21			
25	ST-9	100				
	ST-10	85	GSA ST-10: Gravel - 53% Sand- 35% Silt-7% Clay-5%		-gravel and sand	Quartz sand 1.52 m length 10 slot screen
30					30.65 189.03 Borehole terminated at 30.65 m in gravel and sand.	

TESTING 7128 BOREHOLE LOGS.GPJ OVERBURDENBHLOGNVALUE.GDT 5/25/22

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

WELL NUMBER MW25-01-I

CLIENT Corporation of the Township of Asphodel-Norwood
PROJECT NAME Norwood Transfer Station Monitor Well Installations
PROJECT NUMBER 7496
PROJECT LOCATION Norwood, Ontario
DATE STARTED June 10, 2025 **COMPLETED** June 10, 2025
UTM EASTING 263101.43 **NORTHING** 4919842.31
DRILLING CONTRACTOR Insitu Contractors
GROUND ELEVATION 212.27 masl
DRILLING METHOD Sonic
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING -Water used during drilling activities
NOTES
AFTER DRILLING 9.05 m / Elev 203.22 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
					Casing Top Elev: 213.08 (m) Casing Type: Monument
				0.45 (211.82) SAND AND GRAVEL FILL: Red-brown sand and gravel fill, trace silt, occasional cobble, moist	Cement seal surface to 0.10 mbg.
2	ST-1			SAND AND GRAVEL: Brown sand and gravel, trace to some silt, abundant cobble, moist	
4	ST-2				
6					Bentonite seal 0.10 to 11.60 mbg. 2" PVC pipe from 0.81 mag to 12.30 mbg.
8	ST-3	June 24/25 WL: 9.05 mbg		8.85 (203.42) SANDY GRAVEL: Brown sandy gravel, trace silt, abundant cobble, wet to saturated	
10				9.55 (202.72) SAND AND GRAVEL TILL: Brown-grey sand and gravel till, trace to some silt, trace clay, occasional cobble, saturated.	
12	ST-4			10.65 (201.62) BEDROCK: Grey limestone bedrock, weathered to 11.30 mbg.	
14					Sand filter from 11.60 to 15.25 mbg. 10-point slotted screen from 12.20 to 15.25 mbg.
				15.24 (197.03) Borehole terminated at 15.25 mbg in limestone bedrock.	

BH LOGS WITH TERMINATION NOTES 7496 BH LOGS.GPJ WILL BH LOGS WITH NVALUE.GDT 25-7-9

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

WELL NUMBER MW25-01-II

CLIENT Corporation of the Township of Asphodel-Norwood
PROJECT NAME Norwood Transfer Station Monitor Well Installations
PROJECT NUMBER 7496
PROJECT LOCATION Norwood, Ontario
DATE STARTED June 10, 2025 **COMPLETED** June 10, 2025
UTM EASTING 263100.88 **NORTHING** 4919842.97
DRILLING CONTRACTOR Insitu Contractors
GROUND ELEVATION 212.23 masl
DRILLING METHOD Sonic
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING -Water used during drilling activities
NOTES
AFTER DRILLING 8.96 m / Elev 203.27 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				0.45 — 211.78 **SAND AND GRAVEL FILL:** Red-brown sand and gravel fill, trace silt, occasional cobble, moist	Casing Top Elev: 213.04 (m) Casing Type: Monument; Cement seal from surface to 0.10 mbg
2				**SAND AND GRAVEL:** Brown sand and gravel, trace to some silt, abundant cobble, moist	
4					Bentonite seal from 0.10 to 6.70 mbg; 2" PVC pipe 0.81 mag to 7.30 mbg
6					
8		June 24/25 WL: 8.96 mbg		8.85 — 203.38 **SANDY GRAVEL:** Brown sandy gravel, trace silt, abundant cobble, wet to saturated	Sand filter from 6.70 to 10.35 mbg; 10-point slotted screen 7.30 to 10.35 mbg
10				9.55 — 202.68 **SAND AND GRAVEL TILL:** Brown-grey sand and gravel till, trace to some silt, trace clay, occasional cobble, saturated — 10.35 — 201.88	
				Borehole terminated in sand and gravel till at 10.35 mbg.	

BH LOGS WITH TERMINATION NOTES 7496 BH LOGS.GPJ WILL BH LOGS WITH NVALUE.GDT 25-7-9

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario K9J 0B9

WELL NUMBER MW25-02-I&II

CLIENT Corporation of the Township of Asphodel-Norwood
PROJECT NAME Norwood Transfer Station Monitor Well Installations
PROJECT NUMBER 7496
PROJECT LOCATION Norwood, Ontario
DATE STARTED June 11, 2025 **COMPLETED** June 11, 2025
UTM EASTING 263209.19 **NORTHING** 4919973.21
DRILLING CONTRACTOR Insitu Contractors
GROUND ELEVATION 216.87 masl
DRILLING METHOD Sonic
GROUNDWATER LEVELS:
LOGGED BY LT **CHECKED BY** IA
AT END OF DRILLING -Water used during drilling activities
NOTES
AFTER DRILLING 12.99 m / Elev 203.88 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
				Casing Top Elev: 217.72 (m) Casing Type: Monument		
				TOPSOIL: Brown silty sand topsoil, organics, moist		Cement seal from surface to 0.10 mbg
0.90					215.97	
2	ST-1			GRAVELLY SAND: Brown gravelly sand, trace silt, occasional cobble, moist		2" PVC pipe from 0.85 mag to 13.25 mbg
3.50					213.37	
4	ST-2			SAND AND GRAVEL: Brown sand and gravel, occasional to abundant cobble, moist		Bentonite seal from 0.10 to 7.95 mbg 2" PVC pipe from 0.84 mag to 8.55 mbg
6						
7.65	ST-3				209.22	
8				SANDY GRAVEL: Brown sandy gravel, trace silt, abundant cobble, moist		
9.15					207.72	
10				GRAVEL: Grey gravel, trace to some sand, trace silt, abundant cobble, wet		Sand filter from 7.95 to 12.20 mbg 10-point slotted screen from 8.55 to 11.60 mbg
10.70	ST-4				206.17	
12				SAND AND GRAVEL: Brown sand and gravel, trace silt, abundant cobble, moist		
11.90					204.97	
		June 24/25 WL: 12.99 mbg		BEDROCK: Grey limestone bedrock		Bentonite seal from 12.20 to 12.65 mbg
14						Sand filter from 12.65 to 16.30 mbg 10-point slotted screen from 13.25 to 16.30 mbg
16						
16.75					200.12	

Borehole terminated at 16.75 mbg in limestone bedrock. Borehole caved to 16.30 mbg.

BH LOGS WITH TERMINATION NOTES 7496 BH LOGS.GPJ WILL BH LOGS WITH NVALUE.GDT 25-7-9

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

WELL NUMBER BH24-01-I

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/19/24 **COMPLETED** 11/19/24
UTM ZONE 18T **EASTING** 262813 **NORTHING** 4919407
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 199.57 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -0.82 m / Elev 200.39 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				WL: Nov. 26/24 -0.82 mbg		ORGANICS: Black organics, some silt, some sand, trace clay, saturated, very loose	Casing Top Elev: 200.96 (m) Casing Type: Stick-up; Bentonite from surface to 0.65mbg
	SS-1	42	0-0-0-0 (0)	GSA SS1: Gravel: 0% Sand: 46% Silt: 48% Clay: 6%		Note: Organic content not included in GSA SS1	Quartz sand from 0.65mbg to 1.30mbg
	SS-2	0	0-0-0-0 (0)				1.5" PVC pipe from 1.10mag to 2.75mbg
2	SS-3	40	0-0-4-4 (4)			- wood chips	Pel plug from 1.30mbg to 2.60mbg
	SS-4	37	3-6-4-9 (10)	GSA SS4B: Gravel: 43% Sand: 37% Silt: 15% Clay: 5%		2.55 (197.02) SANDY SILT: Grey sandy silt, trace gravel, trace clay, saturated, compact 2.95 (196.62)	Quartz sand from 2.60mbg to 3.15mbg
	SS-5	42	14-18-16-18 (34)			GRAVEL & SAND: Grey gravel and sand, some silt, trace clay, saturated, compact - dense	Slotted screen from 2.75mbg to 3.05mbg
4							Bentonite from 3.15mbg to 4.45mbg
	SS-7	47	36-50/0.04			4.45 (195.12) - very dense	

Borehole terminated at 4.45 mbg on presumed bedrock.

BH LOGS WITH TERMINATION NOTES 7549 BH LOGS.GPJ OVBCOPY.GDT 12/4/25

WELL NUMBER BH24-01-II

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/19/24 **COMPLETED** 11/19/24
UTM ZONE 18T **EASTING** 262813 **NORTHING** 4919407
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 199.57 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -0.74 m / Elev 200.31 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
		WL: Nov. 26/24 -0.74 mbg		ORGANICS: Black organics, some silt, some sand, trace clay, saturated, very loose		Casing Top Elev: 200.98 (m) Casing Type: Stick-up Bentonite from surface to 0.65mbg Quartz sand from 0.65mbg to 1.30mbg Slotted screen from 0.90mbg to 1.20mbg
2				- wood chips		Pel plug from 1.30mbg to 2.60mbg
				2.55	197.02	
				SANDY SILT: Grey sandy silt, trace gravel, trace clay, saturated, compact		Quartz sand from 2.60mbg to 3.15mbg
				2.95	196.62	
				GRAVEL & SAND: Grey gravel and sand, some silt, trace clay, saturated, compact		
				- dense		
4						Bentonite from 3.15mbg to 4.45mbg
				- very dense		
				4.45	195.12	
				Borehole terminated at 4.45 mbg on presumed bedrock.		

BH LOGS WITH TERMINATION NOTES 7549 BH LOGS.GPJ OVBCOPY.GDT 12/4/25

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

WELL NUMBER BH24-02-I

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/18/24 **COMPLETED** 11/18/24
UTM ZONE 18T **EASTING** 262674 **NORTHING** 4919367
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 199.24 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -1.18 m / Elev 200.42 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	17	0-0-0-0 (0)	WL: Nov. 26/24 -1.18 mbg		ORGANIC MATERIAL: Black organics, some sand, some silt, trace clay, orange mottling, saturated, very loose	Casing Top Elev: 201.03 (m) Casing Type: Stick-up; Bentonite from surface to 0.65mbg
	SS-2	65	1-1-1-0 (2)				Quartz sand from 0.65mbg to 1.30mbg; Slotted screen from 0.90mbg to 1.20mbg
						1.80 / 197.44	
2	SS-3	50	1-4-4-6 (8)			SAND: Grey sand, trace to some silt, saturated, loose	Pel plug from 1.30mbg to 2.60mbg
	SS-4	58	1-6-9-16 (15)	GSA SS5A: Gravel: 0% Sand: 74% Silt: 24% Clay: 2%		- compact - silty	Quartz sand from 2.60mbg to 3.15mbg
	SS-5	54	4-4-4-3 (8)			- loose - trace silt	
4	SS-6	83	5-5-7-6 (12)	GSA SS5B: Gravel: 0% Sand: 88% Silt: 9% Clay: 3%		- compact	Bentonite from 3.15mbg to 6.40mbg
	SS-7	100	6-6-8-8 (14)				
	SS-8	100	4-6-7-12 (13)				
	SS-9	89	7-12-18-20 (30)			- grey-brown, silty, dense	
6	SS-10	79	30-50/0.14			- very dense	
						6.40 / 192.84	
						Borehole terminated at 6.40 mbg on presumed bedrock.	

BH LOGS WITH TERMINATION NOTES 7549 BH LOGS.GPJ OVBCOPY.GDT 12/4/25

WELL NUMBER BH24-02-II

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/18/24 **COMPLETED** 11/18/24
UTM ZONE 18T **EASTING** 262674 **NORTHING** 4919367
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 199.2 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -1.15 m / Elev 200.35 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
		WL: Nov. 26/24 -1.15 mbg		ORGANIC MATERIAL: Black organics, some sand, some silt, trace clay, orange mottling, saturated, very loose	Casing Top Elev: 201.05 (m) Casing Type: Stick-up Bentonite from surface to 0.65mbg Quartz sand from 0.65mbg to 1.30mbg 1.5" PVC pipe from 1.75mag to 2.75mbg Pel plug from 1.30mbg to 2.60mbg Quartz sand from 2.60mbg to 3.15mbg Slotted screen from 2.75mbg to 3.05mbg Bentonite from 3.15mbg to 6.40mbg
				1.80 / 197.40	
2				SAND: Grey sand, trace to some silt, saturated, loose	
				- compact - silty	
				- loose - trace silt	
4				- compact	
				- grey-brown, silty, dense	
6				- very dense	
				6.40 / 192.80	
				Borehole terminated at 6.40 mbg on presumed bedrock.	

BH LOGS WITH TERMINATION NOTES 7549 BH LOGS.GPJ OVBCOPY.GDT 12/4/25

WELL NUMBER BH24-03-I

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/14/24 **COMPLETED** 11/15/24
UTM ZONE 18T **EASTING** 262755 **NORTHING** 4919248
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 197.86 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -2.40 m / Elev 200.26 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS-1	25	0-0-0-0 (0)	WL: Nov. 26/24 -2.40 mbg		ORGANIC MATERIAL: Black organics, some sand, some silt, trace clay, orange mottling, saturated, very loose	Casing Top Elev: 200.99 (m) Casing Type: Stick-up; Bentonite from surface to 0.65mbg
	SS-2	9	0-0-0-0 (0)				Quartz sand from 0.65mbg to 1.30mbg
						1.70 / 196.16	Bentonite from 1.30mbg to 4.25mbg
2	SS-3	53	1-4-8-8 (12)	GSA SS3: Gravel: 0% Sand: 77% Silt: 18% Clay: 5%		SAND: Grey sand, some silt, saturated, compact	
	SS-4	59	7-11-10-9 (21)				
						3.05 / 194.81	1.5" PVC pipe from 3.25mag to 2.75mbg
	SS-5	32	4-4-4-4 (8)	GSA SS5: Gravel: 0% Sand: 77% Silt: 21% Clay: 2%		SILTY SAND: Grey silty sand, saturated, loose	
						3.65 / 194.21	
4	SS-6	83	4-5-6-8 (11)			SAND: Grey sand, trace to some silt, saturated, compact	
	SS-7	48	4-8-11-9 (19)				
	SS-8	31	4-8-9-11 (17)				Pel plug from 4.25mbg to 5.80mbg
	SS-9	72	10-17-12-12 (29)				
6							Quartz sand from 5.80mbg to 8.00mbg
	SS-10	57	4-4-5-5 (9)				
	SS-11	90	5-5-5-5 (10)				Slotted screen from 6.40mbg to 8.00mbg
	SS-12	100	4-4-7-7 (11)				
8	SS-13	675	50/0.08			8.00 - very dense / 189.86	

Borehole terminated at 8.00 mbg in sand on presumed bedrock.

BH LOGS WITH TERMINATION NOTES 7549 BH LOGS.GPJ OVBCOPY.GDT 12/4/25

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON, K9J 0B9

WELL NUMBER BH24-03-II

CLIENT Township of Asphodel-Norwood
PROJECT NAME Norwood Aquifer - Technical Services
PROJECT NUMBER 7549
PROJECT LOCATION Mill Pond, Norwood, Ontario
DATE STARTED 11/14/24 **COMPLETED** 11/15/24
UTM ZONE 18T **EASTING** 262755 **NORTHING** 4919248
DRILLING CONTRACTOR Walker Drilling
GROUND ELEVATION 197.86 masl
DRILLING METHOD H-Core (4") with Split Spoons
GROUNDWATER LEVELS:
LOGGED BY CO **CHECKED BY** LT
AT END OF DRILLING Water used while drilling
NOTES
AFTER DRILLING -2.44 m / Elev 200.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION		WELL DIAGRAM
						Casing Top Elev: 200.95 (m) Casing Type: Stick-up
		WL: Nov. 26/24 -2.44 mbg		ORGANIC MATERIAL: Black organics, some sand, some silt, trace clay, orange mottling, saturated, very loose		Bentonite from surface to 0.65mbg
						Quartz sand from 0.65mbg to 1.30mbg Slotted screen from 0.90mbg to 1.20mbg
				1.70	196.16	
2				SAND: Grey sand, some silt, saturated, compact		
				3.05	194.81	Bentonite from 1.30mbg to 4.25mbg
				SILTY SAND: Grey silty sand, saturated, loose		
				3.65	194.21	
4				SAND: Grey sand, trace to some silt, saturated, compact		
						Pel plug from 4.25mbg to 5.80mbg
6						Quartz sand from 5.80mbg to 8.00mbg
8				8.00 - very dense	189.86	
				Borehole terminated at 8.00 mbg on presumed bedrock.		

Appendix B

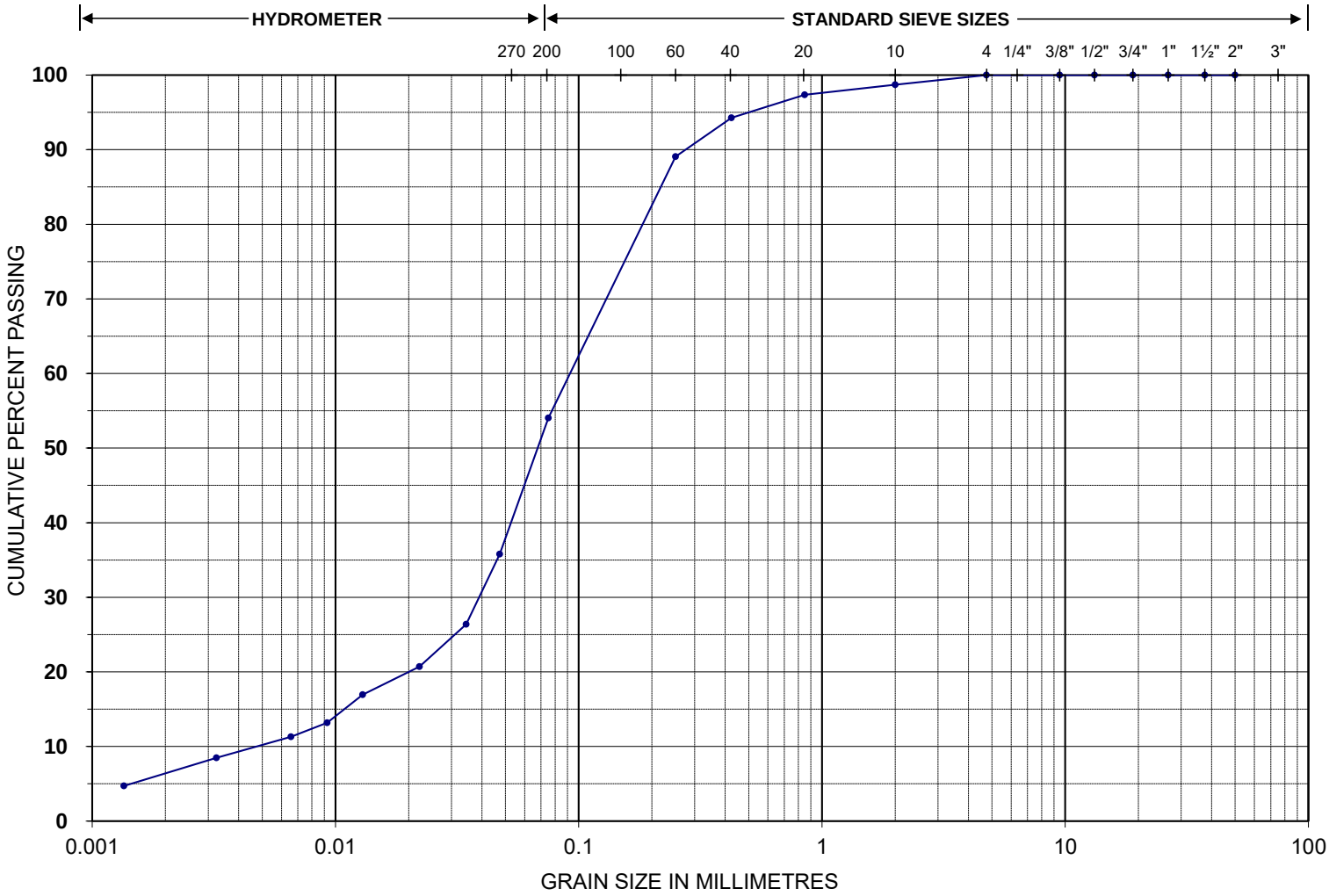
Soil Certificates of Analysis

PRI ENGINEERING
205 St.George Street, Unit 2, Lindsay, ON, K9V 5Z9
(705) 702-3921
info@priengineering.com
www.priengineering.com

PARTICLE SIZE DISTRIBUTION
LS - 702

Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 19-Nov-24

Borehole/Test Pit ID.: BH24-01 **Sample No./Depth:** SS1 / 0 - 1.2 m **LAB ID:** 24HYD-361



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	100.0
13.2	100.0
9.5	100.0
4.750	100.0
2.000	98.7
0.850	97.4
0.425	94.3
0.250	89.1
0.075	54.0

Hydrometer (mm)	% Passing
0.047	35.8
0.034	26.4
0.022	20.7
0.013	16.9
0.009	13.2
0.007	11.3
0.003	8.5
0.001	4.7

PRI ENGINEERING
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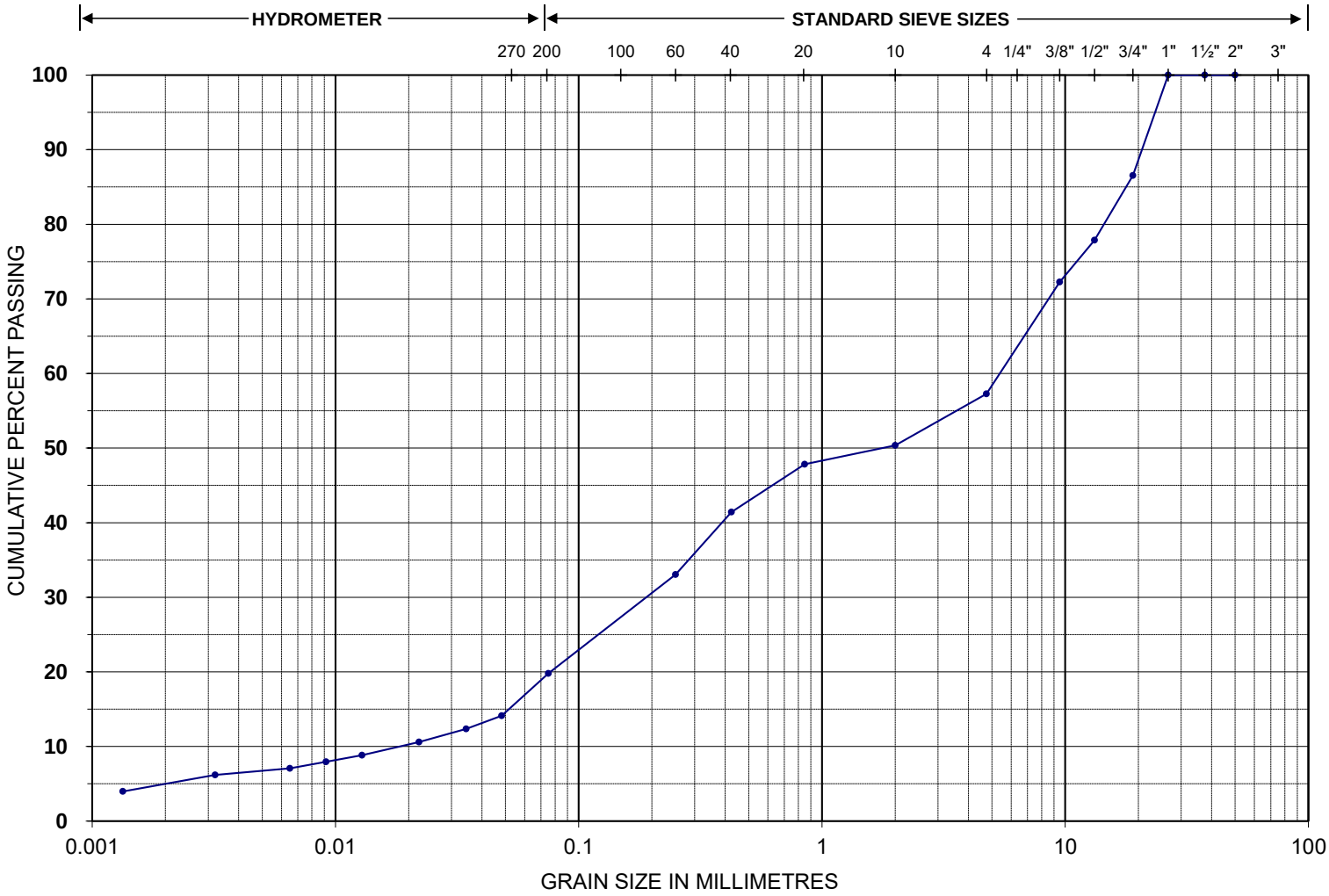
PARTICLE SIZE DISTRIBUTION
LS - 702

Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 19-Nov-24

Borehole/Test Pit ID.: BH24-01 **Sample No./Depth:** SS4B / 2.4 - 3.0 m **LAB ID:** 24HYD-362



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	86.5
13.2	77.9
9.5	72.3
4.750	57.3
2.000	50.4
0.850	47.8
0.425	41.4
0.250	33.0
0.075	19.8

Hydrometer (mm)	% Passing
0.048	14.1
0.034	12.4
0.022	10.6
0.013	8.8
0.009	7.9
0.007	7.1
0.003	6.2
0.001	4.0

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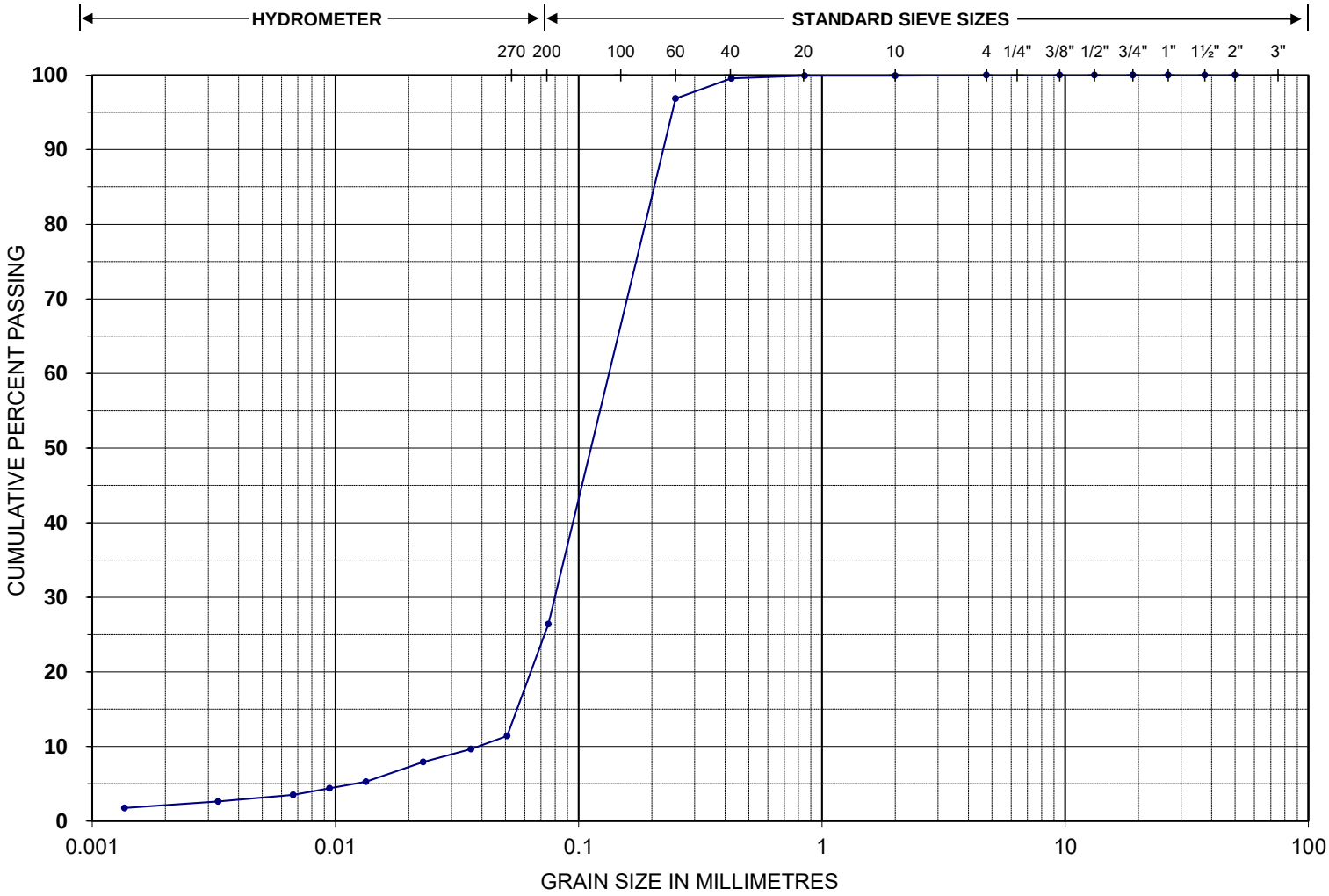
Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 18-Nov-24

Borehole/Test Pit ID.: BH24-02 **Sample No./Depth:** SS5A / 3.0 - 3.7 m **LAB ID:** 24HYD-363



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	100.0
13.2	100.0
9.5	100.0
4.750	100.0
2.000	99.9
0.850	99.9
0.425	99.6
0.250	96.9
0.075	26.4

Hydrometer (mm)	% Passing
0.051	11.4
0.036	9.7
0.023	7.9
0.013	5.3
0.009	4.4
0.007	3.5
0.003	2.6
0.001	1.8

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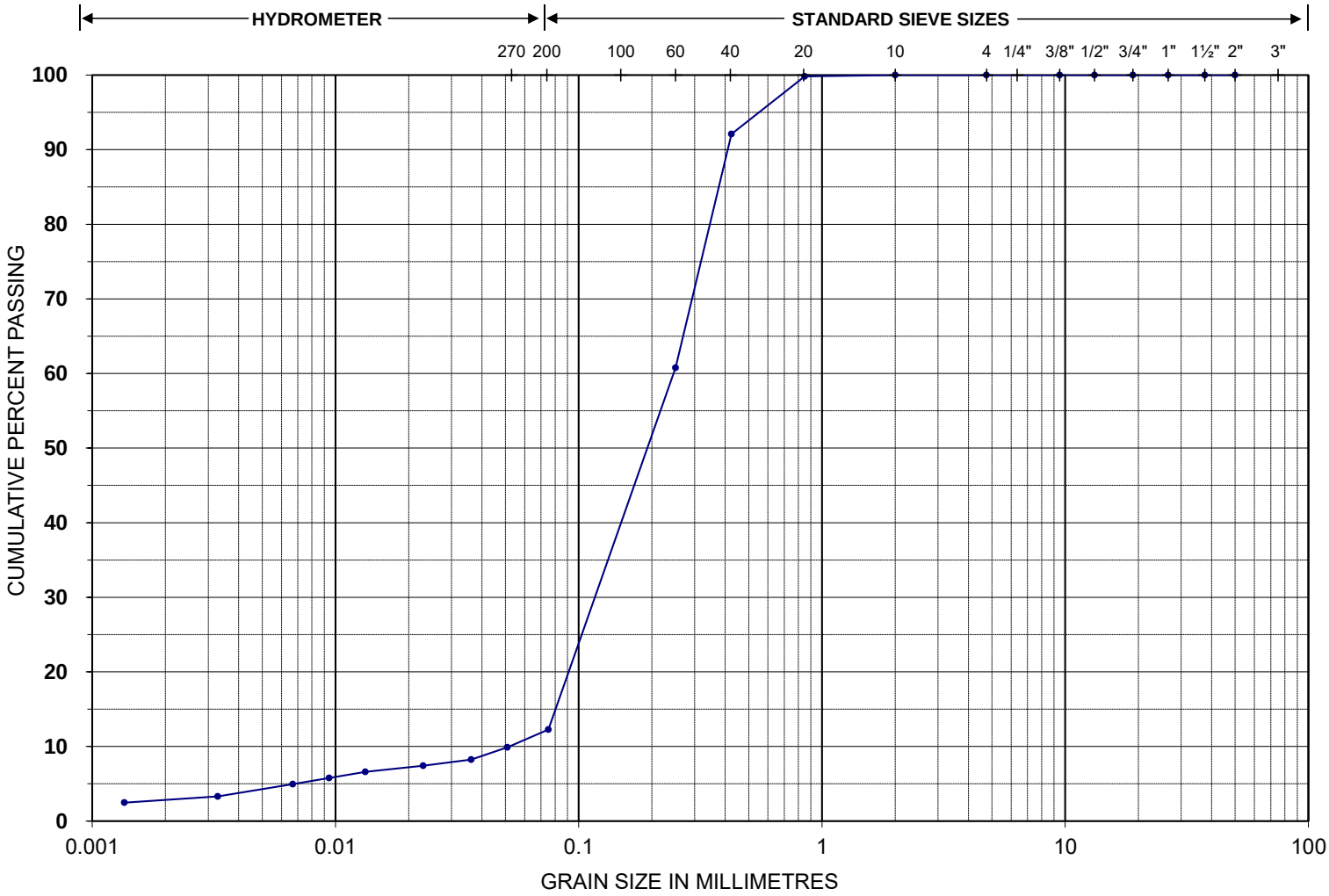
Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 18-Nov-24

Borehole/Test Pit ID.: BH24-02 **Sample No./Depth:** SS5B / 3.0 - 3.7 m **LAB ID:** 24HYD-364



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	100.0
13.2	100.0
9.5	100.0
4.750	100.0
2.000	100.0
0.850	99.8
0.425	92.1
0.250	60.8
0.075	12.3

Hydrometer (mm)	% Passing
0.051	9.9
0.036	8.2
0.023	7.4
0.013	6.6
0.009	5.8
0.007	4.9
0.003	3.3
0.001	2.5

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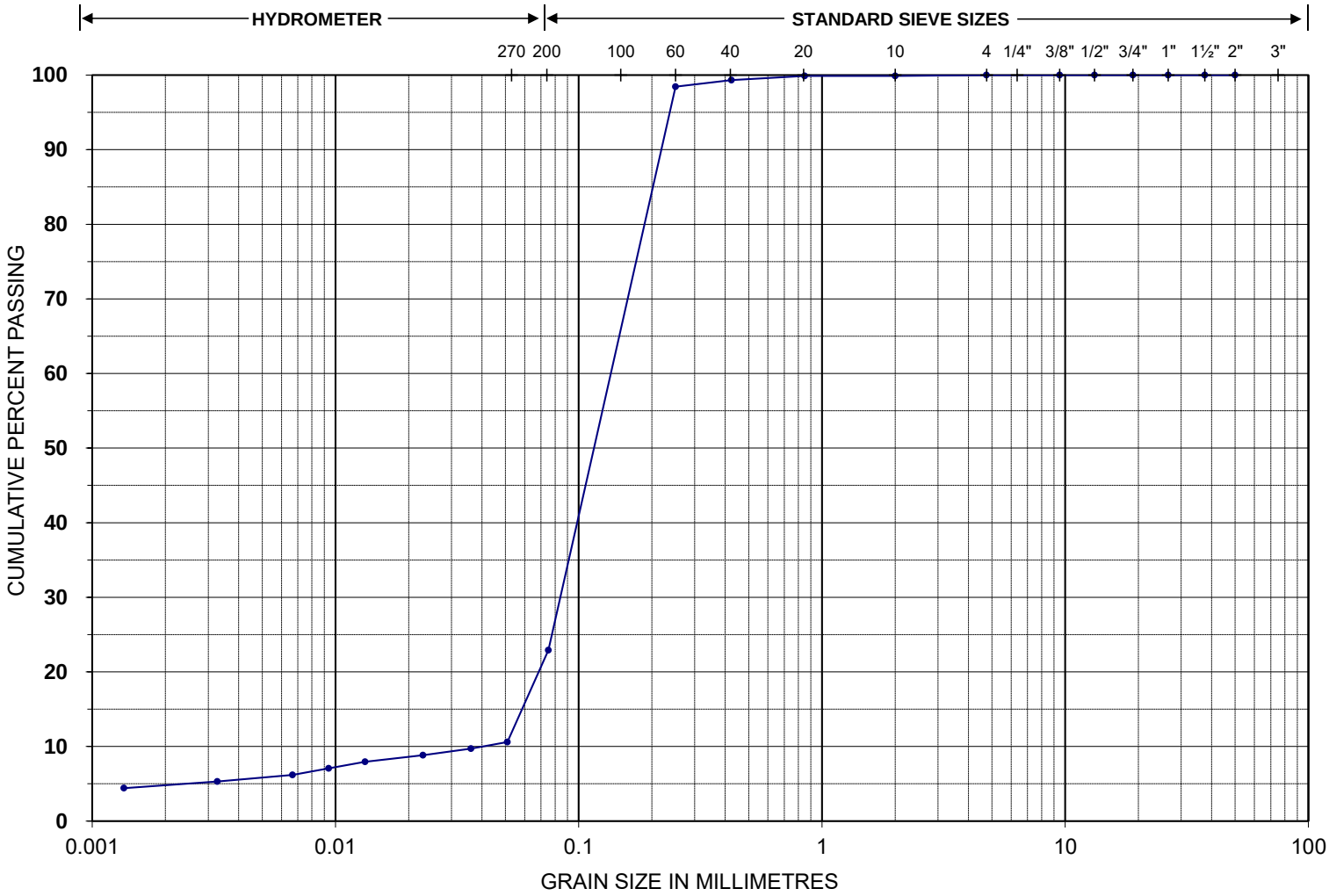
Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 14-Nov-24

Borehole/Test Pit ID.: BH24-03 **Sample No./Depth:** SS3 / 1.7 - 2.3m **LAB ID:** 24HYD-365



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	100.0
13.2	100.0
9.5	100.0
4.750	100.0
2.000	99.9
0.850	99.9
0.425	99.3
0.250	98.4
0.075	22.9

Hydrometer (mm)	% Passing
0.051	10.6
0.036	9.7
0.023	8.8
0.013	7.9
0.009	7.1
0.007	6.2
0.003	5.3
0.001	4.4

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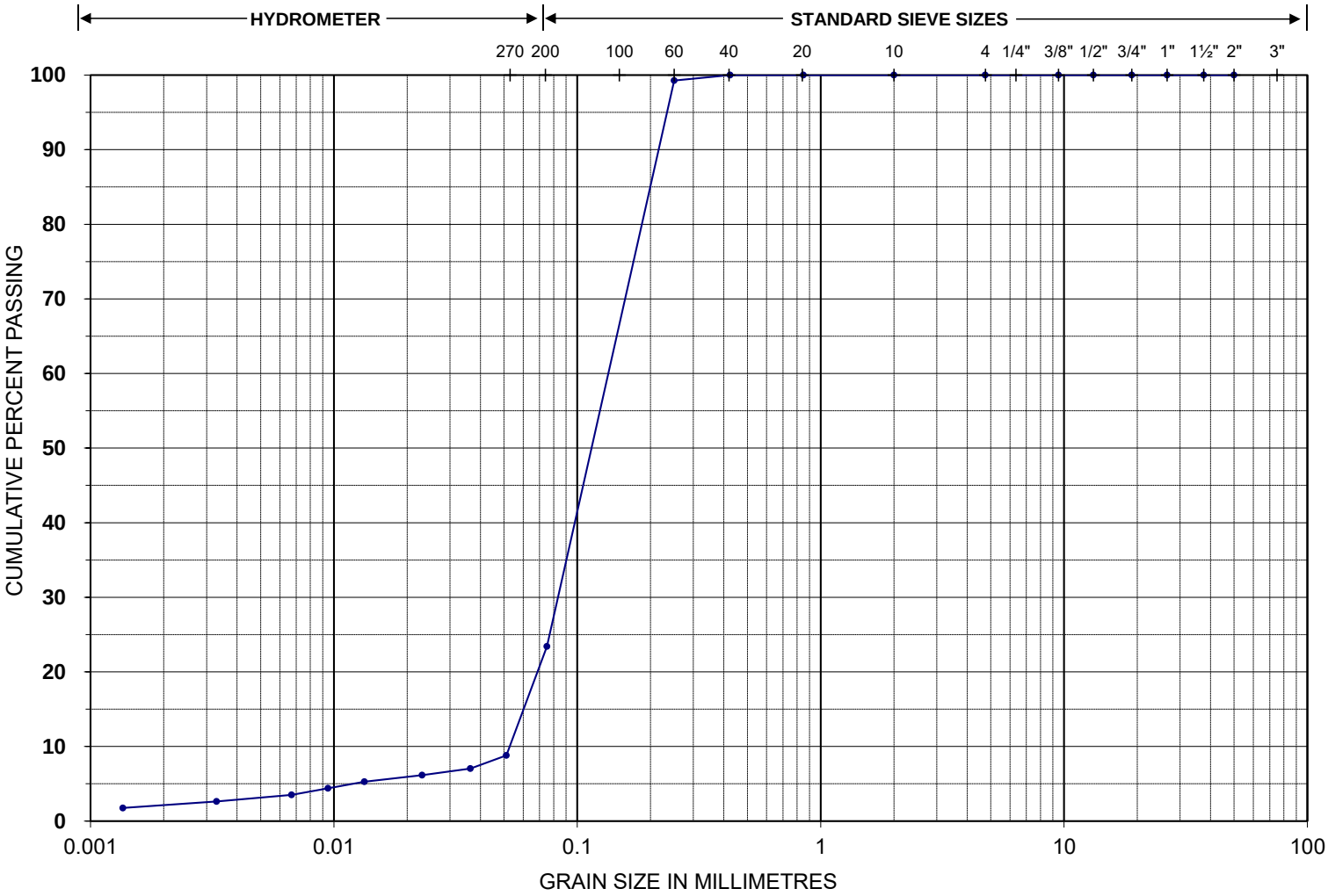
Project Name: Norwood Aquifer (7549) **Project No.:** 22-154 **Sample Date:** 14-Nov-24

Borehole/Test Pit ID.: BH24-03 **Sample No./Depth:** SS5 / 3.0 - 3.7 m **LAB ID:** 24HYD-366



Silt or Clay	Sand	Gravel

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	100.0
13.2	100.0
9.5	100.0
4.750	100.0
2.000	100.0
0.850	100.0
0.425	100.0
0.250	99.3
0.075	23.4

Hydrometer (mm)	% Passing
0.051	8.8
0.036	7.1
0.023	6.2
0.013	5.3
0.009	4.4
0.007	3.5
0.003	2.6
0.001	1.8

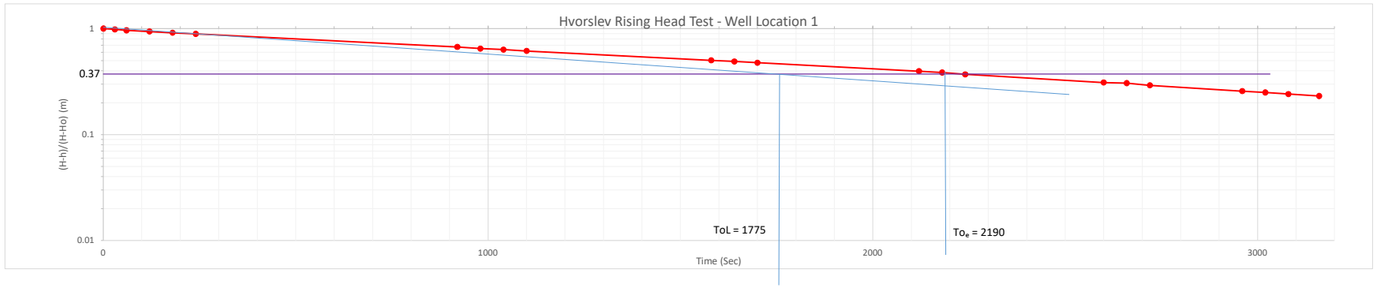
Appendix C

Mill Pond Hydraulic Conductivity Test Results

Rising Head Test - Well Location 1

Project Name: Norwood Aquifer Technical Services Project Number: 7549			
Test Date	June 19th, 2026	**Borehole Radius (R)**	0.100
Well Number	Well Location 1	**Screen Radius (r)**	0.1000
Static Water Level (mbtp)	0.39	**Screen Length (m) (L)**	0.91
Well Depth (mbtp)	2.37	**Ground Elevation (masl)**	-
Stick up (m)	0.36	**Well Diameter (m)**	0.051
Pumping Rate	10 L/min		
Formula			
H=Static Water Level (mbtp)	To_e=2190	$K_e=r^2ln(L/R)/(2LTo_e)$	5.54E-06 (m/sec)
Ho=Head at time=0	To_L=1775	$K_L=r^2ln(L/R)/(2LTo_L)$	6.84E-06 (m/sec)
h=Water Level at time t			

Elapsed Time (sec)	Water Level (mbtp)	H-h	H-Ho	(H-h)/(H-Ho)
0	1.39	-1.00	-1.00	1
30	1.37	-0.98	-1.00	0.982942003
60	1.35	-0.96	-1.00	0.965984347
120	1.33	-0.94	-1.00	0.940196669
180	1.30	-0.91	-1.00	0.915914108
240	1.28	-0.89	-1.00	0.891430865
920	1.06	-0.67	-1.00	0.672285772
980	1.04	-0.65	-1.00	0.648504917
1040	1.02	-0.63	-1.00	0.633654425
1100	1.00	-0.61	-1.00	0.616596428
1580	0.89	-0.50	-1.00	0.502207506
1640	0.88	-0.49	-1.00	0.489263496
1700	0.87	-0.48	-1.00	0.476821192
2120	0.79	-0.40	-1.00	0.39704997
2180	0.77	-0.38	-1.00	0.384507325
2240	0.76	-0.37	-1.00	0.370459563
2600	0.70	-0.31	-1.00	0.310355208
2660	0.70	-0.31	-1.00	0.306341561
2720	0.68	-0.29	-1.00	0.291691752
2960	0.65	-0.26	-1.00	0.257274734
3020	0.64	-0.25	-1.00	0.249247441
3080	0.63	-0.24	-1.00	0.241420831
3160	0.62	-0.23	-1.00	0.231487056



Rising Head Test - Well Location 2

Project Name: Norwood Aquifer Project Number: 7549			
Test Date	June19th, 2026	**Borehole Radius (R)**	0.1
Well Number	Well Location 2	**Screen Radius (r)**	0.1
Static Water Level (mbtp)	1.08	**Screen Length (m) (L)**	0.91
Well Depth (mbtp)	3.9	**Ground Elevation (masl)**	-
Stick up (m)	1.03	**Well Diameter (m)**	0.051
Pumping Rate	10 L/min		
		Formula	
H=Static Water Level (mbtp	To_e=143	$K_e=r^2\ln(L/R)/(2LTo_e)$	8.48E-05 (m/sec)
Ho=Head at time=0	To_L=128	$K_L=r^2\ln(L/R)/(2LTo_L)$	9.48E-05 (m/sec)
h=Water Level at time t			

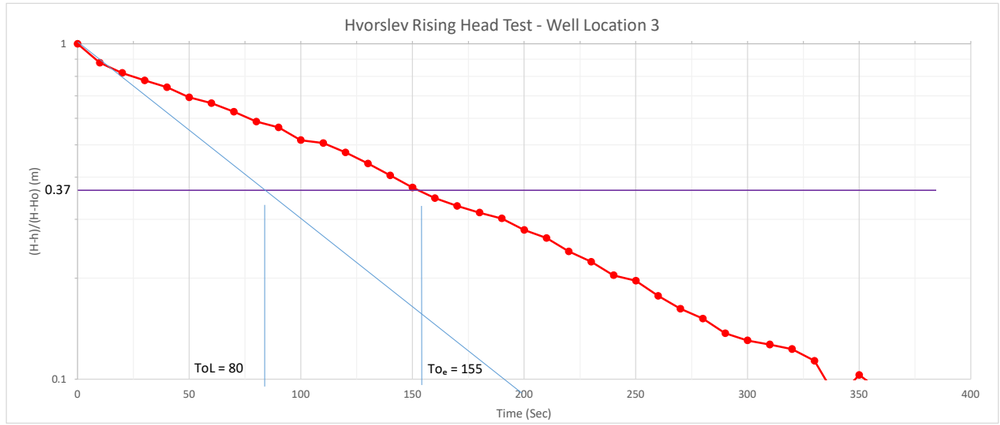
Elapsed Time (sec)	Water Level (mbtp)	H-h	H-Ho	(H-h)/(H-Ho)
0	2.08	-1.00	-1.00	1
15	1.95	-0.87	-1.00	0.870000000
30	1.89	-0.81	-1.00	0.81
45	1.81	-0.73	-1.00	0.73
60	1.73	-0.65	-1.00	0.65
90	1.58	-0.50	-1.00	0.5
120	1.44	-0.36	-1.00	0.36
150	1.35	-0.27	-1.00	0.27
180	1.26	-0.18	-1.00	0.18
210	1.2	-0.12	-1.00	0.12
240	1.17	-0.09	-1.00	0.09
270	1.13	-0.05	-1.00	0.050000000
300	1.11	-0.03	-1.00	0.03
360	1.09	-0.01	-1.00	0.01
420	1.08	0.00	-1.00	0



Falling Head Test - Well Location 3

Project Name: Norwood Aquifer Project Number: 7549			
Test Date	June 19th, 2026	**Borehole Radius (R)**	0.1
Well Number	Well Location 3	**Screen Radius (r)**	0.1
Static Water Level (mbtp)	0.48	**Screen Length (m) (L)**	1.50
Well Depth (mbtp)	3.92	**Ground Elevation (masl)**	213.30
Stick up (m)	0.47	**Well Diameter (m)**	0.051
Pumping Rate	10 L/min		
		Formula	
H=Static Water Level (mbtp	To_e=155	$K_e=r^2ln(L/R)/(2LTo_e)$	5.82E-05 (m/sec)
Ho=Head at time=0	To_L=80	$K_L=r^2ln(L/R)/(2LTo_L)$	1.13E-04 (m/sec)
h=Water Level at time t			

Elapsed Time (sec)	Water Level (mbtp)	H-h	H-Ho	(H-h)/(H-Ho)
0	1.3283	-0.85	-0.85	1
10	1.2245	-0.74	-0.85	0.877637628
20	1.1747	-0.69	-0.85	0.818931982
30	1.1394	-0.66	-0.85	0.777319345
40	1.1097	-0.63	-0.85	0.742308146
50	1.0674	-0.59	-0.85	0.692443711
60	1.0442	-0.56	-0.85	0.665094896
70	1.0127	-0.53	-0.85	0.627961806
80	0.9772	-0.50	-0.85	0.586113403
90	0.9579	-0.48	-0.85	0.563362018
100	0.9179	-0.44	-0.85	0.516208888
110	0.9095	-0.43	-0.85	0.506306731
120	0.8827	-0.40	-0.85	0.474714134
130	0.8529	-0.37	-0.85	0.439585052
140	0.8239	-0.34	-0.85	0.405399033
150	0.7966	-0.32	-0.85	0.373217022
160	0.7742	-0.29	-0.85	0.34681127
170	0.7589	-0.28	-0.85	0.328775197
180	0.7461	-0.27	-0.85	0.313686196
190	0.7359	-0.26	-0.85	0.301662148
200	0.7162	-0.24	-0.85	0.278439231
210	0.7037	-0.22	-0.85	0.263703878
220	0.6839	-0.20	-0.85	0.240363079
230	0.6699	-0.19	-0.85	0.223859484
240	0.6532	-0.17	-0.85	0.204173052
250	0.647	-0.17	-0.85	0.196864317
260	0.6304	-0.15	-0.85	0.177295768
270	0.6178	-0.14	-0.85	0.162442532
280	0.6087	-0.13	-0.85	0.151715195
290	0.5963	-0.12	-0.85	0.137097725
300	0.5907	-0.11	-0.85	0.130496287
310	0.5877	-0.11	-0.85	0.126959802
320	0.5844	-0.10	-0.85	0.123069669
330	0.5763	-0.10	-0.85	0.11352116
340	0.5541	-0.07	-0.85	0.087351173
350	0.5674	-0.09	-0.85	0.103029589
360	0.5579	-0.08	-0.85	0.09183072
370	0.5425	-0.06	-0.85	0.073676765
380	0.5146	-0.03	-0.85	0.040787457
390	0.548	-0.07	-0.85	0.080160321
400	0.5083	-0.03	-0.85	0.033360839
410	0.5076	-0.03	-0.85	0.03253566
420	0.5089	-0.03	-0.85	0.034068136
430	0.4901	-0.01	-0.85	0.011906165
440	0.4894	-0.01	-0.85	0.011080986
450	0.487	-0.01	-0.85	0.008251798
460	0.4786	0.00	-0.85	-0.00165036



Appendix D

Groundwater and Surface Water Quality Tables

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-01	MW21-02	MW21-03
	Collection Date:		26-Nov-24	26-Nov-24	26-Nov-24
PARAMETERS	Units	ODWQS			
Total Coliform	cfu/100mL	0	< 20	12	7
E. Coli	cfu/100mL	0	< 20	1	1
Heterotrophic Plate Count (HPC)	cfu/1mL		NDOGHPC	440	50
UV Transmittance	%T		0.9	59.1	65.00
Alkalinity	mg/L as CaCO3	30-500	286	237	232
Bicarbonate	mg/L as CaCO3		286	237	232
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05	0.13
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05	0.15
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	2	2	3
Total Organic Carbon	mg/L		2	2	3
Chloride	mg/L	250	50	30	24
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	3	3	2
Sulphate	mg/L	500	9	12	9
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	< 0.002
Mercury (total)	mg/L	0.001	0.00002	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	1750	658	292
Aluminum (total)	mg/L	0.1	3	0.4	0.3
Arsenic (total)	mg/L	0.01	0.0018	0.0004	0.0003
Boron (total)	mg/L	5	0.023	0.022	0.015
Barium (total)	mg/L	1	0.366	0.147	0.0883
Beryllium (total)	mg/L		0.000388	0.000052	0.000031
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.00876	0.000812	0.000129
Calcium (total)	mg/L		675	253	112
Cadmium (total)	mg/L	0.005	0.000196	0.000022	0.000008
Copper (total)	mg/L	1	0.015	0.003	< 0.001
Chromium (total)	mg/L	0.05	0.00507	0.00202	0.00062
Iron (total)	mg/L	0.3	3.1	1.33	0.29
Potassium (total)	mg/L		1.64	2.31	1.99
Magnesium (total)	mg/L		15.7	6.24	3.01
Manganese (total)	mg/L	0.05	1.65	0.236	0.0295
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0056	0.0009	0.0004
Sodium (total)	mg/L	20*	33	28	13
Phosphorus (total)	mg/L		1.19	0.223	0.062
Lead (total)	mg/L	0.01	0.0076	0.00238	0.00066
Silicon (total)	mg/L		4.98	3.65	3.5
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.822	0.401	0.251
Thallium (total)	mg/L		0.00004	0.000015	0.000015
Tin (total)	mg/L		0.00011	0.00009	0.00023
Titanium (total)	mg/L		0.0247	0.013	0.0107
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00039	0.00019	0.00014
Uranium (total)	mg/L	0.02	0.000629	0.000247	0.000207
Vanadium (total)	mg/L		0.00834	0.00176	0.00059
Zinc (total)	mg/L	5	0.023	0.006	0.002
Colour	TCU	5	12	14	19
Conductivity	uS/cm		553	535	490
pH	No unit	6.5-8.5	7.66	7.57	7.52
Total Suspended Solids	mg/L		2380	281	83
Turbidity	NTU	5	>4000	190	50
Total Dissolved Solids (calculated)	mg/L		960	477	304
Conductivity (calculated)	uS/cm		2224	1023	602
Langeliers Index 4° C	@ 4° C		0.94	0.37	-0.02
Saturation pH 4°C	pHs @ 4°C		6.72	7.2	7.54
Cation sum	meq/L		37.11	14.56	6.51
Anion Sum	meq/L		7.37	5.89	5.53
Anion-Cation Balance	% difference		66.86	42.38	8.19
Ion Ratio	none		5.04	2.47	1.18

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-04	MW21-05	MW21-07
	Collection Date:		26-Nov-24	26-Nov-24	26-Nov-24
PARAMETERS	Units	ODWQS			
Total Coliform	cfu/100mL	0	20	0	1
E. Coli	cfu/100mL	0	30	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL		NDOGHPC	560	420
UV Transmittance	%T		*****	15.80	91.1
Alkalinity	mg/L as CaCO3	30-500	354	268	238
Bicarbonate	mg/L as CaCO3		354	268	238
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	0.13	0.29	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L		0.19	0.31	0.07
Ammonia+Ammonium (N)	as N mg/L		0.060	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	3	2	2
Total Organic Carbon	mg/L		3	2	2
Chloride	mg/L	250	26	48	51
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	2	5	5
Sulphate	mg/L	500	< 20	20	24
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	< 0.002
Mercury (total)	mg/L	0.001	0.00002	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	3910	899	295
Aluminum (total)	mg/L	0.1	2	1	0.03
Arsenic (total)	mg/L	0.01	0.0012	0.0014	< 0.0002
Boron (total)	mg/L	5	0.025	0.03	0.028
Barium (total)	mg/L	1	0.407	0.374	0.159
Beryllium (total)	mg/L		0.000307	0.000145	< 0.000007
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.00831	0.00291	0.00006
Calcium (total)	mg/L		1540	338	109
Cadmium (total)	mg/L	0.005	0.000333	0.000133	< 0.000003
Copper (total)	mg/L	1	0.003	0.013	0.001
Chromium (total)	mg/L	0.05	0.00396	0.003	0.00057
Iron (total)	mg/L	0.3	0.538	2.01	0.15
Potassium (total)	mg/L		2.83	2.7	2.55
Magnesium (total)	mg/L		14.9	13.2	5.34
Manganese (total)	mg/L	0.05	2.91	0.685	0.0106
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.007	0.0041	0.0002
Sodium (total)	mg/L	20*	14	28	30
Phosphorus (total)	mg/L		0.721	0.908	0.006
Lead (total)	mg/L	0.01	0.00047	0.00203	< 0.00009
Silicon (total)	mg/L		5.88	4.86	3.5
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		2.03	0.547	0.281
Thallium (total)	mg/L		0.000034	0.000039	0.000006
Tin (total)	mg/L		0.00017	0.00016	0.0002
Titanium (total)	mg/L		0.0279	0.04	0.003
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00023	0.00021	0.00024
Uranium (total)	mg/L	0.02	0.000196	0.000445	0.000179
Vanadium (total)	mg/L		0.00097	0.00413	0.00034
Zinc (total)	mg/L	5	0.025	0.018	0.003
Colour	TCU	5	20	16	12
Conductivity	uS/cm		488	625	639
pH	No unit	6.5-8.5	7.61	7.53	7.46
Total Suspended Solids	mg/L		5050	2670	46
Turbidity	NTU	5	>4000	550.0	10
Total Dissolved Solids (calculated)	mg/L		1833	617	370
Conductivity (calculated)	uS/cm		4377	1341	703
Langeliers Index 4° C	@ 4° C		1.31	0.5	-0.09
Saturation pH 4°C	pHs @ 4°C		6.3	7.03	7.55
Cation sum	meq/L		79.3	19.61	7.28
Anion Sum	meq/L		8.24	7.21	6.78
Anion-Cation Balance	% difference		81.17	46.23	3.59
Ion Ratio	none		9.62	2.72	1.07

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-08	MW21-09	MW21-10
	Collection Date:		26-Nov-24	26-Nov-24	26-Nov-24
PARAMETERS	Units	ODWQS			
Total Coliform	cfu/100mL	0	200	0	0
E. Coli	cfu/100mL	0	0	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL		620	480	72
UV Transmittance	%T		80.9	64.00	91.70
Alkalinity	mg/L as CaCO3	30-500	231	251	226
Bicarbonate	mg/L as CaCO3		231	251	226
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05	0.13
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05	0.15
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	2	2	2
Total Organic Carbon	mg/L		2	2	2
Chloride	mg/L	250	48	54	54
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	4	4	5
Sulphate	mg/L	500	17	16	21
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	< 0.002
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	361	340	266
Aluminum (total)	mg/L	0.1	0.2	0.3	0.04
Arsenic (total)	mg/L	0.01	0.0002	0.0002	< 0.0002
Boron (total)	mg/L	5	0.024	0.023	0.021
Barium (total)	mg/L	1	0.141	0.141	0.152
Beryllium (total)	mg/L		0.000018	0.000015	< 0.000007
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.000165	0.000382	0.00004
Calcium (total)	mg/L		136	128	99.2
Cadmium (total)	mg/L	0.005	0.000003	< 0.000003	< 0.000003
Copper (total)	mg/L	1	0.008	0.001	< 0.001
Chromium (total)	mg/L	0.05	0.00227	0.00113	0.00016
Iron (total)	mg/L	0.3	0.687	0.316	0.034
Potassium (total)	mg/L		2.25	1.94	1.86
Magnesium (total)	mg/L		5.17	5.17	4.58
Manganese (total)	mg/L	0.05	0.0466	0.0444	0.00297
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0008	0.0004	0.0001
Sodium (total)	mg/L	20*	27	30	32
Phosphorus (total)	mg/L		0.051	0.032	< 0.003
Lead (total)	mg/L	0.01	0.0003	0.00042	< 0.00009
Silicon (total)	mg/L		3.57	4.15	3.36
Silver (total)	mg/L		0.00092	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.298	0.264	0.244
Thallium (total)	mg/L		0.000007	0.000009	< 0.000005
Tin (total)	mg/L		0.00041	0.00013	0.00026
Titanium (total)	mg/L		0.0069	0.016	0.002
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00021	0.00022	0.00023
Uranium (total)	mg/L	0.02	0.000188	0.000157	0.000136
Vanadium (total)	mg/L		0.00053	0.00082	0.00023
Zinc (total)	mg/L	5	0.004	0.002	< 0.002
Colour	TCU	5	14	12	15
Conductivity	uS/cm		602	630	630
pH	No unit	6.5-8.5	7.53	7.59	7.70
Total Suspended Solids	mg/L		215	60	7
Turbidity	NTU	5	70	85	1
Total Dissolved Solids (calculated)	mg/L		378	389	353
Conductivity (calculated)	uS/cm		746	756	665
Langeliers Index 4° C	@ 4° C		0.06	0.13	0.09
Saturation pH 4°C	pHs @ 4°C		7.47	7.46	7.61
Cation sum	meq/L		8.53	8.19	6.76
Anion Sum	meq/L		6.39	6.94	6.55
Anion-Cation Balance	% difference		14.35	8.32	1.56
Ion Ratio	none		1.33	1.18	1.03

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW24-01-II	MW24-02-II
	Collection Date:		27-Nov-24	27-Nov-24
PARAMETERS	***Units***	***ODWQS***		
Total Coliform	cfu/100mL	0	100	2000
E. Coli	cfu/100mL	0	20	20
Heterotrophic Plate Count (HPC)	cfu/1mL		NDOGHPC	NDOGHPC
UV Transmittance	%T		0.2	4.6
Alkalinity	mg/L as CaCO3	30-500	329	220
Bicarbonate	mg/L as CaCO3		329	220
Carbonate	mg/L as CaCO3		< 2	< 2
OH	mg/L as CaCO3		< 2	< 2
Organic Nitrogen	mg/L	0.15	0.22	4
Total Kjeldahl Nitrogen (N)	as N mg/L		0.58	5.23
Ammonia+Ammonium (N)	as N mg/L		0.360	0.760
Dissolved Organic Carbon	mg/L	5	4	13
Total Organic Carbon	mg/L		4	12
Chloride	mg/L	250	18	12
Fluoride	mg/L	1.5	0.14	0.14
Bromide	mg/L		< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	0.05	< 0.03
Nitrate (as N)	as N mg/L	10	0.06	< 0.06
Sulphate	mg/L	500	46	36
Sulphide	mg/L	0.05	0.05	< 0.02
4AAP-Phenolics	mg/L		< 0.002	0.02
Mercury (total)	mg/L	0.001	0.00	< 0.00001
Hardness	mg/L as CaCO3	80-100	1230	227
Aluminum (total)	mg/L	0.1	3	1
Arsenic (total)	mg/L	0.01	0.0061	0.0064
Boron (total)	mg/L	5	0.041	0.026
Barium (total)	mg/L	1	0.586	0.195
Beryllium (total)	mg/L		0.0018	0.00193
Bismuth (total)	mg/L		0.00003	0.00072
Cobalt (total)	mg/L		0.00232	0.00125
Calcium (total)	mg/L		481	86.2
Cadmium (total)	mg/L	0.005	0.000342	0.000068
Copper (total)	mg/L	1	< 0.001	0.001
Chromium (total)	mg/L	0.05	0.00566	0.0005
Iron (total)	mg/L	0.3	9.28	1.61
Potassium (total)	mg/L		1.96	3.01
Magnesium (total)	mg/L		7.46	2.87
Manganese (total)	mg/L	0.05	1.45	0.753
Molybdenum (total)	mg/L		0.0038	0.0309
Nickel (total)	mg/L		0.0031	0.001
Sodium (total)	mg/L	20*	64	45
Phosphorus (total)	mg/L		1.22	0.636
Lead (total)	mg/L	0.01	0.0188	0.0215
Silicon (total)	mg/L		7.72	7.97
Silver (total)	mg/L		< 0.00005	< 0.00005
Strontium (total)	mg/L		1.26	0.359
Thallium (total)	mg/L		0.000045	0.000039
Tin (total)	mg/L		0.00029	0.00048
Titanium (total)	mg/L		0.0248	0.0169
Antimony (total)	mg/L	0.006	< 0.0009	0.001
Selenium (total)	mg/L	0.05	0.0003	0.00159
Uranium (total)	mg/L	0.02	0.00301	0.00601
Vanadium (total)	mg/L		0.00838	0.00113
Zinc (total)	mg/L	5	0.072	0.008
Colour	TCU	5	16	32
Conductivity	uS/cm		517	445
pH	No unit	6.5-8.5	8.16	7.78
Total Suspended Solids	mg/L		15300	1070
Turbidity	NTU	5	>4000	310
Total Dissolved Solids (calculated)	mg/L		817	316
Conductivity (calculated)	uS/cm		1824	615
Langeliers Index 4° C	@ 4° C		1.36	0.10
Saturation pH 4°C	pHs @ 4°C		6.80	7.68
Cation sum	meq/L		28.41	6.84
Anion Sum	meq/L		8.07	5.47
Anion-Cation Balance	% difference		55.76	11.17
Ion Ratio	none		3.52	1.25

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW24-03-I	MW21-06
	Collection Date:		27-Nov-24	27-Nov-24
PARAMETERS	***Units***	***ODWQS***		
Total Coliform	cfu/100mL	0	60	100
E. Coli	cfu/100mL	0	2	< 5
Heterotrophic Plate Count (HPC)	cfu/1mL		NDOGHPC	NDOGHPC
UV Transmittance	%T		71.40	*****
Alkalinity	mg/L as CaCO3	30-500	281	744
Bicarbonate	mg/L as CaCO3		281	744
Carbonate	mg/L as CaCO3		< 2	< 2
OH	mg/L as CaCO3		< 2	< 2
Organic Nitrogen	mg/L	0.15	1	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L		1.92	0.25
Ammonia+Ammonium (N)	as N mg/L		1.08	0.220
Dissolved Organic Carbon	mg/L	5	5	2
Total Organic Carbon	mg/L		5	2
Chloride	mg/L	250	18	22
Fluoride	mg/L	1.5	0.08	0.12
Bromide	mg/L		< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	< 0.06	< 0.06
Sulphate	mg/L	500	11	15
Sulphide	mg/L	0.05	< 0.02	< 0.02
4AAP-Phenolics	mg/L		0.00	< 0.002
Mercury (total)	mg/L	0.001	< 0.00001	0.00
Hardness	mg/L as CaCO3	80-100	307	2710
Aluminum (total)	mg/L	0.1	0.2	3
Arsenic (total)	mg/L	0.01	0.0011	0.0019
Boron (total)	mg/L	5	0.018	0.103
Barium (total)	mg/L	1	0.173	0.561
Beryllium (total)	mg/L		0.000013	0.000416
Bismuth (total)	mg/L		< 0.00001	0.00002
Cobalt (total)	mg/L		0.000394	0.00336
Calcium (total)	mg/L		115	1013
Cadmium (total)	mg/L	0.005	0.000009	0.000244
Copper (total)	mg/L	1	0.002	0.005
Chromium (total)	mg/L	0.05	0.00111	0.00675
Iron (total)	mg/L	0.3	0.943	9.29
Potassium (total)	mg/L		1.88	2.34
Magnesium (total)	mg/L		4.9	43.2
Manganese (total)	mg/L	0.05	0.335	2.24
Molybdenum (total)	mg/L		0.0056	< 0.0004
Nickel (total)	mg/L		0.0024	0.0041
Sodium (total)	mg/L	20*	12	17
Phosphorus (total)	mg/L		0.097	1.78
Lead (total)	mg/L	0.01	0.00041	0.00905
Silicon (total)	mg/L		8.07	6.91
Silver (total)	mg/L		< 0.00005	< 0.00005
Strontium (total)	mg/L		0.356	1.72
Thallium (total)	mg/L		< 0.000005	0.000068
Tin (total)	mg/L		0.00064	0.00018
Titanium (total)	mg/L		0.0058	0.0265
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00006	0.00015
Uranium (total)	mg/L	0.02	0.000229	0.000665
Vanadium (total)	mg/L		0.00146	0.00932
Zinc (total)	mg/L	5	0.003	0.023
Colour	TCU	5	29	7
Conductivity	uS/cm		558	649
pH	No unit	6.5-8.5	7.87	7.61
Total Suspended Solids	mg/L		570	2610
Turbidity	NTU	5	20	>4000
Total Dissolved Solids (calculated)	mg/L		331	1559
Conductivity (calculated)	uS/cm		661	3585
Langeliers Index 4° C	@ 4° C		0.42	1.46
Saturation pH 4°C	pHs @ 4°C		7.45	6.15
Cation sum	meq/L		6.86	55.92
Anion Sum	meq/L		6.35	15.78
Anion-Cation Balance	% difference		3.86	55.98
Ion Ratio	none		1.08	3.54

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW24-03-I	MW24-03-II	MW21-06
	Collection Date:		11-Dec-24	11-Dec-24	11-Dec-24
PARAMETERS	***Units***	***ODWQS***			
Total Coliform	cfu/100mL	0	20	100	< 100
E. Coli	cfu/100mL	0	0	5	1100
Heterotrophic Plate Count (HPC)	cfu/1mL		740	910	8800
UV Transmittance	%T		55.4	39	89.80
Alkalinity	mg/L as CaCO3	30-500	318	255	535
Bicarbonate	mg/L as CaCO3		318	255	535
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	1	1	0
Total Kjeldahl Nitrogen (N)	as N mg/L		1.75	4.18	0.23
Ammonia+Ammonium (N)	as N mg/L		1.200	3.540	0.10
Dissolved Organic Carbon	mg/L	5	5	19	1
Total Organic Carbon	mg/L		6	19	1
Chloride	mg/L	250	20.00	10.00	24.00
Fluoride	mg/L	1.5	0.07	< 0.06	0.10
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	< 0.06	< 0.06	0
Sulphate	mg/L	500	12	8	15
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	< 0.002
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	313	355	3160
Aluminum (total)	mg/L	0.1	0.1	1	3
Arsenic (total)	mg/L	0.01	0.0012	0.001	0.0022
Boron (total)	mg/L	5	0.018	0.012	0.1
Barium (total)	mg/L	1	0.173	0.187	0.533
Beryllium (total)	mg/L		< 0.000007	0.00007	0.000487
Bismuth (total)	mg/L		< 0.00001	< 0.00001	0.00001
Cobalt (total)	mg/L		0.000219	0.000879	0.00473
Calcium (total)	mg/L		117	136	1180
Cadmium (total)	mg/L	0.005	0.000008	0.000101	0.000272
Copper (total)	mg/L	1	< 0.001	0.002	0.022
Chromium (total)	mg/L	0.05	0.00071	0.00339	0.00938
Iron (total)	mg/L	0.3	2.12	5.43	13.7
Potassium (total)	mg/L		1.66	1.16	2.26
Magnesium (total)	mg/L		5.22	3.95	49.1
Manganese (total)	mg/L	0.05	0.613	1.27	2.36
Molybdenum (total)	mg/L		0.0039	0.0013	< 0.0004
Nickel (total)	mg/L		0.0012	0.0023	0.0057
Sodium (total)	mg/L	20*	17	21	17
Phosphorus (total)	mg/L		0.032	0.614	1.94
Lead (total)	mg/L	0.01	0.00015	0.0029	0.0111
Silicon (total)	mg/L		8.94	13.6	6.45
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.317	0.246	1.65
Thallium (total)	mg/L		< 0.000005	0.000013	0.000081
Tin (total)	mg/L		0.00024	0.00029	0.00039
Titanium (total)	mg/L		0.0039	0.018	0.0334
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00007	0.00029	0.00011
Uranium (total)	mg/L	0.02	0.000193	0.00057	0.000816
Vanadium (total)	mg/L		0.00163	0.00415	0.0139
Zinc (total)	mg/L	5	< 0.002	0.02	0.043
Colour	TCU	5	32	37	10
Conductivity	uS/cm		595	489	633
pH	No unit	6.5-8.5	7.60	7.40	7.35
Total Suspended Solids	mg/L		1550	226	3960
Turbidity	NTU	5	19	45	1100
Total Dissolved Solids (calculated)	mg/L		364	332	1609
Conductivity (calculated)	uS/cm		723	712	3839
Langeliers Index 4° C	@ 4° C		0.21	-0.02	1.12
Saturation pH 4°C	pHs @ 4°C		7.39	7.42	6.23
Cation sum	meq/L		7.3	8.72	65.11
Anion Sum	meq/L		7.16	5.53	11.67
Anion-Cation Balance	% difference		0.92	22.39	69.61
Ion Ratio	none		1.02	1.58	5.58

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-05	MW21-07
	Collection Date:		11-Dec-24	11-Dec-24
PARAMETERS	***Units***	***ODWQS***		
Total Coliform	cfu/100mL	0	20	13
E. Coli	cfu/100mL	0	9	0
Heterotrophic Plate Count (HPC)	cfu/1mL		1190	113
UV Transmittance	%T		83.40	91.50
Alkalinity	mg/L as CaCO3	30-500	320	245
Bicarbonate	mg/L as CaCO3		320	245
Carbonate	mg/L as CaCO3		< 2	< 2
OH	mg/L as CaCO3		< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	1	2
Total Organic Carbon	mg/L		1	1
Chloride	mg/L	250	49.00	47.00
Fluoride	mg/L	1.5	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	5	5
Sulphate	mg/L	500	22	24
Sulphide	mg/L	0.05	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	691	265
Aluminum (total)	mg/L	0.1	1	0.01
Arsenic (total)	mg/L	0.01	0.0012	< 0.0002
Boron (total)	mg/L	5	0.028	0.027
Barium (total)	mg/L	1	0.294	0.146
Beryllium (total)	mg/L		0.00015	< 0.000007
Bismuth (total)	mg/L		< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.00305	0.00004
Calcium (total)	mg/L		257	97.9
Cadmium (total)	mg/L	0.005	0.000077	< 0.000003
Copper (total)	mg/L	1	0.009	< 0.001
Chromium (total)	mg/L	0.05	0.00405	0.00027
Iron (total)	mg/L	0.3	2.71	0.017
Potassium (total)	mg/L		2.76	2.54
Magnesium (total)	mg/L		12.1	5.02
Manganese (total)	mg/L	0.05	0.702	0.00126
Molybdenum (total)	mg/L		< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0043	0.0001
Sodium (total)	mg/L	20*	31	30
Phosphorus (total)	mg/L		0.586	< 0.003
Lead (total)	mg/L	0.01	0.00203	< 0.00009
Silicon (total)	mg/L		4.58	3.07
Silver (total)	mg/L		< 0.00005	< 0.00005
Strontium (total)	mg/L		0.494	0.283
Thallium (total)	mg/L		0.000025	< 0.000005
Tin (total)	mg/L		0.00023	0.0001
Titanium (total)	mg/L		0.0374	0.0013
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00024	0.00019
Uranium (total)	mg/L	0.02	0.00039	0.000168
Vanadium (total)	mg/L		0.00411	0.0002
Zinc (total)	mg/L	5	0.016	< 0.002
Colour	TCU	5	5	4
Conductivity	uS/cm		691	677
pH	No unit	6.5-8.5	7.35	8.05
Total Suspended Solids	mg/L		2110	6
Turbidity	NTU	5	500	1.6
Total Dissolved Solids (calculated)	mg/L		570	358
Conductivity (calculated)	uS/cm		1195	673
Langeliers Index 4° C	@ 4° C		0.28	0.47
Saturation pH 4°C	pHs @ 4°C		7.07	7.58
Cation sum	meq/L		15.6	6.67
Anion Sum	meq/L		8.3	6.79
Anion-Cation Balance	% difference		30.54	-0.95
Ion Ratio	none		1.88	0.98

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-01	MW21-02	MW21-03	MW21-04
	Collection Date:		12-Dec-24	12-Dec-24	12-Dec-24	12-Dec-24
PARAMETERS	***Units***	***ODWQS***				
Total Coliform	cfu/100mL	0	20	< 20	2	20
E. Coli	cfu/100mL	0	< 20	< 20	0	< 20
Heterotrophic Plate Count (HPC)	cfu/1mL		NDOGHPC	920	128	NDOGHPC
UV Transmittance	%T		57.8	85.9	60.9	59.3
Alkalinity	mg/L as CaCO3	30-500	331	260	307	590
Bicarbonate	mg/L as CaCO3		331	260	307	590
Carbonate	mg/L as CaCO3		< 2	< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05	< 0.05	0.23
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05	0.06	0.27
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04	< 0.04	0.04
Dissolved Organic Carbon	mg/L	5	2	2	3	3
Total Organic Carbon	mg/L		2	2	3	3
Chloride	mg/L	250	45	28	33	27
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	3	3	2	2
Sulphate	mg/L	500	12	12	9	9
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.001	< 0.001	< 0.001	< 0.001
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	1080	490	447	2310
Aluminum (total)	mg/L	0.1	2.24	0.356	0.672	3.74
Arsenic (total)	mg/L	0.01	0.0017	0.0003	0.0006	0.0017
Boron (total)	mg/L	5	0.023	0.027	0.015	0.020
Barium (total)	mg/L	1	0.275	0.134	0.0966	0.326
Beryllium (total)	mg/L		0.000267	0.000039	0.000090	0.000557
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.00663	0.000579	0.000432	0.0104
Calcium (total)	mg/L		414	188	173	905
Cadmium (total)	mg/L	0.005	0.000130	0.000020	0.000015	0.000233
Copper (total)	mg/L	1	0.009	0.002	0.001	0.007
Chromium (total)	mg/L	0.05	0.00344	0.00188	0.00124	0.00605
Iron (total)	mg/L	0.3	2.79	1.09	0.789	4.00
Potassium (total)	mg/L		1.64	2.27	2.08	2.73
Magnesium (total)	mg/L		10.4	5.33	3.74	11.2
Manganese (total)	mg/L	0.05	1.01	0.156	0.116	2.39
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0035	0.0014	0.0007	0.0088
Sodium (total)	mg/L	20*	40.5	27.4	15.9	14.2
Phosphorus (total)	mg/L		1.26	0.157	0.166	1.31
Lead (total)	mg/L	0.01	0.00539	0.00137	0.00177	0.00865
Silicon (total)	mg/L		4.50	3.28	3.83	5.40
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.627	0.372	0.367	1.30
Thallium (total)	mg/L		0.000036	0.000010	0.000020	0.000054
Tin (total)	mg/L		0.00014	0.00031	< 0.00006	0.00013
Titanium (total)	mg/L		0.0289	0.0116	0.0190	0.0400
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00029	0.00013	0.00011	0.00021
Uranium (total)	mg/L	0.02	0.000503	0.000212	0.000271	0.000850
Vanadium (total)	mg/L		0.00646	0.00131	0.00110	0.00521
Zinc (total)	mg/L	5	0.013	0.005	0.005	0.033
Colour	TCU	5	9	3	11	12
Conductivity	uS/cm		571	538	516	505
pH	No unit	6.5-8.5	7.64	7.54	7.77	7.69
Total Suspended Solids	mg/L		5380	1440	1460	2800
Turbidity	NTU	5	2400	1.5	380	>4000
Total Dissolved Solids (calculated)	mg/L		725	421	423	1326
Conductivity (calculated)	uS/cm		1599	871	855	3020
Langeliers Index 4° C	@ 4° C		0.78	0.26	0.53	1.40
Saturation pH 4°C	pHs @ 4°C		6.86	7.28	7.24	6.29
Cation sum	meq/L		23.79	11.17	9.82	47.63
Anion Sum	meq/L		8.18	6.26	7.28	12.77
Anion-Cation Balance	% difference		48.82	28.17	14.83	57.71
Ion Ratio	none		2.91	1.78	1.35	3.73

Shaded Results - Concentration exceed ODWQS	Sample Location:		MW21-08	MW21-09	MW21-10
	Collection Date:		12-Dec-24	12-Dec-24	12-Dec-24
PARAMETERS	Units	ODWQS			
Total Coliform	cfu/100mL	0	63	2	6
E. Coli	cfu/100mL	0	0	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL		880	199	840
UV Transmittance	%T		90.1	80.4	83.9
Alkalinity	mg/L as CaCO3	30-500	235	303	242
Bicarbonate	mg/L as CaCO3		235	303	242
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	2	2	2
Total Organic Carbon	mg/L		2	2	2
Chloride	mg/L	250	48	49	54
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	4	4	5
Sulphate	mg/L	500	21	19	20
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.001	< 0.001	< 0.001
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	302	363	330
Aluminum (total)	mg/L	0.1	0.076	0.475	0.377
Arsenic (total)	mg/L	0.01	< 0.0002	0.0002	0.0002
Boron (total)	mg/L	5	0.024	0.023	0.022
Barium (total)	mg/L	1	0.133	0.141	0.170
Beryllium (total)	mg/L		0.000011	0.000024	0.000024
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.000141	0.000420	0.000349
Calcium (total)	mg/L		113	137	124
Cadmium (total)	mg/L	0.005	0.000007	0.000009	0.000008
Copper (total)	mg/L	1	0.006	0.001	0.001
Chromium (total)	mg/L	0.05	0.00123	0.00119	0.00069
Iron (total)	mg/L	0.3	0.672	0.467	0.324
Potassium (total)	mg/L		2.35	2.24	2.05
Magnesium (total)	mg/L		4.62	5.41	5.02
Manganese (total)	mg/L	0.05	0.0386	0.0667	0.0436
Molybdenum (total)	mg/L		0.0005	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0011	0.0005	0.0004
Sodium (total)	mg/L	20*	29.3	29.3	31.5
Phosphorus (total)	mg/L		0.049	0.068	0.034
Lead (total)	mg/L	0.01	0.00020	0.00063	0.00053
Silicon (total)	mg/L		3.29	4.41	3.68
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.300	0.312	0.302
Thallium (total)	mg/L		< 0.000005	0.000008	0.000008
Tin (total)	mg/L		0.00074	0.00028	0.00023
Titanium (total)	mg/L		0.0034	0.0234	0.0160
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00018	0.00022	0.00024
Uranium (total)	mg/L	0.02	0.000196	0.000178	0.000162
Vanadium (total)	mg/L		0.00025	0.00106	0.00074
Zinc (total)	mg/L	5	0.003	0.002	< 0.002
Colour	TCU	5	3	< 3	< 3
Conductivity	uS/cm		632	629	648
pH	No unit	6.5-8.5	7.72	7.76	7.82
Total Suspended Solids	mg/L		49	673	106
Turbidity	NTU	5	15	85	75
Total Dissolved Solids (calculated)	mg/L		363	428	386
Conductivity (calculated)	uS/cm		698	829	747
Langeliers Index 4° C	@ 4° C		0.18	0.41	0.33
Saturation pH 4°C	pHs @ 4°C		7.54	7.35	7.49
Cation sum	meq/L		7.43	8.69	8.09
Anion Sum	meq/L		6.54	7.90	6.84
Anion-Cation Balance	% difference		6.32	4.79	8.35
Ion Ratio	none		1.13	1.10	1.18

Shaded Results - Concentration exceed ODWQS	Sample Location:		Well 5-1HR	Well5_34hr	Well 5-72hr
	Collection Date:		02-Dec-24	04-Dec-24	5-Dec-24
PARAMETERS	***Units***	***ODWQS***			
Total Coliform	cfu/100mL	0	0	0	0
E. Coli	cfu/100mL	0	0	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL		25	66	4
Fecal Coliform	cfu/100mL	0	0	0	0
Cryptosporidium oocysts	-	-	0	-	0
Giardia cysts	-	-	0	-	0
PBAD	-		0	-	0
Residual chlorine	mg/L				< 0.02
Chlorine Demand	mg/L				0.4
Chlorine Demand pH	no unit				7.73
Chlorine Demand temperature	°C				21.3
UV Transmittance	%T		92.1	92.2	92
Alkalinity	mg/L as CaCO3	30-500	233	223	233
Bicarbonate	mg/L as CaCO3		233	223	233
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L		< 0.05	< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L		< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	5	2	2	2
Total Organic Carbon	mg/L		2	2	2
Chloride	mg/L	250	55	51	50
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	5	5	4
Sulphate	mg/L	500	20	18	19
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	0.00
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	261	270	293
Aluminum (total)	mg/L	0.1	< 0.001	< 0.001	< 0.001
Arsenic (total)	mg/L	0.01	< 0.0002	< 0.0002	< 0.0002
Boron (total)	mg/L	5	0.02	0.019	0.021
Barium (total)	mg/L	1	0.148	0.158	0.158
Beryllium (total)	mg/L		< 0.000007	< 0.000007	< 0.000007
Bismuth (total)	mg/L		< 0.00001	< 0.00001	0.00003
Cobalt (total)	mg/L		0.000041	0.000029	0.000031
Calcium (total)	mg/L		96.2	100	109
Cadmium (total)	mg/L	0.005	< 0.000003	< 0.000003	0.000004
Copper (total)	mg/L	1	< 0.001	< 0.001	< 0.001
Chromium (total)	mg/L	0.05	0.00013	0.00016	0.00015
Iron (total)	mg/L	0.3	< 0.007	< 0.007	< 0.007
Potassium (total)	mg/L		1.98	2.07	2.12
Magnesium (total)	mg/L		5.09	4.77	4.75
Manganese (total)	mg/L	0.05	0.00017	0.00009	0.00006
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0002	0.0002	< 0.0001
Sodium (total)	mg/L	20*	32	33	32
Phosphorus (total)	mg/L		< 0.003	< 0.003	< 0.003
Lead (total)	mg/L	0.01	< 0.00009	< 0.00009	< 0.00009
Silicon (total)	mg/L		2.92	2.96	3.57
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.279	0.285	0.262
Thallium (total)	mg/L		< 0.000005	< 0.000005	0.000053
Tin (total)	mg/L		< 0.00006	< 0.00006	< 0.00006
Titanium (total)	mg/L		< 0.0001	< 0.0001	< 0.0001
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00022	0.0002	0.0002
Uranium (total)	mg/L	0.02	0.000139	0.000133	0.000158
Vanadium (total)	mg/L		0.00018	0.00017	0.00016
Zinc (total)	mg/L	5	0.002	0.004	0.003
Colour	TCU	5	15	7	21
Conductivity	uS/cm		636	628	613
pH	No unit	6.5-8.5	7.62	7.74	7.77
Total Suspended Solids	mg/L		< 2	< 2	2
Turbidity	NTU	5	0.29	0	0
Total Dissolved Solids (calculated)	mg/L		355	347	361
Conductivity (calculated)	uS/cm		669	661	691
Langeliers Index 4° C	@ 4° C		0.01	0.13	0.21
Saturation pH 4°C	pHs @ 4°C		7.61	7.61	7.56
Cation sum	meq/L		6.69	6.89	7.29
Anion Sum	meq/L		6.7	6.33	6.53
Anion-Cation Balance	% difference		-0.06	4.22	5.55
Ion Ratio	none		1	1.09	1.12

Shaded Results - Concentration does not meet PWQO	*Sample Location:*		SW1	SW2	SW3
	Collection Date:		04-Dec-24	04-Dec-24	04-Dec-24
PARAMETERS	***Units***	***ODWQS***			
General Chemistry					
Total Coliform	cfu/100mL	0	11	120	29
E. Coli	cfu/100mL	0	0	20	3
Heterotrophic Plate Count (HPC)	cfu/1mL		126	176	115
UV Transmittance	%T		59.1	64.9	60.60
Alkalinity	mg/L as CaCO3	30-500	222	212	224
Bicarbonate	mg/L as CaCO3		222	212	224
Carbonate	mg/L as CaCO3		< 2	< 2	< 2
OH	mg/L as CaCO3		< 2	< 2	< 2
Organic Nitrogen	mg/L	0.15	0.3	0.2	0.2
Total Kjeldahl Nitrogen (N)	as N mg/L		0.35	0.22	0.28
Ammonia+Ammonium (N)	as N mg/L		0.050	< 0.04	0.06
Dissolved Organic Carbon	mg/L	5	6	5	5
Total Organic Carbon	mg/L		5	4	5
Chloride	mg/L	250	13	10	8
Fluoride	mg/L	1.5	< 0.06	< 0.06	< 0.06
Bromide	mg/L		< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	10	0.10	0.19	2.31
Sulphate	mg/L	500	3	4	3
Sulphide	mg/L	0.05	< 0.02	< 0.02	< 0.02
4AAP-Phenolics	mg/L		< 0.002	< 0.002	< 0.002
Mercury (total)	mg/L	0.001	< 0.00001	< 0.00001	< 0.00001
Hardness	mg/L as CaCO3	80-100	235	236	235
Metals					
Aluminum (total)	mg/L	0.1	0.01	0.02	0.01
Arsenic (total)	mg/L	0.01	0.0003	0.0003	0.0003
Boron (total)	mg/L	5	0.007	0.006	0.006
Barium (total)	mg/L	1	0.0789	0.0751	0.079
Beryllium (total)	mg/L		< 0.000007	< 0.000007	< 0.000007
Bismuth (total)	mg/L		< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L		0.000032	0.000048	0.00003
Calcium (total)	mg/L		89.9	90.6	90.3
Cadmium (total)	mg/L	0.005	< 0.000003	0.000008	< 0.000003
Copper (total)	mg/L	1	< 0.001	< 0.001	< 0.001
Chromium (total)	mg/L	0.05	0.00012	0.00009	0.00009
Iron (total)	mg/L	0.3	0.083	0.089	0.088
Potassium (total)	mg/L		0.752	0.667	0.67
Magnesium (total)	mg/L		2.45	2.27	2.34
Manganese (total)	mg/L	0.05	0.03	0.02	0.04
Molybdenum (total)	mg/L		< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L		0.0002	0.0001	0.0001
Sodium (total)	mg/L	20*	6.9	5.9	4.86
Phosphorus (total)	mg/L		0.011	0.007	0.006
Lead (total)	mg/L	0.01	< 0.00009	0.00014	< 0.00009
Silicon (total)	mg/L		2.39	2.67	2.82
Silver (total)	mg/L		< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L		0.201	0.192	0.194
Thallium (total)	mg/L		< 0.000005	< 0.000005	< 0.000005
Tin (total)	mg/L		< 0.00006	< 0.00006	< 0.00006
Titanium (total)	mg/L		0.0005	0.0009	0.0003
Antimony (total)	mg/L	0.006	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.05	0.00005	0.00008	0.00006
Uranium (total)	mg/L	0.02	0.00009	0.000083	0.000086
Vanadium (total)	mg/L		0.00027	0.00021	0.00019
Zinc (total)	mg/L	5	< 0.002	< 0.002	< 0.002
Field Parameters					
Colour	TCU	5	37	31	38
Conductivity	uS/cm		430	414	409
pH	No unit	6.5-8.5	8.18	8.21	8.09
Total Suspended Solids	mg/L		2	2	< 2
Turbidity	NTU	5	1	4	1
Total Dissolved Solids (calculated	mg/L		250	240	246
Conductivity (calculated)	uS/cm		494	479	487
Langeliers Index 4° C	@ 4° C		0.53	0.55	0.45
Saturation pH 4°C	pHs @ 4°C		7.65	7.66	7.64
Other					
Cation sum	meq/L		5.02	5	4.94
Anion Sum	meq/L		4.87	4.59	4.8
Anion-Cation Balance	% difference		1.56	4.29	1.47
Ion Ratio	none		1.03	1.09	1.03

Appendix E

Groundwater and Surface Water Certificates of Analysis

York-Durham Regional Environmental Laboratory
901 McKay Road
Pickering, ON L1W 3A3
Phone (905)686-0041 Fax (905)686-0664

LABORATORY ANALYSIS REPORT

Work Order #: 134055 **Work ID:** REL24-3897

Description: 7549
Client: D.M. Wills Associates Limited
Profile: Non-regulated Water Sampling
Sampled By: Ralf Bolvin
Sample Count: 1

Report To: Lynsey Tuters
D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON K9J 0B9

Authorized by: Jennifer Koene-Fenton, Laboratory Superintendent

Workorder Summary

Workorder Comments

Cryptosporidium and Giardia Internal Control – Percent Recovery: Cryptosporidium, 55%; Giardia, 70%.

Analysis Results Comments

13405501 (1) - PBAD

A total equivalent volume of 20% of the original volume was examined by microscopy. No PBADs were detected.

Analytical Results

Lab ID: 13405501 **Sample ID:** 1 **Criteria:** N/A **Date Received:** 12/3/2024
Matrix: Water **Location:** Well 5-1 HR **Date Collected:** 12/2/2024
Type: Ground Water **Description:**

Parameter	Results	Units	MDL	RDL	DF	Limit	Prepared	Analyzed	C
CRYPTOSPORIDIUM / GIARDIA (RELM-9)									
Cryptosporidium oocysts	0	n/a	1	1	1		12/04/2024	12/06/2024	
Filtered Volume	11	L					12/04/2024	12/06/2024	
Giardia cysts	0	n/a	1	1	1		12/04/2024	12/06/2024	
PHYTOPLANKTON (RELM-15)									
Filtered Volume	11	L					12/09/2024	12/09/2024	
PBAD	Absent	n/a			1		12/09/2024	12/09/2024	*

The results pertain to the items tested and apply to the sample as received.This report shall not be reproduced, except in full, without the written consent of York-Durham Regional Environmental Laboratory. All supporting analytical information including measurement uncertainty is available upon request. The statement of conformity is based on simple acceptance, whether the result is within or outside the acceptance limits. The uncertainty is not taken into account in the statement of conformity. The end user is responsible for determining conformity.

Legend: MDL = Method Detection Limit; RDL = Reporting Detection Limit; MU = Measurement Uncertainty; < or ND = Less Than or Non-detect; ^ = Result outside limit; Limit = MAC; DF = Dilution Factor; OG = Operational Guideline; AO = Aesthetic Objective; HC = Health Canada; C = Comment; * = Comment Present

York-Durham Regional Environmental Laboratory

901 McKay Road
Pickering, ON L1W 3A3
Phone (905)686-0041 Fax (905)686-0664

LABORATORY ANALYSIS REPORT

Work Order #: 134055 **Work ID:** REL24-3897

York-Durham
Regional Environmental Laboratory
ickering ON L1W 3A3 Toll Free: 1-877-551-8877 Local: 905-686-0041
.64 Email: rel@durham.ca Web: www.durham.ca

REL24-3897

Page 1 of 1

Non-regulated Water, Wastewater,Biosolid,Soil
Chain of Custody Form

ormation
ny Name: Dm Wills
ity Name:
acility Address: 150 Jameson Dr.
Facility Contact:
Email: ltuters@dmwills.com Tel: 289-385-6230
Project Information (if applicable)
Description: # 7549

Invoice To (leave blank if same as Client)
Company:
accounts@dmwills.com
Quote #:
PO #: 7549

Report to (email address)
1) ltuters@dmwills.com
2) LTUTERS@DMWILLS.COM
3)
4)
5)

Standard Turnaround Time (TAT) is 10 business days ☐ *RUSH *Rush TAT requires lab approval in advance. Surcharge will apply.

Sample(s) Information

Lab ID (lab use only)	Field ID	Location/Description/Comment(s)	Matrix	Type	Collection mm-dd-yy	Collection HH:MM	Test Group(s)	Container Type	Container Sent	Container Rec'd	Chlorine Free	Chlorine Total	Apply Criteria (Y/N) (*1)
01	1	Well 5 - 1 HR →	GW		12-02-24	03:10 PM	Crypto, Giardia Fecals (MSCG PBAD)	10L Carboy	1	1			

Sampled By: Ralf BOLVIN Tel: ~~705-991-32~~ 705-868-1691
Relinquished By (Print/Sign): Ralf BOLVIN Date/Time: Dec. 3rd, 2024

(1) Select One Applicable Criteria — Provide Municipality / City / Description
☐ Sanitary Sewer Use By-law
☐ Storm Sewer Use By-law
☐ New Water Main
☐ Other

LABORATORY USE ONLY
Delivery Method: Courier ☐ Drop Off ☑ YDREL Pickup ☐
Sorted by: Labelled by:
Checked by: Proofed by:
WO #: 134055
134055
ved Date/Time: DEC 3 2024 10:25
ved By: SS
Comments: Temp received at 8°C

REL-COC-NONREG-NOV-2019-REV-1

The results pertain to the items tested and apply to the sample as received.This report shall not be reproduced, except in full, without the written consent of York-Durham Regional Environmental Laboratory. All supporting analytical information including measurement uncertainty is available upon request. The statement of conformity is based on simple acceptance, whether the result is within or outside the acceptance limits. The uncertainty is not taken into account in the statement of conformity. The end user is responsible for determining conformity.

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York-Durham Regional Environmental Laboratory
901 McKay Road
Pickering, ON L1W 3A3
Phone (905)686-0041 Fax (905)686-0664

LABORATORY ANALYSIS REPORT

Work Order #: 134324 **Work ID:** REL24-3869

Description: Project 7549
Client: D.M. Wills Associates Limited
Profile: Non-regulated Water Sampling
Sampled By: Lynsey Tuters
Sample Count: 1

Report To: Lynsey Tuters
D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, ON K9J 0B9

Authorized by: Jennifer Koene-Fenton, Laboratory Superintendent

Workorder Summary

Workorder Comments

Cryptosporidium and Giardia Internal Control – Percent Recovery: Cryptosporidium, 55%; Giardia, 70%.

Analysis Results Comments

13432401 (1) - PBAD

A total equivalent volume of 20% of the original volume was examined by microscopy. No PBADs were detected.

Analytical Results

Lab ID: 13432401 **Sample ID:** 1 **Criteria:** N/A **Date Received:** 12/5/2024
Matrix: Water **Location:** Well 5 -72 Hr **Date Collected:** 12/5/2024
Type: Ground Water **Description:**

Parameter	Results	Units	MDL	RDL	DF	Limit	Prepared	Analyzed	C
CRYPTOSPORIDIUM / GIARDIA (RELM-9)									
Cryptosporidium oocysts	0	n/a	1	1	1		12/06/2024	12/06/2024	
Filtered Volume	11	L					12/06/2024	12/06/2024	
Giardia cysts	0	n/a	1	1	1		12/06/2024	12/06/2024	
PHYTOPLANKTON (RELM-15)									
Filtered Volume	11	L					12/09/2024	12/09/2024	
PBAD	Absent	n/a			1		12/09/2024	12/09/2024	*

The results pertain to the items tested and apply to the sample as received.This report shall not be reproduced, except in full, without the written consent of York-Durham Regional Environmental Laboratory. All supporting analytical information including measurement uncertainty is available upon request. The statement of conformity is based on simple acceptance, whether the result is within or outside the acceptance limits. The uncertainty is not taken into account in the statement of conformity. The end user is responsible for determining conformity.

Legend: MDL = Method Detection Limit; RDL = Reporting Detection Limit; MU = Measurement Uncertainty; < or ND = Less Than or Non-detect; ^ = Result outside limit; Limit = MAC; DF = Dilution Factor; OG = Operational Guideline; AO = Aesthetic Objective; HC = Health Canada; C = Comment; * = Comment Present

York-Durham Regional Environmental Laboratory

901 McKay Road
Pickering, ON L1W 3A3
Phone (905)686-0041 Fax (905)686-0664

LABORATORY ANALYSIS REPORT

Work Order #: 134324 **Work ID:** REL24-3869

York-Durham
Regional Environmental Laboratory
901 McKay Road, Pickering ON L1W 3A3 Toll Free: 1-877-551-8877 Local: 905-686-0041
Fax: 905-686-0664 Email: rel@durham.ca Web: www.durham.ca

REL24-3869

Page 1 of

Non-regulated Water, Wastewater,Biosolid,Soil
Chain of Custody Form

SS

Client Information	Invoice To (leave blank if same as Client)	Report to (email address)
Company Name: DM Wills Associates Limited	Company: Same	1) LTUTERS@DMWILLS.COM
Facility Name:	accounts@dmwills.com	2)
Facility Address: 150 JAMESON DRIVE, Peterborough	Quote #:	3)
Facility Contact: Lynsey Tulers	PO #: 7549	4)
Email: LTUTERS@DMWILLS.com Tel: 289-385-6230		5)

Project Information (if applicable)
Description: Project #7549

Standard Turnaround Time (TAT) is 10 business days ☐ *RUSH *Rush TAT requires lab approval in advance. Surcharge will apply.

Sample(s) Information

Lab ID (lab use only)	Field ID	Location/Description/Comment(s)	Matrix	Type	Collection mm-dd-yy	Collection HH:MM	Test Group(s)	Container Type	Container Sent	Container Rec'd	Chlorine Free	Chlorine Total	Apply Criteria (Y/N) (*1)
01		Well 5 - 72 HR	GW		12-05-24	13:30 RB	TBCGPBAD		1	1			

Sampled By: Lynsey Tulers Tel: 289-385-6230

Relinquished By (Print/Sign): Ralf Balvin 705-868-1691 Date/Time: December 5, 2024

(1) Select One Applicable Criteria — Provide Municipality / City / Description
☐ Sanitary Sewer Use By-law
☐ Storm Sewer Use By-law
☐ New Water Main
☐ Other

134324

LABORATORY USE ONLY

Delivery Method: Courier ☐ Drop Off ☐ YDREL Pickup ☐
Sorted by: _____ Labelled by: _____
Checked by: _____ Proofed by: _____
WO #: 134324

Received Date/Time: DEC 5 2024 15:41
Received By: SS
Comments: Recieved at Temp 18°C

REL-COC-NONREG-NOV-2019-REV-1

The results pertain to the items tested and apply to the sample as received.This report shall not be reproduced, except in full, without the written consent of York-Durham Regional Environmental Laboratory. All supporting analytical information including measurement uncertainty is available upon request. The statement of conformity is based on simple acceptance, whether the result is within or outside the acceptance limits. The uncertainty is not taken into account in the statement of conformity. The end user is responsible for determining conformity.

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FINAL REPORT

CA12818-NOV24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	D.M. Wills -Peterborough	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Lynsey Tuters	Telephone	705-652-2000
Telephone	289-385-6230	Facsimile	705-652-6365
Facsimile	705-741-3568	Email	Maarit.Wolfe@sgs.com
Email	ltuters@dmwills.com	SGS Reference	CA12818-NOV24
Project	7549	Received	11/26/2024
Order Number		Approved	12/02/2024
Samples	Ground Water (10)	Report Number	CA12818-NOV24 R1
		Date Reported	12/02/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

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

Chain of Custody Number: 034934

NDOGHPC - No Data: Overgrown with HPC
Note: Elevated TotColi and Ecoli reporting limit due to sample matrix.

SIGNATORIES

Maarit Wolfe, Hon.B.Sc



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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11	12	13	14
				Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-05	MW21-07	MW21-08	MW21-09
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry												
UV Transmittance	%T				0.9	59.1	65.0	*****	15.8	91.1	80.9	64.0
Alkalinity	mg/L as CaCO3	2	500		286	237	232	354	268	238	231	251
Bicarbonate	mg/L as CaCO3	2			286	237	232	354	268	238	231	251
Carbonate	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Colour	TCU	3	5		12	14	19	20	16	12	14	12
Conductivity	uS/cm	2			553	535	490	488	625	639	602	630
Total Suspended Solids	mg/L	2			2380	281	83	5050	2670	46	215	60
Turbidity	NTU	0.10	5	1	>4000	190	50	>4000	550	10	70	85
Organic Nitrogen	mg/L	0.05	0.15		< 0.05	< 0.05	0.13	0.13	0.29	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			< 0.05	< 0.05	0.15	0.19	0.31	0.07	< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04	< 0.04	< 0.04	0.06	< 0.04	< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	1	5		2	2	3	3	2	2	2	2
Total Organic Carbon	mg/L	1			2	2	3	3	2	2	2	2

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-05	MW21-07	MW21-08	MW21-09
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024
						Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics													
Fluoride	mg/L	0.06		1.5		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bromide	mg/L	0.3				< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10		3.24	3.16	1.79	1.92	4.60	4.97	4.01	4.41
Sulphate	mg/L	2	500			9	12	9	< 20↑	20	24	17	16
Sulphide	mg/L	0.02				< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05	100			1750	658	292	3910	899	295	361	340
Aluminum (total)	mg/L	0.001	0.1			3.01	0.424	0.311	1.82	1.42	0.033	0.175	0.331
Arsenic (total)	mg/L	0.0002		0.01		0.0018	0.0004	0.0003	0.0012	0.0014	< 0.0002	0.0002	0.0002
Boron (total)	mg/L	0.002		5		0.023	0.022	0.015	0.025	0.030	0.028	0.024	0.023
Barium (total)	mg/L	0.00008		1		0.366	0.147	0.0883	0.407	0.374	0.159	0.141	0.141
Beryllium (total)	mg/L	0.000007				0.000388	0.000052	0.000031	0.000307	0.000145	< 0.000007	0.000018	0.000015
Bismuth (total)	mg/L	0.00001				< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L	0.000004				0.00876	0.000812	0.000129	0.00831	0.00291	0.000060	0.000165	0.000382
Calcium (total)	mg/L	0.01				675	253	112	1540	338	109	136	128
Cadmium (total)	mg/L	0.000003		0.005		0.000196	0.000022	0.000008	0.000333	0.000133	< 0.000003	0.000003	< 0.000003
Copper (total)	mg/L	0.001	1			0.015	0.003	< 0.001	0.003	0.013	0.001	0.008	0.001
Chromium (total)	mg/L	0.00008		0.05		0.00507	0.00202	0.00062	0.00396	0.00300	0.00057	0.00227	0.00113
Iron (total)	mg/L	0.007	0.3			3.10	1.33	0.290	0.538	2.01	0.150	0.687	0.316
Potassium (total)	mg/L	0.009				1.64	2.31	1.99	2.83	2.70	2.55	2.25	1.94
Magnesium (total)	mg/L	0.001				15.7	6.24	3.01	14.9	13.2	5.34	5.17	5.17
Manganese (total)	mg/L	0.00001	0.05			1.65	0.236	0.0295	2.91	0.685	0.0106	0.0466	0.0444

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-05	MW21-07	MW21-08	MW21-09
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024
						Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)													
Molybdenum (total)	mg/L	0.0004				< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L	0.0001				0.0056	0.0009	0.0004	0.0070	0.0041	0.0002	0.0008	0.0004
Sodium (total)	mg/L	0.01	200	20		33.3	27.5	12.9	13.6	28.4	29.8	27.4	29.6
Phosphorus (total)	mg/L	0.003				1.19	0.223	0.062	0.721	0.908	0.006	0.051	0.032
Lead (total)	mg/L	0.00009		0.01		0.00760	0.00238	0.00066	0.00047	0.00203	< 0.00009	0.00030	0.00042
Silicon (total)	mg/L	0.02				4.98	3.65	3.50	5.88	4.86	3.50	3.57	4.15
Silver (total)	mg/L	0.00005				< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00092	< 0.00005
Strontium (total)	mg/L	0.00008				0.822	0.401	0.251	2.03	0.547	0.281	0.298	0.264
Thallium (total)	mg/L	0.000005				0.000040	0.000015	0.000015	0.000034	0.000039	0.000006	0.000007	0.000009
Tin (total)	mg/L	0.00006				0.00011	0.00009	0.00023	0.00017	0.00016	0.00020	0.00041	0.00013
Titanium (total)	mg/L	0.0001				0.0247	0.0130	0.0107	0.0279	0.0400	0.0030	0.0069	0.0160
Antimony (total)	mg/L	0.0009		0.006		< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05		0.00039	0.00019	0.00014	0.00023	0.00021	0.00024	0.00021	0.00022
Uranium (total)	mg/L	0.000002		0.02		0.000629	0.000247	0.000207	0.000196	0.000445	0.000179	0.000188	0.000157
Vanadium (total)	mg/L	0.00001				0.00834	0.00176	0.00059	0.00097	0.00413	0.00034	0.00053	0.00082
Zinc (total)	mg/L	0.002	5			0.023	0.006	0.002	0.025	0.018	0.003	0.004	0.002
Cation sum	meq/L	-9999				37.11	14.56	6.51	79.30	19.61	7.28	8.53	8.19
Anion Sum	meq/L	-9999				7.37	5.89	5.53	8.24	7.21	6.78	6.39	6.94
Anion-Cation Balance	% difference	-9999				66.86	42.38	8.19	81.17	46.23	3.59	14.35	8.32
Ion Ratio	none	-9999				5.04	2.47	1.18	9.62	2.72	1.07	1.33	1.18
Total Dissolved Solids (calculated)	mg/L	-9999				960	477	304	1833	617	370	378	389
Conductivity (calculated)	uS/cm	-9999				2224	1023	602	4377	1341	703	746	756

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-05	MW21-07	MW21-08	MW21-09
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024	26/11/2024
						Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)													
Langeliers Index 4° C	@ 4° C	-9999				0.94	0.37	-0.02	1.31	0.50	-0.09	0.06	0.13
Saturation pH 4°C	pHs @ 4°C	-9999				6.72	7.20	7.54	6.30	7.03	7.55	7.47	7.46
Microbiology													
Total Coliform	cfu/100mL	0		0		< 20↑	12	7	20	0	1	200	0
E. Coli	cfu/100mL	0		0		< 20↑	1	1	30	0	0	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0				#NDOGHPC	440	50	#NDOGHPC	560	420	620	480
Other (ORP)													
pH	No unit	0.05	8.5			7.66	7.57	7.52	7.61	7.53	7.46	7.53	7.59
Chloride	mg/L	1	250			50	30	24	26	48	51	48	54
Mercury (total)	mg/L	0.00001				0.00002	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenols													
4AAP-Phenolics	mg/L	0.002				< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number					15	16
Sample Name					MW21-10	MW21-11
Sample Matrix					Ground Water	Ground Water
Sample Date					26/11/2024	26/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
General Chemistry						
UV Transmittance	%T				91.7	71.0
Alkalinity	mg/L as CaCO3	2	500		226	230
Bicarbonate	mg/L as CaCO3	2			226	230
Carbonate	mg/L as CaCO3	2			< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2
Colour	TCU	3	5		15	14
Conductivity	uS/cm	2			630	494
Total Suspended Solids	mg/L	2			7	163
Turbidity	NTU	0.10	5	1	0.75	37
Organic Nitrogen	mg/L	0.05	0.15		0.13	0.15
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.15	0.18
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	1	5		2	3
Total Organic Carbon	mg/L	1			2	3

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	15	16
				Sample Name	MW21-10	MW21-11
				Sample Matrix	Ground Water	Ground Water
				Sample Date	26/11/2024	26/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics						
Fluoride	mg/L	0.06		1.5	< 0.06	< 0.06
Bromide	mg/L	0.3			< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	5.17	1.80
Sulphate	mg/L	2	500		21	8
Sulphide	mg/L	0.02			< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05	100		266	301
Aluminum (total)	mg/L	0.001	0.1		0.041	0.210
Arsenic (total)	mg/L	0.0002		0.01	< 0.0002	0.0003
Boron (total)	mg/L	0.002		5	0.021	0.016
Barium (total)	mg/L	0.00008		1	0.152	0.0907
Beryllium (total)	mg/L	0.000007			< 0.000007	0.000028
Bismuth (total)	mg/L	0.00001			< 0.00001	< 0.00001
Cobalt (total)	mg/L	0.000004			0.000040	0.000148
Calcium (total)	mg/L	0.01			99.2	115
Cadmium (total)	mg/L	0.000003		0.005	< 0.000003	0.000005
Copper (total)	mg/L	0.001	1		< 0.001	< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00016	0.00064
Iron (total)	mg/L	0.007	0.3		0.034	0.291
Potassium (total)	mg/L	0.009			1.86	1.93
Magnesium (total)	mg/L	0.001			4.58	3.08
Manganese (total)	mg/L	0.00001	0.05		0.00297	0.0319

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	15	16
				Sample Name	MW21-10	MW21-11
				Sample Matrix	Ground Water	Ground Water
				Sample Date	26/11/2024	26/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics (continued)						
Molybdenum (total)	mg/L	0.0004			< 0.0004	< 0.0004
Nickel (total)	mg/L	0.0001			0.0001	0.0004
Sodium (total)	mg/L	0.01	200	20	31.5	13.0
Phosphorus (total)	mg/L	0.003			< 0.003	0.045
Lead (total)	mg/L	0.00009		0.01	< 0.00009	0.00066
Silicon (total)	mg/L	0.02			3.36	3.54
Silver (total)	mg/L	0.00005			< 0.00005	< 0.00005
Strontium (total)	mg/L	0.00008			0.244	0.255
Thallium (total)	mg/L	0.000005			< 0.000005	0.000010
Tin (total)	mg/L	0.00006			0.00026	< 0.00006
Titanium (total)	mg/L	0.0001			0.0020	0.0116
Antimony (total)	mg/L	0.0009		0.006	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00023	0.00015
Uranium (total)	mg/L	0.000002		0.02	0.000136	0.000221
Vanadium (total)	mg/L	0.00001			0.00023	0.00044
Zinc (total)	mg/L	0.002	5		< 0.002	0.003
Cation sum	meq/L	-9999			6.76	6.68
Anion Sum	meq/L	-9999			6.55	5.48
Anion-Cation Balance	% difference	-9999			1.56	9.83
Ion Ratio	none	-9999			1.03	1.22
Total Dissolved Solids (calculated)	mg/L	-9999			353	306
Conductivity (calculated)	uS/cm	-9999			665	608

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters/C. Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	15	16
				Sample Name	MW21-10	MW21-11
				Sample Matrix	Ground Water	Ground Water
				Sample Date	26/11/2024	26/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics (continued)						
Langeliers Index 4° C	@ 4° C	-9999			0.09	0.22
Saturation pH 4°C	pHs @ 4°C	-9999			7.61	7.53
Microbiology						
Total Coliform	cfu/100mL	0		0	0	4
E. Coli	cfu/100mL	0		0	0	1
Heterotrophic Plate Count (HPC)	cfu/1mL	0			72	35
Other (ORP)						
pH	No unit	0.05	8.5		7.70	7.75
Chloride	mg/L	1	250		54	24
Mercury (total)	mg/L	0.00001			< 0.00001	< 0.00001
Phenols						
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-01					
Colour	SM 2120	TCU	12	5	
Turbidity	SM 2130	NTU	>4000	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	3.01	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	1750	100	
Iron	SM 3030/EPA 200.8	mg/L	3.10	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	1.65	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	33.3		20
Total Coliform	SM 9222	cfu/100mL	< 20		0
E.Coli	SM 9222D	cfu/100mL	< 20		0
MW21-02					
Colour	SM 2120	TCU	14	5	
Turbidity	SM 2130	NTU	190	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.424	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	658	100	
Iron	SM 3030/EPA 200.8	mg/L	1.33	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.236	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	27.5		20
Total Coliform	SM 9222	cfu/100mL	12		0
E.Coli	SM 9222D	cfu/100mL	1		0
MW21-03					
Colour	SM 2120	TCU	19	5	
Turbidity	SM 2130	NTU	50	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.311	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	292	100	
Total Coliform	SM 9222	cfu/100mL	7		0
E.Coli	SM 9222D	cfu/100mL	1		0
MW21-04					
Colour	SM 2120	TCU	20	5	
Turbidity	SM 2130	NTU	>4000	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	1.82	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	3910	100	
Iron	SM 3030/EPA 200.8	mg/L	0.538	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	2.91	0.05	
Total Coliform	SM 9222	cfu/100mL	20		0
E.Coli	SM 9222D	cfu/100mL	30		0
MW21-05					
Organic Nitrogen		mg/L	0.29	0.15	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-05 (continued)					
Colour	SM 2120	TCU	16	5	
Turbidity	SM 2130	NTU	550	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	1.42	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	899	100	
Iron	SM 3030/EPA 200.8	mg/L	2.01	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.685	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	28.4		20
MW21-07					
Colour	SM 2120	TCU	12	5	
Turbidity	SM 2130	NTU	10	5	1
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	295	100	
Sodium	SM 3030/EPA 200.8	mg/L	29.8		20
Total Coliform	SM 9222	cfu/100mL	1		0
MW21-08					
Colour	SM 2120	TCU	14	5	
Turbidity	SM 2130	NTU	70	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.175	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	361	100	
Iron	SM 3030/EPA 200.8	mg/L	0.687	0.3	
Sodium	SM 3030/EPA 200.8	mg/L	27.4		20
Total Coliform	SM 9222	cfu/100mL	200		0
MW21-09					
Colour	SM 2120	TCU	12	5	
Turbidity	SM 2130	NTU	85	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.331	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	340	100	
Iron	SM 3030/EPA 200.8	mg/L	0.316	0.3	
Sodium	SM 3030/EPA 200.8	mg/L	29.6		20
MW21-10					
Colour	SM 2120	TCU	15	5	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	266	100	
Sodium	SM 3030/EPA 200.8	mg/L	31.5		20
MW21-11					
Colour	SM 2120	TCU	14	5	
Turbidity	SM 2130	NTU	37	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.210	0.1	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-11 (continued)					
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	301	100	
Total Coliform	SM 9222	cfu/100mL	4		0
E.Coli	SM 9222D	cfu/100mL	1		0

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0555-NOV24	mg/L as CaCO3	2	< 2	ND	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0238-NOV24	mg/L	0.04	<0.04	ND	10	96	90	110	95	75	125
Ammonia+Ammonium (N)	SKA0250-NOV24	mg/L	0.04	<0.04	6	10	98	90	110	90	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8046-NOV24	mg/L	1	<1	ND	20	100	80	120	98	75	125
Sulphate	DIO8046-NOV24	mg/L	2	<2	ND	20	104	80	120	99	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0650-NOV24	mg/L	0.3	<0.3	ND	20	99	90	110	93	75	125
Nitrite (as N)	DIO0650-NOV24	mg/L	0.03	<0.03	ND	20	103	90	110	105	75	125
Nitrate (as N)	DIO0650-NOV24	mg/L	0.06	<0.06	0	20	100	90	110	101	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0246-NOV24	mg/L	1	<1	1	20	97	90	110	98	75	125
Total Organic Carbon	SKA0246-NOV24	mg/L	1	<1	1	20	97	90	110	98	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0555-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0555-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
OH	EWL0555-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0603-NOV24	TCU	3	< 3	3	10	95	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0555-NOV24	uS/cm	2	< 2	0	20	98	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0556-NOV24	mg/L	0.06	<0.06	ND	10	93	90	110	95	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0071-NOV24	mg/L	0.00001	< 0.00001	ND	20	114	80	120	127	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0320-NOV24	mg/L	0.00005	<0.00005	ND	20	103	90	110	84	70	130
Aluminum (total)	EMS0320-NOV24	mg/L	0.001	<0.001	ND	20	103	90	110	98	70	130
Arsenic (total)	EMS0320-NOV24	mg/L	0.0002	<0.0002	ND	20	105	90	110	102	70	130
Barium (total)	EMS0320-NOV24	mg/L	0.00008	<0.00008	ND	20	103	90	110	101	70	130
Beryllium (total)	EMS0320-NOV24	mg/L	0.000007	<0.000007	ND	20	98	90	110	96	70	130
Boron (total)	EMS0320-NOV24	mg/L	0.002	<0.002	ND	20	102	90	110	92	70	130
Bismuth (total)	EMS0320-NOV24	mg/L	0.00001	<0.00001	ND	20	104	90	110	102	70	130
Calcium (total)	EMS0320-NOV24	mg/L	0.01	<0.01	ND	20	103	90	110	100	70	130
Cadmium (total)	EMS0320-NOV24	mg/L	0.000003	<0.000003	ND	20	103	90	110	105	70	130
Cobalt (total)	EMS0320-NOV24	mg/L	0.000004	<0.000004	ND	20	101	90	110	93	70	130
Chromium (total)	EMS0320-NOV24	mg/L	0.00008	<0.00008	ND	20	108	90	110	104	70	130
Copper (total)	EMS0320-NOV24	mg/L	0.001	<0.001	ND	20	107	90	110	102	70	130
Iron (total)	EMS0320-NOV24	mg/L	0.007	<0.007	ND	20	100	90	110	100	70	130
Potassium (total)	EMS0320-NOV24	mg/L	0.009	<0.009	ND	20	101	90	110	101	70	130
Magnesium (total)	EMS0320-NOV24	mg/L	0.001	<0.001	ND	20	100	90	110	97	70	130
Manganese (total)	EMS0320-NOV24	mg/L	0.00001	<0.00001	ND	20	106	90	110	101	70	130
Molybdenum (total)	EMS0320-NOV24	mg/L	0.0004	<0.0004	ND	20	105	90	110	80	70	130
Sodium (total)	EMS0320-NOV24	mg/L	0.01	<0.01	ND	20	101	90	110	98	70	130
Nickel (total)	EMS0320-NOV24	mg/L	0.0001	<0.0001	ND	20	106	90	110	96	70	130
Lead (total)	EMS0320-NOV24	mg/L	0.00009	<0.00009	ND	20	103	90	110	99	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0320-NOV24	mg/L	0.003	<0.003	ND	20	96	90	110	NV	70	130
Antimony (total)	EMS0320-NOV24	mg/L	0.0009	<0.0009	ND	20	107	90	110	118	70	130
Selenium (total)	EMS0320-NOV24	mg/L	0.00004	<0.00004	ND	20	105	90	110	99	70	130
Silicon (total)	EMS0320-NOV24	mg/L	0.02	<0.02	ND	20	100	90	110	NV	70	130
Tin (total)	EMS0320-NOV24	mg/L	0.00006	<0.00006	ND	20	101	90	110	NV	70	130
Strontium (total)	EMS0320-NOV24	mg/L	0.00008	<0.00008	ND	20	101	90	110	93	70	130
Titanium (total)	EMS0320-NOV24	mg/L	0.0001	<0.0001	ND	20	102	90	110	NV	70	130
Thallium (total)	EMS0320-NOV24	mg/L	0.000005	<0.000005	ND	20	103	90	110	84	70	130
Uranium (total)	EMS0320-NOV24	mg/L	0.000002	<0.000002	ND	20	100	90	110	95	70	130
Vanadium (total)	EMS0320-NOV24	mg/L	0.00001	<0.00001	ND	20	106	90	110	102	70	130
Zinc (total)	EMS0320-NOV24	mg/L	0.002	<0.002	ND	20	105	90	110	103	70	130
Calcium (total)	EMS0360-NOV24	mg/L	0.01	<0.01	2	20	102	90	110	108	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9383-NOV24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9383-NOV24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9383-NOV24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0555-NOV24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0248-NOV24	mg/L	0.002	<0.002	ND	10	100	80	120	92	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0247-NOV24	mg/L	0.02	<0.02	ND	20	98	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0564-NOV24	mg/L	2	< 2	5	10	96	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0242-NOV24	mg/L	0.05	<0.05	6	10	99	90	110	79	75	125
Total Kjeldahl Nitrogen (N)	SKA0253-NOV24	mg/L	0.05	<0.05	2	10	98	90	110	110	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0551-NOV24	NTU	0.10	< 0.10	0	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm.
The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 034934

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page ____ of ____

Laboratory Information Section - Lab use only

Received By: ____ Received By (signature): ____
Received Date: NOV 26 2024 (mm/dd/yy) Custody Seal Present: Yes ☒ No ☐ Cooling Agent Present: Yes ☒ No ☐ Type: ICE
Received Time: 15 : 50 (hr : min) Custody Seal Intact: Yes ☒ No ☐ Temperature Upon Receipt (°C) 10 , 11 , 8
CA-12818-NOV24 ADD
LAB LIMS #: ____ QC

REPORT INFORMATION

Company: D.M. Wills
Contact: L. Tuters
Address: 150 Jameson Dr. Peterborough
Phone: 289-385-6230
Fax: ____
Email: ltuters@dmwills.com

INVOICE INFORMATION

☑ (same as Report Information)
Company: ____
Contact: ____
Address: ____
Phone: ____
Email: accounts@dmwills.com

Quotation #: ____ P.O. #: 7549
Project #: 7549 Site Location/ID: ____

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day
RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION
Specify Due Date: ____
*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other: ____
☐ MISA ____
☑ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality: ____

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH, (B(HWS), EC, SAR–soil), (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS–soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs (all incl PAHs, ABNs, CPs	PCB: PCBs (Total ☐ Aroclor ☐)	PHC: F1-F4 + BTEX	PHC: F1-F4 only (no BTEX	VOC: VOCs (all incl BTEX	VOC: BTEX only	Pest: Pesticides (Organochlorine or specify other	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Sewer Use: (Specify pkg:)	Water Characterization Pkg (General ☑ Extended ☐)	SPLP (Specify tests)	TCLP (Specify tests)	COMMENTS:
1	MW21-01	NOV 26/24	AM	15	GW	→	received	↓	↓	15	bottles												X	☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	
2	MW21-02		AM			↓	"	"		13	"												X			
3	MW21-03		AM			↓	"	"		14	"												X			
4	MW21-04		AM			↓	"	"		15	"												X			
5	MW21-05		PM			↓	"	"		14	"												X			
6	MW21-07		PM																				X			
7	MW21-08		PM																				X			
8	MW21-09		PM																				X			
9	MW21-10		PM																				X			
10	MW21-11		AM			↓	"	"		15	"												X			10x EC
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): L. Tuters/ C-Ostic Signature: L. Tuters Date: NOV / 26 / 2024 (mm/dd/yy) Pink Copy - Client
Relinquished by (NAME): L. Tuters Signature: L. Tuters Date: NOV / 26 / 2024 (mm/dd/yy) Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





FINAL REPORT

CA15001-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	D.M. Wills -Peterborough	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Lynsey Tuters	Telephone	2165
Telephone	289-385-6230	Facsimile	705-652-6365
Facsimile	705-741-3568	Email	jill.campbell@sgs.com
Email	ltuters@dmwills.com	SGS Reference	CA15001-DEC24
Project	7549	Received	12/02/2024
Order Number		Approved	12/09/2024
Samples	Ground Water (1)	Report Number	CA15001-DEC24 R1
		Date Reported	12/09/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

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

Chain of Custody Number: 034932

SIGNATORIES

Member of the SGS Group (SGS SA)

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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Ralf Bolvin

MATRIX: WATER

Sample Number	7
Sample Name	Well 5-1HR
Sample Matrix	Ground Water
Sample Date	02/12/2024

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

General Chemistry

Parameter	Units	RL	L1	L2	Result
UV Transmittance	%T				92.1
Alkalinity	mg/L as CaCO3	2	500		233
Bicarbonate	mg/L as CaCO3	2			233
Carbonate	mg/L as CaCO3	2			< 2
OH	mg/L as CaCO3	2			< 2
Colour	TCU	3	5		15
Conductivity	uS/cm	2			636
Total Suspended Solids	mg/L	2			< 2
Turbidity	NTU	0.10	5	1	0.29
Organic Nitrogen	mg/L	0.05	0.15		< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04
Dissolved Organic Carbon	mg/L	1	5		2
Total Organic Carbon	mg/L	1			2

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Ralf Bolvin

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well 5-1HR
Sample Matrix	Ground Water
Sample Date	02/12/2024

Metals and Inorganics

Parameter	Units	RL	L1	L2	Result
Fluoride	mg/L	0.06		1.5	< 0.06
Bromide	mg/L	0.3			< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	4.98
Sulphate	mg/L	2	500		20
Sulphide	mg/L	0.02			< 0.02
Hardness	mg/L as CaCO3	0.05	100		261
Aluminum (total)	mg/L	0.001	0.1		< 0.001
Arsenic (total)	mg/L	0.0002		0.01	< 0.0002
Boron (total)	mg/L	0.002		5	0.020
Barium (total)	mg/L	0.00008		1	0.148
Beryllium (total)	mg/L	0.000007			< 0.000007
Bismuth (total)	mg/L	0.00001			< 0.00001
Cobalt (total)	mg/L	0.000004			0.000041
Calcium (total)	mg/L	0.01			96.2
Cadmium (total)	mg/L	0.000003		0.005	< 0.000003
Copper (total)	mg/L	0.001	1		< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00013
Iron (total)	mg/L	0.007	0.3		< 0.007
Potassium (total)	mg/L	0.009			1.98
Magnesium (total)	mg/L	0.001			5.09
Manganese (total)	mg/L	0.00001	0.05		0.00017

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Ralf Bolvin

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well 5-1HR
Sample Matrix	Ground Water
Sample Date	02/12/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Molybdenum (total)	mg/L	0.0004			< 0.0004
Nickel (total)	mg/L	0.0001			0.0002
Sodium (total)	mg/L	0.01	200	20	32.3
Phosphorus (total)	mg/L	0.003			< 0.003
Lead (total)	mg/L	0.00009		0.01	< 0.00009
Silicon (total)	mg/L	0.02			2.92
Silver (total)	mg/L	0.00005			< 0.00005
Strontium (total)	mg/L	0.00008			0.279
Thallium (total)	mg/L	0.000005			< 0.000005
Tin (total)	mg/L	0.00006			< 0.00006
Titanium (total)	mg/L	0.0001			< 0.0001
Antimony (total)	mg/L	0.0009		0.006	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00022
Uranium (total)	mg/L	0.000002		0.02	0.000139
Vanadium (total)	mg/L	0.00001			0.00018
Zinc (total)	mg/L	0.002	5		0.002
Cation sum	meq/L	-9999			6.69
Anion Sum	meq/L	-9999			6.70
Anion-Cation Balance	% difference	-9999			-0.06
Ion Ratio	none	-9999			1.00
Total Dissolved Solids (calculated)	mg/L	-9999			355
Conductivity (calculated)	uS/cm	-9999			669

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Ralf Bolvin

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well 5-1HR
Sample Matrix	Ground Water
Sample Date	02/12/2024

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Langeliers Index 4° C	@ 4° C	-9999			0.01
Saturation pH 4°C	pHs @ 4°C	-9999			7.61
Microbiology					
Total Coliform	cfu/100mL	0		0	0
E. Coli	cfu/100mL	0		0	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0			25
Fecal Coliform	cfu/100mL	0			0
Other (ORP)					
pH	No unit	0.05	8.5		7.62
Chloride	mg/L	1	250		55
Mercury (total)	mg/L	0.00001			< 0.00001
Phenols					
4AAP-Phenolics	mg/L	0.002			< 0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
Well 5-1HR					
Colour	SM 2120	TCU	15	5	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	261	100	
Sodium	SM 3030/EPA 200.8	mg/L	32.3		20

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0028-DEC24	mg/L as CaCO3	2	< 2	1	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0030-DEC24	mg/L	0.04	<0.04	ND	10	101	90	110	96	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8001-DEC24	mg/L	1	<1	ND	20	99	80	120	100	75	125
Sulphate	DIO8001-DEC24	mg/L	2	<2	ND	20	106	80	120	102	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0037-DEC24	mg/L	0.3	<0.3	ND	20	101	90	110	99	75	125
Nitrite (as N)	DIO0037-DEC24	mg/L	0.03	<0.03	ND	20	100	90	110	102	75	125
Nitrate (as N)	DIO0037-DEC24	mg/L	0.06	<0.06	0	20	100	90	110	97	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0027-DEC24	mg/L	1	<1	5	20	97	90	110	91	75	125
Total Organic Carbon	SKA0027-DEC24	mg/L	1	<1	5	20	97	90	110	91	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0028-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0028-DEC24	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0028-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0034-DEC24	TCU	3	< 3	0	10	100	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0028-DEC24	uS/cm	2	< 2	2	20	98	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0031-DEC24	mg/L	0.06	<0.06	4	10	97	90	110	91	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0003-DEC24	mg/L	0.00001	< 0.00001	ND	20	120	80	120	122	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0014-DEC24	mg/L	0.00005	<0.00005	ND	20	96	90	110	94	70	130
Aluminum (total)	EMS0014-DEC24	mg/L	0.001	<0.001	ND	20	100	90	110	107	70	130
Arsenic (total)	EMS0014-DEC24	mg/L	0.0002	<0.0002	ND	20	96	90	110	100	70	130
Barium (total)	EMS0014-DEC24	mg/L	0.00008	<0.00008	ND	20	93	90	110	96	70	130
Beryllium (total)	EMS0014-DEC24	mg/L	0.000007	<0.000007	ND	20	105	90	110	110	70	130
Boron (total)	EMS0014-DEC24	mg/L	0.002	<0.002	0	20	97	90	110	85	70	130
Bismuth (total)	EMS0014-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	89	70	130
Calcium (total)	EMS0014-DEC24	mg/L	0.01	<0.01	ND	20	99	90	110	98	70	130
Cadmium (total)	EMS0014-DEC24	mg/L	0.000003	<0.000003	ND	20	97	90	110	118	70	130
Cobalt (total)	EMS0014-DEC24	mg/L	0.000004	<0.000004	ND	20	92	90	110	112	70	130
Chromium (total)	EMS0014-DEC24	mg/L	0.00008	<0.00008	ND	20	91	90	110	104	70	130
Copper (total)	EMS0014-DEC24	mg/L	0.001	<0.001	ND	20	96	90	110	116	70	130
Iron (total)	EMS0014-DEC24	mg/L	0.007	<0.007	ND	20	102	90	110	100	70	130
Potassium (total)	EMS0014-DEC24	mg/L	0.009	<0.009	ND	20	107	90	110	103	70	130
Magnesium (total)	EMS0014-DEC24	mg/L	0.001	<0.001	0	20	107	90	110	103	70	130
Manganese (total)	EMS0014-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	108	70	130
Molybdenum (total)	EMS0014-DEC24	mg/L	0.0004	<0.0004	ND	20	101	90	110	97	70	130
Sodium (total)	EMS0014-DEC24	mg/L	0.01	<0.01	0	20	100	90	110	94	70	130
Nickel (total)	EMS0014-DEC24	mg/L	0.0001	<0.0001	ND	20	95	90	110	102	70	130
Lead (total)	EMS0014-DEC24	mg/L	0.00009	<0.00009	ND	20	93	90	110	100	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0014-DEC24	mg/L	0.003	<0.003	ND	20	100	90	110	NV	70	130
Antimony (total)	EMS0014-DEC24	mg/L	0.0009	<0.0009	ND	20	100	90	110	105	70	130
Selenium (total)	EMS0014-DEC24	mg/L	0.00004	<0.00004	ND	20	97	90	110	105	70	130
Silicon (total)	EMS0014-DEC24	mg/L	0.02	<0.02	2	20	99	90	110	NV	70	130
Tin (total)	EMS0014-DEC24	mg/L	0.00006	<0.00006	ND	20	98	90	110	NV	70	130
Strontium (total)	EMS0014-DEC24	mg/L	0.00008	<0.00008	ND	20	99	90	110	101	70	130
Titanium (total)	EMS0014-DEC24	mg/L	0.0001	<0.0001	ND	20	101	90	110	NV	70	130
Thallium (total)	EMS0014-DEC24	mg/L	0.000005	<0.000005	ND	20	94	90	110	108	70	130
Uranium (total)	EMS0014-DEC24	mg/L	0.000002	<0.000002	ND	20	95	90	110	111	70	130
Vanadium (total)	EMS0014-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	107	70	130
Zinc (total)	EMS0014-DEC24	mg/L	0.002	<0.002	ND	20	95	90	110	120	70	130

QC SUMMARY

Microbiology

Method: SM 9215A | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Heterotrophic Plate Count (HPC)	BAC9009-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9009-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9009-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Fecal Coliform	BAC9086-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0028-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0026-DEC24	mg/L	0.002	<0.002	ND	10	104	80	120	104	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0028-DEC24	mg/L	0.02	<0.02	ND	20	99	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0026-DEC24	mg/L	2	< 2	1	10	96	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0029-DEC24	mg/L	0.05	<0.05	1	10	100	90	110	105	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0023-DEC24	NTU	0.10	< 0.10	1	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 034932 Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Siri Romard. Received By (signature): Siri Romard.
Received Date: 12/02/24 (mm/dd/yy) Custody Seal Present: Yes ☑ No ☐ Cooling Agent Present: Yes ☑ No ☐ Type: ICE/SNOW.
Received Time: 16 : 30 (hr : min) Custody Seal Intact: Yes ☑ No ☐ Temperature Upon Receipt (°C) 7.10.7. LAB LIMS #: CA 15001-DEC24

SR

REPORT INFORMATION

Company: DM Wills
Contact: ltuters@dmwills.com
Address: 150 Jameson Dr. Peterborough
Phone: 289 385 6230
Fax: Lynsey TUTERS
Email: ltuters@dmwills.com

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email: accounts@dmwills.com

Quotation #: P.O. #: 7549
Project #: 7549 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: *NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA ☒ ODWS Not Reportable *See note

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)					Sewer Use: Specify pkg:	Water Characterization Pkg: Extended ☒ General ☐	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	Well 5 - 1HR	Dec. 2, 2024	3:10 PM	14	GW	N																X			
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): Ralf BOLVIN Signature: Date: 12/02/24 (mm/dd/yy)
Relinquished by (NAME): Ralf BOLVIN Signature: Date: 12/02/24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





FINAL REPORT

CA15035-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

First Page

CLIENT DETAILS

Client	D.M. Wills -Peterborough
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada
Contact	Lynsey Tuters
Telephone	289-385-6230
Facsimile	705-741-3568
Email	ltuters@dmwills.com
Project	7549
Order Number	
Samples	Solution (1)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA15035-DEC24
Received	12/04/2024
Approved	12/11/2024
Report Number	CA15035-DEC24 R1
Date Reported	12/11/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

Temperature of Sample upon Receipt: 6 degrees C
Cooling Agent Present: YES
Custody Seal Present: YES

Chain of Custody Number: 034930

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

Sample Number	7
Sample Name	Well5_34hr
Sample Matrix	Solution
Sample Date	04/12/2024

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

General Chemistry

Parameter	Units	RL	L1	L2	Result
UV Transmittance	%T				92.2
Alkalinity	mg/L as CaCO3	2	500		223
Bicarbonate	mg/L as CaCO3	2			223
Carbonate	mg/L as CaCO3	2			< 2
OH	mg/L as CaCO3	2			< 2
Colour	TCU	3	5		7
Conductivity	uS/cm	2			628
Total Suspended Solids	mg/L	2			< 2
Turbidity	NTU	0.10	5	1	0.35
Organic Nitrogen	mg/L	0.05	0.15		< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04
Dissolved Organic Carbon	mg/L	1	5		2
Total Organic Carbon	mg/L	1			2

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well5_34hr
Sample Matrix	Solution
Sample Date	04/12/2024

Metals and Inorganics

Parameter	Units	RL	L1	L2	Result
Fluoride	mg/L	0.06		1.5	< 0.06
Bromide	mg/L	0.3			< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	4.51
Sulphate	mg/L	2	500		18
Sulphide	mg/L	0.02			< 0.02
Hardness	mg/L as CaCO3	0.05	100		270
Aluminum (total)	mg/L	0.001	0.1		< 0.001
Arsenic (total)	mg/L	0.0002		0.01	< 0.0002
Boron (total)	mg/L	0.002		5	0.019
Barium (total)	mg/L	0.00008		1	0.158
Beryllium (total)	mg/L	0.000007			< 0.000007
Bismuth (total)	mg/L	0.00001			< 0.00001
Cobalt (total)	mg/L	0.000004			0.000029
Calcium (total)	mg/L	0.01			100
Cadmium (total)	mg/L	0.000003		0.005	< 0.000003
Copper (total)	mg/L	0.001	1		< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00016
Iron (total)	mg/L	0.007	0.3		< 0.007
Potassium (total)	mg/L	0.009			2.07
Magnesium (total)	mg/L	0.001			4.77
Manganese (total)	mg/L	0.00001	0.05		0.00009

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well5_34hr
Sample Matrix	Solution
Sample Date	04/12/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Molybdenum (total)	mg/L	0.0004			< 0.0004
Nickel (total)	mg/L	0.0001			0.0002
Sodium (total)	mg/L	0.01	200	20	33.1
Phosphorus (total)	mg/L	0.003			< 0.003
Lead (total)	mg/L	0.00009		0.01	< 0.00009
Silicon (total)	mg/L	0.02			2.96
Silver (total)	mg/L	0.00005			< 0.00005
Strontium (total)	mg/L	0.00008			0.285
Thallium (total)	mg/L	0.000005			< 0.000005
Tin (total)	mg/L	0.00006			< 0.00006
Titanium (total)	mg/L	0.0001			< 0.0001
Antimony (total)	mg/L	0.0009		0.006	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00020
Uranium (total)	mg/L	0.000002		0.02	0.000133
Vanadium (total)	mg/L	0.00001			0.00017
Zinc (total)	mg/L	0.002	5		0.004
Cation sum	meq/L	-9999			6.89
Anion Sum	meq/L	-9999			6.33
Anion-Cation Balance	% difference	-9999			4.22
Ion Ratio	none	-9999			1.09
Total Dissolved Solids (calculated)	mg/L	-9999			347
Conductivity (calculated)	uS/cm	-9999			661

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

Sample Number	7
Sample Name	Well5_34hr
Sample Matrix	Solution
Sample Date	04/12/2024

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Langeliers Index 4° C	@ 4° C	-9999			0.13
Saturation pH 4°C	pHs @ 4°C	-9999			7.61
Microbiology					
Total Coliform	cfu/100mL	0		0	0
E. Coli	cfu/100mL	0		0	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0			66
Fecal Coliform	cfu/100mL	0			0
Other (ORP)					
pH	No unit	0.05	8.5		7.74
Chloride	mg/L	1	250		51
Mercury (total)	mg/L	0.00001			< 0.00001
Phenols					
4AAP-Phenolics	mg/L	0.002			< 0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
Well5_34hr					
Colour	SM 2120	TCU	7	5	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	270	100	
Sodium	SM 3030/EPA 200.8	mg/L	33.1		20

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0090-DEC24	mg/L as CaCO3	2	< 2	1	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0049-DEC24	mg/L	0.04	<0.04	ND	10	99	90	110	96	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8006-DEC24	mg/L	1	<1	0	20	98	80	120	87	75	125
Sulphate	DIO8006-DEC24	mg/L	2	<2	1	20	103	80	120	100	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0096-DEC24	mg/L	0.3	<0.3	ND	20	98	90	110	78	75	125
Nitrite (as N)	DIO0096-DEC24	mg/L	0.03	<0.03	ND	20	98	90	110	102	75	125
Nitrate (as N)	DIO0096-DEC24	mg/L	0.06	<0.06	0	20	99	90	110	97	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0050-DEC24	mg/L	1	<1	2	20	101	90	110	100	75	125
Total Organic Carbon	SKA0050-DEC24	mg/L	1	<1	2	20	101	90	110	100	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0090-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0090-DEC24	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0090-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0100-DEC24	TCU	3	< 3	9	10	100	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0090-DEC24	uS/cm	2	< 2	3	20	99	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0092-DEC24	mg/L	0.06	<0.06	0	10	102	90	110	99	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0009-DEC24	mg/L	0.00001	< 0.00001	ND	20	95	80	120	119	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0060-DEC24	mg/L	0.00005	<0.00005	ND	20	97	90	110	78	70	130
Aluminum (total)	EMS0060-DEC24	mg/L	0.001	<0.001	1	20	94	90	110	118	70	130
Arsenic (total)	EMS0060-DEC24	mg/L	0.0002	<0.0002	2	20	94	90	110	113	70	130
Barium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	0	20	95	90	110	94	70	130
Beryllium (total)	EMS0060-DEC24	mg/L	0.000007	<0.000007	ND	20	92	90	110	103	70	130
Boron (total)	EMS0060-DEC24	mg/L	0.002	<0.002	1	20	105	90	110	107	70	130
Bismuth (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	110	70	130
Calcium (total)	EMS0060-DEC24	mg/L	0.01	<0.01	1	20	101	90	110	100	70	130
Cadmium (total)	EMS0060-DEC24	mg/L	0.000003	<0.000003	19	20	97	90	110	108	70	130
Cobalt (total)	EMS0060-DEC24	mg/L	0.000004	<0.000004	4	20	99	90	110	109	70	130
Chromium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	13	20	93	90	110	105	70	130
Copper (total)	EMS0060-DEC24	mg/L	0.001	<0.001	1	20	96	90	110	113	70	130
Iron (total)	EMS0060-DEC24	mg/L	0.007	<0.007	8	20	102	90	110	125	70	130
Potassium (total)	EMS0060-DEC24	mg/L	0.009	<0.009	1	20	105	90	110	98	70	130
Magnesium (total)	EMS0060-DEC24	mg/L	0.001	<0.001	2	20	100	90	110	95	70	130
Manganese (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	2	20	100	90	110	107	70	130
Molybdenum (total)	EMS0060-DEC24	mg/L	0.0004	<0.0004	2	20	102	90	110	123	70	130
Sodium (total)	EMS0060-DEC24	mg/L	0.01	<0.01	2	20	103	90	110	99	70	130
Nickel (total)	EMS0060-DEC24	mg/L	0.0001	<0.0001	2	20	93	90	110	97	70	130
Lead (total)	EMS0060-DEC24	mg/L	0.00009	<0.00009	7	20	95	90	110	103	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0060-DEC24	mg/L	0.003	<0.003	0	20	102	90	110	NV	70	130
Antimony (total)	EMS0060-DEC24	mg/L	0.0009	<0.0009	ND	20	97	90	110	112	70	130
Selenium (total)	EMS0060-DEC24	mg/L	0.00004	<0.00004	8	20	92	90	110	107	70	130
Silicon (total)	EMS0060-DEC24	mg/L	0.02	<0.02	4	20	97	90	110	NV	70	130
Tin (total)	EMS0060-DEC24	mg/L	0.00006	<0.00006	5	20	102	90	110	NV	70	130
Strontium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	1	20	95	90	110	99	70	130
Titanium (total)	EMS0060-DEC24	mg/L	0.0001	<0.0001	10	20	98	90	110	NV	70	130
Thallium (total)	EMS0060-DEC24	mg/L	0.000005	<0.000005	15	20	96	90	110	105	70	130
Uranium (total)	EMS0060-DEC24	mg/L	0.000002	<0.000002	5	20	96	90	110	112	70	130
Vanadium (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	0	20	95	90	110	109	70	130
Zinc (total)	EMS0060-DEC24	mg/L	0.002	<0.002	1	20	96	90	110	119	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Fecal Coliform	BAC9080-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9080-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9080-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9105-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0090-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0047-DEC24	mg/L	0.002	<0.002	ND	10	99	80	120	100	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0059-DEC24	mg/L	0.02	<0.02	ND	20	99	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0088-DEC24	mg/L	2	< 2	9	10	93	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0056-DEC24	mg/L	0.05	<0.05	ND	10	100	90	110	99	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0084-DEC24	NTU	0.10	< 0.10	5	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 034930

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Nishi Patel
Received By (signature): NP
Received Date: DEC 04 2024 (mm/dd/yy)
Received Time: 15:30 (hr : min)
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ice bag
Temperature Upon Receipt (°C): 6, 6, 5
LAB LIMS #: CA-15035-DEC 24 NP

REPORT INFORMATION

Company: DM WILLS
Contact: LYNSEY TUTERS
Address: 150 JAMESON DRIVE
PETERBOROUGH, ON
Phone: 289-385-6230
Fax:
Email: ltuters@dmwills.com

INVOICE INFORMATION

☑ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email: accounts@dmwills.com

Quotation #:
P.O. #: 7549
Project #: 7549
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:
*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☑ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☑ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS–soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)					SPLP: Specify tests	TCLP: Specify tests	COMMENTS:
																			FECAL Coliforms ✓	Sewer Use: Specify pkg:	Water Characterization Pkg ☑ General ☐ Extended ☐	☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	
1	Well5_34hr	DEC 4/24	12 AM	15	GW	N																		
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

Observations/Comments/Special Instructions

Sampled By (NAME): CHRIS OSTIC Signature: Chris Ostic Date: 12, 04, 24 (mm/dd/yy)
Relinquished by (NAME): CHRIS OSTIC Signature: Chris Ostic Date: 12, 04, 24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





FINAL REPORT

CA15454-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

CA15454-DEC24 R1

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	D.M. Wills -Peterborough	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Lynsey Tuters	Telephone	2165
Telephone	289-385-6230	Facsimile	705-652-6365
Facsimile	705-741-3568	Email	jill.campbell@sgs.com
Email	ltuters@dmwills.com	SGS Reference	CA15454-DEC24
Project	7549	Received	12/05/2024
Order Number		Approved	12/12/2024
Samples	Ground Water (1)	Report Number	CA15454-DEC24 R1
		Date Reported	01/08/2025

COMMENTS

MAC - Maximum Acceptable Concentration

AO/OG - Aesthetic Objective / Operational Guideline

NR - Not reportable under applicable Provincial drinking water regulations as per client.

SIGNATORIES

Jill Campbell, B.Sc.,GISAS



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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L Tuters

MATRIX: WATER

Sample Number	7
Sample Name	Well 5-72hr
Sample Matrix	Ground Water
Sample Date	05/12/2024

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

General Chemistry

Parameter	Units	RL	L1	L2	Result
UV Transmittance	%T				92.0
Alkalinity	mg/L as CaCO3	2	500		233
Bicarbonate	mg/L as CaCO3	2			233
Carbonate	mg/L as CaCO3	2			< 2
OH	mg/L as CaCO3	2			< 2
Colour	TCU	3	5		21
Conductivity	uS/cm	2			613
Total Suspended Solids	mg/L	2			2
Turbidity	NTU	0.10	5	1	0.20
Organic Nitrogen	mg/L	0.05	0.15		< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04
Dissolved Organic Carbon	mg/L	1	5		2
Total Organic Carbon	mg/L	1			2

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well 5-72hr
Sample Matrix	Ground Water
Sample Date	05/12/2024

Metals and Inorganics

Parameter	Units	RL	L1	L2	Result
Residual chlorine	mg/L	0.02			< 0.02
Fluoride	mg/L	0.06		1.5	< 0.06
Bromide	mg/L	0.3			< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	4.46
Sulphate	mg/L	2	500		19
Sulphide	mg/L	0.02			< 0.02
Hardness	mg/L as CaCO3	0.05	100		293
Aluminum (total)	mg/L	0.001	0.1		< 0.001
Arsenic (total)	mg/L	0.0002		0.01	< 0.0002
Boron (total)	mg/L	0.002		5	0.021
Barium (total)	mg/L	0.00008		1	0.158
Beryllium (total)	mg/L	0.000007			< 0.000007
Bismuth (total)	mg/L	0.00001			0.00003
Cobalt (total)	mg/L	0.000004			0.000031
Calcium (total)	mg/L	0.01			109
Cadmium (total)	mg/L	0.000003		0.005	0.000004
Copper (total)	mg/L	0.001	1		< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00015
Iron (total)	mg/L	0.007	0.3		< 0.007
Potassium (total)	mg/L	0.009			2.12
Magnesium (total)	mg/L	0.001			4.75

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7
Sample Name	Well 5-72hr
Sample Matrix	Ground Water
Sample Date	05/12/2024

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Manganese (total)	mg/L	0.00001	0.05		0.00006
Molybdenum (total)	mg/L	0.0004			< 0.0004
Nickel (total)	mg/L	0.0001			< 0.0001
Sodium (total)	mg/L	0.01	200	20	31.7
Phosphorus (total)	mg/L	0.003			< 0.003
Lead (total)	mg/L	0.00009		0.01	< 0.00009
Silicon (total)	mg/L	0.02			3.57
Silver (total)	mg/L	0.00005			< 0.00005
Strontium (total)	mg/L	0.00008			0.262
Thallium (total)	mg/L	0.000005			0.000053
Tin (total)	mg/L	0.00006			< 0.00006
Titanium (total)	mg/L	0.0001			< 0.0001
Antimony (total)	mg/L	0.0009		0.006	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00020
Uranium (total)	mg/L	0.000002		0.02	0.000158
Vanadium (total)	mg/L	0.00001			0.00016
Zinc (total)	mg/L	0.002	5		0.003
Cation sum	meq/L	-9999			7.29
Anion Sum	meq/L	-9999			6.53
Anion-Cation Balance	% difference	-9999			5.55
Ion Ratio	none	-9999			1.12
Total Dissolved Solids (calculated)	mg/L	-9999			361

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L Tuters

MATRIX: WATER

Sample Number	7
Sample Name	Well 5-72hr
Sample Matrix	Ground Water
Sample Date	05/12/2024

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Conductivity (calculated)	uS/cm	-9999			691
Langeliers Index 4° C	@ 4° C	-9999			0.21
Saturation pH 4°C	pHs @ 4°C	-9999			7.56
Microbiology					
Total Coliform	cfu/100mL	0		0	0
E. Coli	cfu/100mL	0		0	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0			4
Fecal Coliform	cfu/100mL	0			0
Other (ORP)					
pH	No unit	0.05	8.5		7.77
Chloride	mg/L	1	250		50
Mercury (total)	mg/L	0.00001			< 0.00001
Phenols					
4AAP-Phenolics	mg/L	0.002			0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
Well 5-72hr					
Colour	SM 2120	TCU	21	5	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	293	100	
Sodium	SM 3030/EPA 200.8	mg/L	31.7		20

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0131-DEC24	mg/L as CaCO3	2	< 2	ND	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0071-DEC24	mg/L	0.04	<0.04	2	10	101	90	110	90	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8007-DEC24	mg/L	1	<1	ND	20	97	80	120	101	75	125
Sulphate	DIO8007-DEC24	mg/L	2	<2	ND	20	106	80	120	106	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0132-DEC24	mg/L	0.3	<0.3	ND	20	106	90	110	94	75	125
Nitrite (as N)	DIO0132-DEC24	mg/L	0.03	<0.03	ND	20	100	90	110	102	75	125
Nitrate (as N)	DIO0132-DEC24	mg/L	0.06	<0.06	0	20	101	90	110	99	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0066-DEC24	mg/L	1	<1	4	20	105	90	110	109	75	125
Total Organic Carbon	SKA0066-DEC24	mg/L	1	<1	4	20	105	90	110	109	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0131-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0131-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
OH	EWL0131-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0124-DEC24	TCU	3	< 3	0	10	110	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0131-DEC24	uS/cm	2	< 2	2	20	96	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0119-DEC24	mg/L	0.06	<0.06	ND	10	97	90	110	94	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0011-DEC24	mg/L	0.00001	< 0.00001	ND	20	120	80	120	NV	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0069-DEC24	mg/L	0.00005	<0.00005	ND	20	104	90	110	78	70	130
Aluminum (total)	EMS0069-DEC24	mg/L	0.001	<0.001	1	20	93	90	110	115	70	130
Arsenic (total)	EMS0069-DEC24	mg/L	0.0002	<0.0002	ND	20	96	90	110	108	70	130
Barium (total)	EMS0069-DEC24	mg/L	0.00008	<0.00008	4	20	97	90	110	114	70	130
Beryllium (total)	EMS0069-DEC24	mg/L	0.000007	<0.000007	ND	20	95	90	110	96	70	130
Boron (total)	EMS0069-DEC24	mg/L	0.002	<0.002	3	20	95	90	110	95	70	130
Bismuth (total)	EMS0069-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	100	70	130
Calcium (total)	EMS0069-DEC24	mg/L	0.01	<0.01	2	20	102	90	110	122	70	130
Cadmium (total)	EMS0069-DEC24	mg/L	0.000003	<0.000003	ND	20	98	90	110	104	70	130
Cobalt (total)	EMS0069-DEC24	mg/L	0.000004	<0.000004	0	20	96	90	110	109	70	130
Chromium (total)	EMS0069-DEC24	mg/L	0.00008	<0.00008	16	20	102	90	110	99	70	130
Copper (total)	EMS0069-DEC24	mg/L	0.001	<0.001	2	20	104	90	110	106	70	130
Iron (total)	EMS0069-DEC24	mg/L	0.007	<0.007	ND	20	101	90	110	100	70	130
Potassium (total)	EMS0069-DEC24	mg/L	0.009	<0.009	7	20	102	90	110	119	70	130
Magnesium (total)	EMS0069-DEC24	mg/L	0.001	<0.001	0	20	103	90	110	115	70	130
Manganese (total)	EMS0069-DEC24	mg/L	0.00001	<0.00001	3	20	95	90	110	104	70	130
Molybdenum (total)	EMS0069-DEC24	mg/L	0.0004	<0.0004	ND	20	96	90	110	106	70	130
Sodium (total)	EMS0069-DEC24	mg/L	0.01	<0.01	0	20	100	90	110	110	70	130
Nickel (total)	EMS0069-DEC24	mg/L	0.0001	<0.0001	ND	20	109	90	110	118	70	130
Lead (total)	EMS0069-DEC24	mg/L	0.00009	<0.00009	ND	20	99	90	110	107	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0069-DEC24	mg/L	0.003	<0.003	ND	20	102	90	110	NV	70	130
Antimony (total)	EMS0069-DEC24	mg/L	0.0009	<0.0009	ND	20	109	90	110	121	70	130
Selenium (total)	EMS0069-DEC24	mg/L	0.00004	<0.00004	17	20	99	90	110	113	70	130
Silicon (total)	EMS0069-DEC24	mg/L	0.02	<0.02	2	20	93	90	110	NV	70	130
Tin (total)	EMS0069-DEC24	mg/L	0.00006	<0.00006	ND	20	97	90	110	NV	70	130
Strontium (total)	EMS0069-DEC24	mg/L	0.00008	<0.00008	0	20	96	90	110	107	70	130
Titanium (total)	EMS0069-DEC24	mg/L	0.0001	<0.0001	ND	20	95	90	110	NV	70	130
Thallium (total)	EMS0069-DEC24	mg/L	0.000005	<0.000005	ND	20	105	90	110	101	70	130
Uranium (total)	EMS0069-DEC24	mg/L	0.000002	<0.000002	ND	20	108	90	110	116	70	130
Vanadium (total)	EMS0069-DEC24	mg/L	0.00001	<0.00001	13	20	94	90	110	109	70	130
Zinc (total)	EMS0069-DEC24	mg/L	0.002	<0.002	5	20	100	90	110	111	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Fecal Coliform	BAC9095-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9095-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9105-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9105-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0131-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0065-DEC24	mg/L	0.002	<0.002	ND	10	102	80	120	102	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0059-DEC24	mg/L	0.02	<0.02	ND	20	99	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0117-DEC24	mg/L	2	< 2	4	10	95	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0074-DEC24	mg/L	0.05	<0.05	1	10	99	90	110	111	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0115-DEC24	NTU	0.10	< 0.10	0	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 011398 Page _____ of _____

Laboratory Information Section - Lab use only

Received By: _____ Received By (signature): _____
Received Date: DEC 05 2024 (mm/dd/yy) Custody Seal Present: Yes ☐ No ☐ Cooling Agent Present: Yes ☐ No ☐ Type: _____
Received Time: _____ : _____ (hr : min) Custody Seal Intact: Yes ☐ No ☐ Temperature Upon Receipt (°C) _____, _____, _____ LAB LIMS #: _____

CA 15454 DEC24 WA

REPORT INFORMATION

Company: DM Wills
Contact: Lynsey Tuters
Address: 150 Jameson Dr. Peterborough
Phone: 289-385-6230
Fax: _____
Email: ltuters@dmwills.com

INVOICE INFORMATION

☑ (same as Report Information)
Company: _____
Contact: _____
Address: _____
Phone: _____
Email: accounts@dmwills.com

Quotation #: _____ P.O. #: 7549
Project #: 7549 Site Location/ID: _____

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: _____

NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table _____ ☐ Res/Park ☐ Ind/Com ☐ Agri/Other Soil Texture: ☐ Coarse ☐ Medium ☐ Fine

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☑ Other: SWS ☐ MISA

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality: _____

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics incl CrVI, CN,Hg pH,(BHWS),EC,SAR–soil) (Cl, Na-water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni, Se,Ag,Ti,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other:	Other:	Other:	Other: Chlorine Demand test	Other: Fecal coliform	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg ☑ General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	Well 5 - 72 hr	Dec 5/24	1:30pm	16	GW	N														✓	✓		✓		
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): L Tuters **Signature:** L Tuters Date: Dec 5 2024 (mm/dd/yy)
Relinquished by (NAME): Ray BOLVIN **Signature:** _____ Date: Dec 5 2024 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.2
Date of Issue: 09 Sept, 2019

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





FINAL REPORT

CA15473-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

First Page

CLIENT DETAILS

Client	D.M. Wills -Peterborough
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada
Contact	Lynsey Tuters
Telephone	289-385-6230
Facsimile	705-741-3568
Email	ltuters@dmwills.com
Project	7549
Order Number	
Samples	Ground Water (5)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA15473-DEC24
Received	12/12/2024
Approved	12/18/2024
Report Number	CA15473-DEC24 R1
Date Reported	12/18/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

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

Chain of Custody Number: 011402

Note: Elevated TotColi reporting limit due to sample matrix.

SIGNATORIES

Brad Moore Hon. B.Sc

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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11
				Sample Name	MW24-03-I	MW24-03-II	MW21-06	MW21-05	MW21-07
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	11/12/2024	11/12/2024	11/12/2024	11/12/2024	11/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry									
UV Transmittance	%T				55.4	39.0	89.8	83.4	91.5
Alkalinity	mg/L as CaCO3	2	500		318	255	535	320	245
Bicarbonate	mg/L as CaCO3	2			318	255	535	320	245
Carbonate	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2
Colour	TCU	3	5		32	37	10	5	4
Conductivity	uS/cm	2			595	489	633	691	677
Total Suspended Solids	mg/L	2			1550	226	3960	2110	6
Turbidity	NTU	0.10	5	1	19	45	1100	500	1.6
Organic Nitrogen	mg/L	0.05	0.15		0.55	0.64	0.13	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			1.75	4.18	0.23	< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			1.20	3.54	0.10	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	1	5		5	19	1	1	2
Total Organic Carbon	mg/L	1			6	19	1	1	1

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11
				Sample Name	MW24-03-I	MW24-03-II	MW21-06	MW21-05	MW21-07
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	11/12/2024	11/12/2024	11/12/2024	11/12/2024	11/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics									
Fluoride	mg/L	0.06		1.5	0.07	< 0.06	0.10	< 0.06	< 0.06
Bromide	mg/L	0.3			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	< 0.06	0.20	4.56	4.58
Sulphate	mg/L	2	500		12	8	15	22	24
Sulphide	mg/L	0.02			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05	100		313	355	3160	691	265
Aluminum (total)	mg/L	0.001	0.1		0.086	0.825	3.48	1.40	0.006
Arsenic (total)	mg/L	0.0002		0.01	0.0012	0.0010	0.0022	0.0012	< 0.0002
Boron (total)	mg/L	0.002		5	0.018	0.012	0.100	0.028	0.027
Barium (total)	mg/L	0.00008		1	0.173	0.187	0.533	0.294	0.146
Beryllium (total)	mg/L	0.000007			< 0.000007	0.000070	0.000487	0.000150	< 0.000007
Bismuth (total)	mg/L	0.00001			< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L	0.000004			0.000219	0.000879	0.00473	0.00305	0.000040
Calcium (total)	mg/L	0.01			117	136	1180	257	97.9
Cadmium (total)	mg/L	0.000003		0.005	0.000008	0.000101	0.000272	0.000077	< 0.000003
Copper (total)	mg/L	0.001	1		< 0.001	0.002	0.022	0.009	< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00071	0.00339	0.00938	0.00405	0.00027
Iron (total)	mg/L	0.007	0.3		2.12	5.43	13.7	2.71	0.017
Potassium (total)	mg/L	0.009			1.66	1.16	2.26	2.76	2.54
Magnesium (total)	mg/L	0.001			5.22	3.95	49.1	12.1	5.02
Manganese (total)	mg/L	0.00001	0.05		0.613	1.27	2.36	0.702	0.00126

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: L. Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	7	8	9	10	11
					Sample Name	MW24-03-I	MW24-03-II	MW21-06	MW21-05	MW21-07
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	11/12/2024	11/12/2024	11/12/2024	11/12/2024	11/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)									
Molybdenum (total)	mg/L	0.0004			0.0039	0.0013	< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L	0.0001			0.0012	0.0023	0.0057	0.0043	0.0001
Sodium (total)	mg/L	0.01	200	20	17.3	20.8	17.1	31.1	29.7
Phosphorus (total)	mg/L	0.003			0.032	0.614	1.94	0.586	< 0.003
Lead (total)	mg/L	0.00009		0.01	0.00015	0.00290	0.0111	0.00203	< 0.00009
Silicon (total)	mg/L	0.02			8.94	13.6	6.45	4.58	3.07
Silver (total)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L	0.00008			0.317	0.246	1.65	0.494	0.283
Thallium (total)	mg/L	0.000005			< 0.000005	0.000013	0.000081	0.000025	< 0.000005
Tin (total)	mg/L	0.00006			0.00024	0.00029	0.00039	0.00023	0.00010
Titanium (total)	mg/L	0.0001			0.0039	0.0180	0.0334	0.0374	0.0013
Antimony (total)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00007	0.00029	0.00011	0.00024	0.00019
Uranium (total)	mg/L	0.000002		0.02	0.000193	0.000570	0.000816	0.000390	0.000168
Vanadium (total)	mg/L	0.00001			0.00163	0.00415	0.0139	0.00411	0.00020
Zinc (total)	mg/L	0.002	5		< 0.002	0.020	0.043	0.016	< 0.002
Cation sum	meq/L	-9999			7.30	8.72	65.11	15.60	6.67
Anion Sum	meq/L	-9999			7.16	5.53	11.67	8.30	6.79
Anion-Cation Balance	% difference	-9999			0.92	22.39	69.61	30.54	-0.95
Ion Ratio	none	-9999			1.02	1.58	5.58	1.88	0.98
Total Dissolved Solids (calculated)	mg/L	-9999			364	332	1609	570	358
Conductivity (calculated)	uS/cm	-9999			723	712	3839	1195	673

Client: D.M. Wills -Peterborough
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Project Manager: Lynsey Tuters
Samplers: L. Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11
				Sample Name	MW24-03-I	MW24-03-II	MW21-06	MW21-05	MW21-07
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	11/12/2024	11/12/2024	11/12/2024	11/12/2024	11/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)									
Langeliers Index 4° C	@ 4° C	-9999			0.21	-0.02	1.12	0.28	0.47
Saturation pH 4°C	pHs @ 4°C	-9999			7.39	7.42	6.23	7.07	7.58
Microbiology									
Total Coliform	cfu/100mL	0		0	20	100	< 100↑	20	13
E. Coli	cfu/100mL	0		0	0	5	1100	9	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0			740	910	8800	1190	113
Other (ORP)									
pH	No unit	0.05	8.5		7.60	7.40	7.35	7.35	8.05
Chloride	mg/L	1	250		20	10	24	49	47
Mercury (total)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenols									
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW24-03-I					
Organic Nitrogen		mg/L	0.55	0.15	
Colour	SM 2120	TCU	32	5	
Turbidity	SM 2130	NTU	19	5	1
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	313	100	
Iron	SM 3030/EPA 200.8	mg/L	2.12	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.613	0.05	
Total Coliform	SM 9222	cfu/100mL	20		0
MW24-03-II					
Organic Nitrogen		mg/L	0.64	0.15	
Colour	SM 2120	TCU	37	5	
Turbidity	SM 2130	NTU	45	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.825	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	355	100	
Iron	SM 3030/EPA 200.8	mg/L	5.43	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	1.27	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	20.8		20
Dissolved Organic Carbon	SM 5310	mg/L	19	5	
Total Coliform	SM 9222	cfu/100mL	100		0
E.Coli	SM 9222D	cfu/100mL	5		0
MW21-06					
Colour	SM 2120	TCU	10	5	
Turbidity	SM 2130	NTU	1100	5	1
Alkalinity	SM 2320	mg/L as CaCO3	535	500	
Aluminum	SM 3030/EPA 200.8	mg/L	3.48	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	3160	100	
Iron	SM 3030/EPA 200.8	mg/L	13.7	0.3	
Lead	SM 3030/EPA 200.8	mg/L	0.0111		0.01
Manganese	SM 3030/EPA 200.8	mg/L	2.36	0.05	
Total Coliform	SM 9222	cfu/100mL	< 100		0
E.Coli	SM 9222D	cfu/100mL	1100		0
MW21-05					
Turbidity	SM 2130	NTU	500	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	1.40	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	691	100	
Iron	SM 3030/EPA 200.8	mg/L	2.71	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.702	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	31.1		20
Total Coliform	SM 9222	cfu/100mL	20		0
E.Coli	SM 9222D	cfu/100mL	9		0

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-07					
Turbidity	SM 2130	NTU	1.6		1
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	265	100	
Sodium	SM 3030/EPA 200.8	mg/L	29.7		20
Total Coliform	SM 9222	cfu/100mL	13		0

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0246-DEC24	mg/L as CaCO3	2	< 2	1	20	109	80	120	NA		
Alkalinity	EWL0259-DEC24	mg/L as CaCO3	2	< 2	2	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0136-DEC24	mg/L	0.04	<0.04	1	10	95	90	110	98	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8021-DEC24	mg/L	1	<1	ND	20	98	80	120	101	75	125
Sulphate	DIO8021-DEC24	mg/L	2	<2	ND	20	107	80	120	107	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0299-DEC24	mg/L	0.3	<0.3	ND	20	96	90	110	98	75	125
Nitrite (as N)	DIO0299-DEC24	mg/L	0.03	<0.03	ND	20	94	90	110	97	75	125
Nitrate (as N)	DIO0299-DEC24	mg/L	0.06	<0.06	ND	20	100	90	110	101	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0135-DEC24	mg/L	1	<1	2	20	98	90	110	87	75	125
Total Organic Carbon	SKA0135-DEC24	mg/L	1	<1	2	20	98	90	110	87	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0246-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0246-DEC24	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0246-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Carbonate	EWL0259-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0259-DEC24	mg/L as CaCO3	2	< 2	2	10	NA	90	110	NA		
OH	EWL0259-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0274-DEC24	TCU	3	< 3	0	10	100	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0246-DEC24	uS/cm	2	< 2	1	20	99	90	110	NA		
Conductivity	EWL0259-DEC24	uS/cm	2	< 2	1	20	94	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0264-DEC24	mg/L	0.06	<0.06	ND	10	109	90	110	106	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0027-DEC24	mg/L	0.00001	< 0.00001	ND	20	88	80	120	100	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0146-DEC24	mg/L	0.00005	<0.00005	ND	20	101	90	110	91	70	130
Aluminum (total)	EMS0146-DEC24	mg/L	0.001	<0.001	2	20	102	90	110	92	70	130
Arsenic (total)	EMS0146-DEC24	mg/L	0.0002	<0.0002	13	20	104	90	110	108	70	130
Barium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	1	20	99	90	110	99	70	130
Beryllium (total)	EMS0146-DEC24	mg/L	0.000007	<0.000007	ND	20	106	90	110	97	70	130
Boron (total)	EMS0146-DEC24	mg/L	0.002	<0.002	2	20	103	90	110	94	70	130
Bismuth (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	ND	20	99	90	110	92	70	130
Calcium (total)	EMS0146-DEC24	mg/L	0.01	<0.01	1	20	104	90	110	99	70	130
Cadmium (total)	EMS0146-DEC24	mg/L	0.000003	<0.000003	ND	20	107	90	110	101	70	130
Cobalt (total)	EMS0146-DEC24	mg/L	0.000004	<0.000004	18	20	100	90	110	98	70	130
Chromium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	ND	20	106	90	110	108	70	130
Copper (total)	EMS0146-DEC24	mg/L	0.001	<0.001	0	20	104	90	110	117	70	130
Iron (total)	EMS0146-DEC24	mg/L	0.007	<0.007	ND	20	109	90	110	100	70	130
Potassium (total)	EMS0146-DEC24	mg/L	0.009	<0.009	0	20	105	90	110	97	70	130
Magnesium (total)	EMS0146-DEC24	mg/L	0.001	<0.001	0	20	105	90	110	98	70	130
Manganese (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	8	20	103	90	110	101	70	130
Molybdenum (total)	EMS0146-DEC24	mg/L	0.0004	<0.0004	3	20	103	90	110	101	70	130
Sodium (total)	EMS0146-DEC24	mg/L	0.01	<0.01	0	20	106	90	110	101	70	130
Nickel (total)	EMS0146-DEC24	mg/L	0.0001	<0.0001	6	20	102	90	110	95	70	130
Lead (total)	EMS0146-DEC24	mg/L	0.00009	<0.00009	ND	20	100	90	110	90	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0146-DEC24	mg/L	0.003	<0.003	ND	20	102	90	110	NV	70	130
Antimony (total)	EMS0146-DEC24	mg/L	0.0009	<0.0009	ND	20	105	90	110	108	70	130
Selenium (total)	EMS0146-DEC24	mg/L	0.00004	<0.00004	8	20	101	90	110	110	70	130
Silicon (total)	EMS0146-DEC24	mg/L	0.02	<0.02	0	20	100	90	110	NV	70	130
Tin (total)	EMS0146-DEC24	mg/L	0.00006	<0.00006	ND	20	104	90	110	NV	70	130
Strontium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	1	20	98	90	110	92	70	130
Titanium (total)	EMS0146-DEC24	mg/L	0.0001	<0.0001	ND	20	110	90	110	NV	70	130
Thallium (total)	EMS0146-DEC24	mg/L	0.000005	<0.000005	ND	20	100	90	110	94	70	130
Uranium (total)	EMS0146-DEC24	mg/L	0.000002	<0.000002	2	20	100	90	110	97	70	130
Vanadium (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	4	20	104	90	110	101	70	130
Zinc (total)	EMS0146-DEC24	mg/L	0.002	<0.002	12	20	101	90	110	87	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9236-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9236-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9236-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0246-DEC24	No unit	0.05	NA	0		100			NA		
pH	EWL0259-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0134-DEC24	mg/L	0.002	<0.002	ND	10	98	80	120	91	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0128-DEC24	mg/L	0.02	<0.02	ND	20	105	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0313-DEC24	mg/L	2	< 2	4	10	97	90	110	NA		
Total Suspended Solids	EWL0325-DEC24	mg/L	2	< 2	2	10	95	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0139-DEC24	mg/L	0.05	<0.05	ND	10	100	90	110	111	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0256-DEC24	NTU	0.10	< 0.10	0	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 011402 Page _____ of _____

Laboratory Information Section - Lab use only

Received By: natasham. Received By (signature): ne
Received Date: 12,12,24 (mm/dd/yy) Custody Seal Present: Yes ☑ No ☐ Cooling Agent Present: Yes ☑ No ☐ Type: ice.
Received Time: 08:45 (hr : min) Custody Seal Intact: Yes ☑ No ☐ Temperature Upon Receipt (°C) 11, 9, 10. LAB LIMS #: CA15473-dec24.

REPORT INFORMATION	INVOICE INFORMATION
Company: D.M. Wills	☑ (same as Report Information)
Contact: Lynsey Tuters	Company:
Address: 150 Jameson Dr. Peterborough, Ont.	Contact:
Phone: 289-385-6230	Address:
Fax:	Phone:
Email: ltuters@dmwills.com	Email: account@dmwills.com

Quotation #: P.O. #: 7549
Project #: 7549 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days) TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table _____ ☐ Res/Park ☐ Ind/Com ☐ Agri/Other Soil Texture: ☐ Coarse ☐ Medium ☐ Fine

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☑ Other: DOWQS ☐ MISA

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Nw-water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni, Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Sewer Use: Specify pkg:	Water Characterization Pkg ☐ General Extended	TCLP Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	MW24-03-I	Dec11/24	AM	14	GW	N																	✓		
2	MW24-03-II	↓	AM	↓	↓	N																	✓		
3	MW21-06		PM			N																	✓		
4	MW21-05		PM			N																	✓		
5	MW21-07	↓	PM	↓	↓	N																	✓		
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): L. Tuters Signature: L Tuters Date: Dec, 12, '24 (mm/dd/yy)
Relinquished by (NAME): L. Tuters Signature: L Tuters Date: Dec, 12, '24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.2
Date of Issue: 09 Sept, 2019

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





FINAL REPORT

CA15491-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

CA15491-DEC24 R1

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	D.M. Wills -Peterborough	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Lynsey Tuters	Telephone	705-652-2000
Telephone	289-385-6230	Facsimile	705-652-6365
Facsimile	705-741-3568	Email	Maarit.Wolfe@sgs.com
Email	ltuters@dmwills.com	SGS Reference	CA15491-DEC24
Project	7549	Received	12/12/2024
Order Number		Approved	12/19/2024
Samples	Ground Water (8)	Report Number	CA15491-DEC24 R1
		Date Reported	12/19/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

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

Chain of Custody Number: 038250

Note: Elevated TotColi and Ecoli reporting limit due to sample matrix.

SIGNATORIES

Maarit Wolfe, Hon.B.Sc



Member of the SGS Group (SGS SA)

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FINAL REPORT

CA15491-DEC24 R1

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11	12	13	14
				Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-08	MW21-09	MW21-10	MW21-11
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry												
UV Transmittance	%T				57.8	85.9	60.9	59.3	90.1	80.4	83.9	85.5
Alkalinity	mg/L as CaCO3	2	500		331	260	307	590	235	303	242	272
Bicarbonate	mg/L as CaCO3	2			331	260	307	590	235	303	242	272
Carbonate	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Colour	TCU	3	5		9	3	11	12	3	< 3	< 3	3
Conductivity	uS/cm	2			571	538	516	505	632	629	648	544
Total Suspended Solids	mg/L	2			5380	1440	1460	2800	49	673	106	972
Turbidity	NTU	0.10	5	1	2400	1.5	380	>4000	15	85	75	220
Organic Nitrogen	mg/L	0.05	0.15		< 0.05	< 0.05	< 0.05	0.23	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			< 0.05	< 0.05	0.06	0.27	< 0.05	< 0.05	< 0.05	< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04	< 0.04	< 0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	mg/L	1	5		2	2	3	3	2	2	2	2
Total Organic Carbon	mg/L	1			2	2	3	3	2	2	2	2

FINAL REPORT

CA15491-DEC24 R1

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10	11	12	13	14
				Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-08	MW21-09	MW21-10	MW21-11
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics												
Fluoride	mg/L	0.06		1.5	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bromide	mg/L	0.3			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	3.35	2.76	1.67	1.76	4.18	4.45	4.92	2.79
Sulphate	mg/L	2	500		12	12	9	9	21	19	20	12
Sulphide	mg/L	0.02			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05	100		1080	490	447	2310	302	363	330	438
Aluminum (total)	mg/L	0.001	0.1		2.24	0.356	0.672	3.74	0.076	0.475	0.377	0.344
Arsenic (total)	mg/L	0.0002		0.01	0.0017	0.0003	0.0006	0.0017	< 0.0002	0.0002	0.0002	0.0003
Boron (total)	mg/L	0.002		5	0.023	0.027	0.015	0.020	0.024	0.023	0.022	0.021
Barium (total)	mg/L	0.00008		1	0.275	0.134	0.0966	0.326	0.133	0.141	0.170	0.129
Beryllium (total)	mg/L	0.000007			0.000267	0.000039	0.000090	0.000557	0.000011	0.000024	0.000024	0.000038
Bismuth (total)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L	0.000004			0.00663	0.000579	0.000432	0.0104	0.000141	0.000420	0.000349	0.000431
Calcium (total)	mg/L	0.01			414	188	173	905	113	137	124	167
Cadmium (total)	mg/L	0.000003		0.005	0.000130	0.000020	0.000015	0.000233	0.000007	0.000009	0.000008	0.000021
Copper (total)	mg/L	0.001	1		0.009	0.002	0.001	0.007	0.006	0.001	0.001	0.002
Chromium (total)	mg/L	0.00008		0.05	0.00344	0.00188	0.00124	0.00605	0.00123	0.00119	0.00069	0.00149
Iron (total)	mg/L	0.007	0.3		2.79	1.09	0.789	4.00	0.672	0.467	0.324	0.939
Potassium (total)	mg/L	0.009			1.64	2.27	2.08	2.73	2.35	2.24	2.05	2.33
Magnesium (total)	mg/L	0.001			10.4	5.33	3.74	11.2	4.62	5.41	5.02	4.87
Manganese (total)	mg/L	0.00001	0.05		1.01	0.156	0.116	2.39	0.0386	0.0667	0.0436	0.114

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-08	MW21-09	MW21-10	MW21-11
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)													
Molybdenum (total)	mg/L	0.0004			< 0.0004	< 0.0004	< 0.0004	< 0.0004	0.0005	< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L	0.0001			0.0035	0.0014	0.0007	0.0088	0.0011	0.0005	0.0004	0.0011
Sodium (total)	mg/L	0.01	200	20	40.5	27.4	15.9	14.2	29.3	29.3	31.5	26.9
Phosphorus (total)	mg/L	0.003			1.26	0.157	0.166	1.31	0.049	0.068	0.034	0.106
Lead (total)	mg/L	0.00009		0.01	0.00539	0.00137	0.00177	0.00865	0.00020	0.00063	0.00053	0.00127
Silicon (total)	mg/L	0.02			4.50	3.28	3.83	5.40	3.29	4.41	3.68	3.47
Silver (total)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L	0.00008			0.627	0.372	0.367	1.30	0.300	0.312	0.302	0.342
Thallium (total)	mg/L	0.000005			0.000036	0.000010	0.000020	0.000054	< 0.000005	0.000008	0.000008	0.000011
Tin (total)	mg/L	0.00006			0.00014	0.00031	< 0.00006	0.00013	0.00074	0.00028	0.00023	0.00015
Titanium (total)	mg/L	0.0001			0.0289	0.0116	0.0190	0.0400	0.0034	0.0234	0.0160	0.0126
Antimony (total)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00029	0.00013	0.00011	0.00021	0.00018	0.00022	0.00024	0.00013
Uranium (total)	mg/L	0.000002		0.02	0.000503	0.000212	0.000271	0.000850	0.000196	0.000178	0.000162	0.000206
Vanadium (total)	mg/L	0.00001			0.00646	0.00131	0.00110	0.00521	0.00025	0.00106	0.00074	0.00109
Zinc (total)	mg/L	0.002	5		0.013	0.005	0.005	0.033	0.003	0.002	< 0.002	0.004
Cation sum	meq/L	-9999			23.79	11.17	9.82	47.63	7.43	8.69	8.09	10.08
Anion Sum	meq/L	-9999			8.18	6.26	7.28	12.77	6.54	7.90	6.84	6.50
Anion-Cation Balance	% difference	-9999			48.82	28.17	14.83	57.71	6.32	4.79	8.35	21.58
Ion Ratio	none	-9999			2.91	1.78	1.35	3.73	1.13	1.10	1.18	1.55
Total Dissolved Solids (calculated)	mg/L	-9999			725	421	423	1326	363	428	386	407
Conductivity (calculated)	uS/cm	-9999			1599	871	855	3020	698	829	747	829

Client: D.M. Wills -Peterborough
Project: 7549
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MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW21-01	MW21-02	MW21-03	MW21-04	MW21-08	MW21-09	MW21-10	MW21-11
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024	12/12/2024
						Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)													
Langeliers Index 4° C	@ 4° C	-9999				0.78	0.26	0.53	1.40	0.18	0.41	0.33	0.43
Saturation pH 4°C	pHs @ 4°C	-9999				6.86	7.28	7.24	6.29	7.54	7.35	7.49	7.31
Microbiology													
Total Coliform	cfu/100mL	0		0		20	< 20↑	2	20	63	2	6	4
E. Coli	cfu/100mL	0		0		< 20↑	< 20↑	0	< 20↑	0	0	0	0
Heterotrophic Plate Count (HPC)	cfu/1mL	0				#NDOGHPC	920	128	#NDOGHPC	880	199	840	1040
Other (ORP)													
pH	No unit	0.05	8.5			7.64	7.54	7.77	7.69	7.72	7.76	7.82	7.74
Chloride	mg/L	1	250			45	28	33	27	48	49	54	28
Mercury (total)	mg/L	0.00001				< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenols													
4AAP-Phenolics	mg/L	0.001				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-01					
Colour	SM 2120	TCU	9	5	
Turbidity	SM 2130	NTU	2400	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	2.24	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	1080	100	
Iron	SM 3030/EPA 200.8	mg/L	2.79	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	1.01	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	40.5		20
Total Coliform	SM 9222	cfu/100mL	20		0
E.Coli	SM 9222D	cfu/100mL	< 20		0
MW21-02					
Turbidity	SM 2130	NTU	1.5		1
Aluminum	SM 3030/EPA 200.8	mg/L	0.356	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	490	100	
Iron	SM 3030/EPA 200.8	mg/L	1.09	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.156	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	27.4		20
Total Coliform	SM 9222	cfu/100mL	< 20		0
E.Coli	SM 9222D	cfu/100mL	< 20		0
MW21-03					
Colour	SM 2120	TCU	11	5	
Turbidity	SM 2130	NTU	380	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.672	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	447	100	
Iron	SM 3030/EPA 200.8	mg/L	0.789	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.116	0.05	
Total Coliform	SM 9222	cfu/100mL	2		0
MW21-04					
Organic Nitrogen		mg/L	0.23	0.15	
Colour	SM 2120	TCU	12	5	
Turbidity	SM 2130	NTU	>4000	5	1
Alkalinity	SM 2320	mg/L as CaCO3	590	500	
Aluminum	SM 3030/EPA 200.8	mg/L	3.74	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	2310	100	
Iron	SM 3030/EPA 200.8	mg/L	4.00	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	2.39	0.05	
Total Coliform	SM 9222	cfu/100mL	20		0
E.Coli	SM 9222D	cfu/100mL	< 20		0

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-08					
Turbidity	SM 2130	NTU	15	5	1
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	302	100	
Iron	SM 3030/EPA 200.8	mg/L	0.672	0.3	
Sodium	SM 3030/EPA 200.8	mg/L	29.3		20
Total Coliform	SM 9222	cfu/100mL	63		0
MW21-09					
Turbidity	SM 2130	NTU	85	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.475	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	363	100	
Iron	SM 3030/EPA 200.8	mg/L	0.467	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.0667	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	29.3		20
Total Coliform	SM 9222	cfu/100mL	2		0
MW21-10					
Turbidity	SM 2130	NTU	75	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.377	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	330	100	
Iron	SM 3030/EPA 200.8	mg/L	0.324	0.3	
Sodium	SM 3030/EPA 200.8	mg/L	31.5		20
Total Coliform	SM 9222	cfu/100mL	6		0
MW21-11					
Turbidity	SM 2130	NTU	220	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.344	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	438	100	
Iron	SM 3030/EPA 200.8	mg/L	0.939	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.114	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	26.9		20
Total Coliform	SM 9222	cfu/100mL	4		0

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0259-DEC24	mg/L as CaCO3	2	< 2	2	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0136-DEC24	mg/L	0.04	<0.04	1	10	95	90	110	98	75	125
Ammonia+Ammonium (N)	SKA0149-DEC24	mg/L	0.04	<0.04	1	10	100	90	110	98	75	125
Ammonia+Ammonium (N)	SKA0163-DEC24	mg/L	0.04	<0.04	0	10	100	90	110	93	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8023-DEC24	mg/L	1	<1	2	20	98	80	120	96	75	125
Sulphate	DIO8023-DEC24	mg/L	2	<2	0	20	107	80	120	87	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0314-DEC24	mg/L	0.3	<0.3	ND	20	99	90	110	108	75	125
Nitrite (as N)	DIO0314-DEC24	mg/L	0.03	<0.03	ND	20	98	90	110	101	75	125
Nitrate (as N)	DIO0314-DEC24	mg/L	0.06	<0.06	0	20	101	90	110	101	75	125
Bromide	DIO0316-DEC24	mg/L	0.3	<0.3	ND	20	97	90	110	98	75	125
Nitrite (as N)	DIO0316-DEC24	mg/L	0.03	<0.03	ND	20	98	90	110	101	75	125
Nitrate (as N)	DIO0316-DEC24	mg/L	0.06	<0.06	0	20	101	90	110	98	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0135-DEC24	mg/L	1	<1	2	20	98	90	110	87	75	125
Total Organic Carbon	SKA0135-DEC24	mg/L	1	<1	2	20	98	90	110	87	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0259-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0259-DEC24	mg/L as CaCO3	2	< 2	2	10	NA	90	110	NA		
OH	EWL0259-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0274-DEC24	TCU	3	< 3	0	10	100	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0259-DEC24	uS/cm	2	< 2	1	20	94	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0264-DEC24	mg/L	0.06	<0.06	ND	10	109	90	110	106	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0027-DEC24	mg/L	0.00001	< 0.00001	ND	20	88	80	120	100	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0146-DEC24	mg/L	0.00005	<0.00005	ND	20	101	90	110	91	70	130
Aluminum (total)	EMS0146-DEC24	mg/L	0.001	<0.001	2	20	102	90	110	92	70	130
Arsenic (total)	EMS0146-DEC24	mg/L	0.0002	<0.0002	13	20	104	90	110	108	70	130
Barium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	1	20	99	90	110	99	70	130
Beryllium (total)	EMS0146-DEC24	mg/L	0.000007	<0.000007	ND	20	106	90	110	97	70	130
Boron (total)	EMS0146-DEC24	mg/L	0.002	<0.002	2	20	103	90	110	94	70	130
Bismuth (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	ND	20	99	90	110	92	70	130
Calcium (total)	EMS0146-DEC24	mg/L	0.01	<0.01	1	20	104	90	110	99	70	130
Cadmium (total)	EMS0146-DEC24	mg/L	0.000003	<0.000003	ND	20	107	90	110	101	70	130
Cobalt (total)	EMS0146-DEC24	mg/L	0.000004	<0.000004	18	20	100	90	110	98	70	130
Chromium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	ND	20	106	90	110	108	70	130
Copper (total)	EMS0146-DEC24	mg/L	0.001	<0.001	0	20	104	90	110	117	70	130
Iron (total)	EMS0146-DEC24	mg/L	0.007	<0.007	ND	20	109	90	110	100	70	130
Potassium (total)	EMS0146-DEC24	mg/L	0.009	<0.009	0	20	105	90	110	97	70	130
Magnesium (total)	EMS0146-DEC24	mg/L	0.001	<0.001	0	20	105	90	110	98	70	130
Manganese (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	8	20	103	90	110	101	70	130
Molybdenum (total)	EMS0146-DEC24	mg/L	0.0004	<0.0004	3	20	103	90	110	101	70	130
Sodium (total)	EMS0146-DEC24	mg/L	0.01	<0.01	0	20	106	90	110	101	70	130
Nickel (total)	EMS0146-DEC24	mg/L	0.0001	<0.0001	6	20	102	90	110	95	70	130
Lead (total)	EMS0146-DEC24	mg/L	0.00009	<0.00009	ND	20	100	90	110	90	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0146-DEC24	mg/L	0.003	<0.003	ND	20	102	90	110	NV	70	130
Antimony (total)	EMS0146-DEC24	mg/L	0.0009	<0.0009	ND	20	105	90	110	108	70	130
Selenium (total)	EMS0146-DEC24	mg/L	0.00004	<0.00004	8	20	101	90	110	110	70	130
Silicon (total)	EMS0146-DEC24	mg/L	0.02	<0.02	0	20	100	90	110	NV	70	130
Tin (total)	EMS0146-DEC24	mg/L	0.00006	<0.00006	ND	20	104	90	110	NV	70	130
Strontium (total)	EMS0146-DEC24	mg/L	0.00008	<0.00008	1	20	98	90	110	92	70	130
Titanium (total)	EMS0146-DEC24	mg/L	0.0001	<0.0001	ND	20	110	90	110	NV	70	130
Thallium (total)	EMS0146-DEC24	mg/L	0.000005	<0.000005	ND	20	100	90	110	94	70	130
Uranium (total)	EMS0146-DEC24	mg/L	0.000002	<0.000002	2	20	100	90	110	97	70	130
Vanadium (total)	EMS0146-DEC24	mg/L	0.00001	<0.00001	4	20	104	90	110	101	70	130
Zinc (total)	EMS0146-DEC24	mg/L	0.002	<0.002	12	20	101	90	110	87	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9247-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9247-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9247-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0259-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0129-DEC24	mg/L	0.001	<0.001	ND	10	96	80	120	98	75	125
4AAP-Phenolics	SKA0134-DEC24	mg/L	0.001	<0.001	ND	10	98	80	120	91	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0128-DEC24	mg/L	0.02	<0.02	ND	20	105	80	120	NA	75	125

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0321-DEC24	mg/L	2	< 2	3	10	99	90	110	NA		
Total Suspended Solids	EWL0325-DEC24	mg/L	2	< 2	2	10	95	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0152-DEC24	mg/L	0.05	<0.05	0	10	101	90	110	97	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0256-DEC24	NTU	0.10	< 0.10	0	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.
Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.
LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.
Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.
RL: Reporting limit
RPD: Relative percent difference
AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.
Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.
Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.
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This report supersedes all previous versions.

-- End of Analytical Report --

SGS — Request for Laboratory Services and CHAIN OF CUSTODY

No: 038250

Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Nishi Patel
Received By (signature): NP
Received Date: DEC 12 2024 (mm/dd/yy)
Received Time: 15:00 (hr : min)
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice bag
Temperature Upon Receipt (°C): 3.3.2
LAB LIMS #: CA-15491-Dec 24 NP

REPORT INFORMATION

Company: DM WILLS
Contact: LYNSEY TUTERS
Address: 150 JAMESON DRIVE PETERBOROUGH, ON
Phone: 289-385-6230
Fax:
Email: ltuters@dmwills.com

INVOICE INFORMATION

☑ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email: accounts@dmwills.com

Quotation #:
P.O. #: 7549
Project #: 7549
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☑ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,(BHWS),EC,SAR–soil) (Cl, Na-water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other	Other	Other	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg ☑ Extended ☐ General	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	MW21-01	Dec 12/24	1:15PM	14	GW	N																X			
2	MW 21-02		12:30PM																			X			
3	MW 21-03		12:00 PM																			X			
4	MW 21-04		11:30AM																			X			
5	MW 21-08		9:15AM																			X			
6	MW 21-09		9:45AM																			X			
7	MW 21-10		10:45AM																			X			
8	MW 21-11		12:45PM																			X			
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): CHRIS OSTIC Signature: Chris Ostic Date: 12/12/24 (mm/dd/yy)
Relinquished by (NAME): CHRIS OSTIC Signature: Chris Ostic Date: 12/12/24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.



FINAL REPORT

CA15898-NOV24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

CA15898-NOV24 R1

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	D.M. Wills -Peterborough	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Lynsey Tuters	Telephone	2165
Telephone	289-385-6230	Facsimile	705-652-6365
Facsimile	705-741-3568	Email	jill.campbell@sgs.com
Email	ltuters@dmwills.com	SGS Reference	CA15898-NOV24
Project	7549	Received	11/27/2024
Order Number		Approved	12/09/2024
Samples	Ground Water (4)	Report Number	CA15898-NOV24 R1
		Date Reported	12/09/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.
NDOGHPC - No Data: Overgrown with HPC

Temperature of Sample upon Receipt: 9 degrees C

Chain of Custody Number:039433

Unable to read UV-Trans for sample #10 as it is not on the wavelegth used in this method

SIGNATORIES

Jill Campbell, B.Sc.,GISAS



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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic/Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	MW24-01-II	MW24-02-II	MW24-03-I	MW21-06
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	27/11/2024	27/11/2024	27/11/2024	27/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
General Chemistry								
UV Transmittance	%T				0.2	4.6	71.4	*****
Alkalinity	mg/L as CaCO3	2	500		329	220	281	744
Bicarbonate	mg/L as CaCO3	2			329	220	281	744
Carbonate	mg/L as CaCO3	2			< 2	< 2	< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2	< 2	< 2
Colour	TCU	3	5		16	32	29	7
Conductivity	uS/cm	2			517	445	558	649
Total Suspended Solids	mg/L	2			15300	1070	570	2610
Turbidity	NTU	0.10	5	1	>4000	310	20	>4000
Organic Nitrogen	mg/L	0.05	0.15		0.22	4.47	0.84	< 0.05
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.58	5.23	1.92	0.25
Ammonia+Ammonium (N)	as N mg/L	0.04			0.36	0.76	1.08	0.22
Dissolved Organic Carbon	mg/L	1	5		4	13	5	2
Total Organic Carbon	mg/L	1			4	12	5	2

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L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	MW24-01-II	MW24-02-II	MW24-03-I	MW21-06
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	27/11/2024	27/11/2024	27/11/2024	27/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics								
Fluoride	mg/L	0.06		1.5	0.14	0.14	0.08	0.12
Bromide	mg/L	0.3			< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1	0.05	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	0.06	< 0.06	< 0.06	< 0.06
Sulphate	mg/L	2	500		46	36	11	15
Sulphide	mg/L	0.02			0.050	< 0.02	< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05	100		1230	227	307	2710
Aluminum (total)	mg/L	0.001	0.1		2.76	0.818	0.152	2.65
Arsenic (total)	mg/L	0.0002		0.01	0.0061	0.0064	0.0011	0.0019
Boron (total)	mg/L	0.002		5	0.041	0.026	0.018	0.103
Barium (total)	mg/L	0.00008		1	0.586	0.195	0.173	0.561
Beryllium (total)	mg/L	0.000007			0.00180	0.00193	0.000013	0.000416
Bismuth (total)	mg/L	0.00001			0.00003	0.00072	< 0.00001	0.00002
Cobalt (total)	mg/L	0.000004			0.00232	0.00125	0.000394	0.00336
Calcium (total)	mg/L	0.01			481	86.2	115	1013
Cadmium (total)	mg/L	0.000003		0.005	0.000342	0.000068	0.000009	0.000244
Copper (total)	mg/L	0.001	1		< 0.001	0.001	0.002	0.005
Chromium (total)	mg/L	0.00008		0.05	0.00566	0.00050	0.00111	0.00675
Iron (total)	mg/L	0.007	0.3		9.28	1.61	0.943	9.29
Potassium (total)	mg/L	0.009			1.96	3.01	1.88	2.34
Magnesium (total)	mg/L	0.001			7.46	2.87	4.90	43.2
Manganese (total)	mg/L	0.00001	0.05		1.45	0.753	0.335	2.24

Client: D.M. Wills -Peterborough
Project: 7549
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Samplers: Chris Ostic/Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	7	8	9	10
					Sample Name	MW24-01-II	MW24-02-II	MW24-03-I	MW21-06
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	27/11/2024	27/11/2024	27/11/2024	27/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Molybdenum (total)	mg/L	0.0004			0.0038	0.0309	0.0056	< 0.0004
Nickel (total)	mg/L	0.0001			0.0031	0.0010	0.0024	0.0041
Sodium (total)	mg/L	0.01	200	20	64.2	44.7	11.7	17.2
Phosphorus (total)	mg/L	0.003			1.22	0.636	0.097	1.78
Lead (total)	mg/L	0.00009		0.01	0.0188	0.0215	0.00041	0.00905
Silicon (total)	mg/L	0.02			7.72	7.97	8.07	6.91
Silver (total)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L	0.00008			1.26	0.359	0.356	1.72
Thallium (total)	mg/L	0.000005			0.000045	0.000039	< 0.000005	0.000068
Tin (total)	mg/L	0.00006			0.00029	0.00048	0.00064	0.00018
Titanium (total)	mg/L	0.0001			0.0248	0.0169	0.0058	0.0265
Antimony (total)	mg/L	0.0009		0.006	< 0.0009	0.0010	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00030	0.00159	0.00006	0.00015
Uranium (total)	mg/L	0.000002		0.02	0.00301	0.00601	0.000229	0.000665
Vanadium (total)	mg/L	0.00001			0.00838	0.00113	0.00146	0.00932
Zinc (total)	mg/L	0.002	5		0.072	0.008	0.003	0.023
Cation sum	meq/L	-9999			28.41	6.84	6.86	55.92
Anion Sum	meq/L	-9999			8.07	5.47	6.35	15.78
Anion-Cation Balance	% difference	-9999			55.76	11.17	3.86	55.98
Ion Ratio	none	-9999			3.52	1.25	1.08	3.54
Total Dissolved Solids (calculated)	mg/L	-9999			817	316	331	1559
Conductivity (calculated)	uS/cm	-9999			1824	615	661	3585

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Chris Ostic/Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	MW24-01-II	MW24-02-II	MW24-03-I	MW21-06
				Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
				Sample Date	27/11/2024	27/11/2024	27/11/2024	27/11/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Langeliers Index 4° C	@ 4° C	-9999			1.36	0.10	0.42	1.46
Saturation pH 4°C	pHs @ 4°C	-9999			6.80	7.68	7.45	6.15
Microbiology								
Total Coliform	cfu/100mL	0		0	100	2000	60	100
E. Coli	cfu/100mL	0		0	20	20	2	< 5↑
Heterotrophic Plate Count (HPC)	cfu/1mL	0			#NDOGHPC	#NDOGHPC	#NDOGHPC	#NDOGHPC
Other (ORP)								
pH	No unit	0.05	8.5		8.16	7.78	7.87	7.61
Chloride	mg/L	1	250		18	12	18	22
Mercury (total)	mg/L	0.00001			0.00008	< 0.00001	< 0.00001	0.00002
Phenols								
4AAP-Phenolics	mg/L	0.002			< 0.002	0.021	0.003	< 0.002

EXCEEDANCE SUMMARY

MW24-01-II

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
Organic Nitrogen		mg/L	0.22	0.15	
Colour	SM 2120	TCU	16	5	
Turbidity	SM 2130	NTU	>4000	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	2.76	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	1230	100	
Iron	SM 3030/EPA 200.8	mg/L	9.28	0.3	
Lead	SM 3030/EPA 200.8	mg/L	0.0188		0.01
Manganese	SM 3030/EPA 200.8	mg/L	1.45	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	64.2		20
Total Coliform	SM 9222	cfu/100mL	100		0
E.Coli	SM 9222D	cfu/100mL	20		0

MW24-02-II

Organic Nitrogen		mg/L	4.47	0.15	
Colour	SM 2120	TCU	32	5	
Turbidity	SM 2130	NTU	310	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.818	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	227	100	
Iron	SM 3030/EPA 200.8	mg/L	1.61	0.3	
Lead	SM 3030/EPA 200.8	mg/L	0.0215		0.01
Manganese	SM 3030/EPA 200.8	mg/L	0.753	0.05	
Sodium	SM 3030/EPA 200.8	mg/L	44.7		20
Dissolved Organic Carbon	SM 5310	mg/L	13	5	
Total Coliform	SM 9222	cfu/100mL	2000		0
E.Coli	SM 9222D	cfu/100mL	20		0

MW24-03-I

Organic Nitrogen		mg/L	0.84	0.15	
Colour	SM 2120	TCU	29	5	
Turbidity	SM 2130	NTU	20	5	1
Aluminum	SM 3030/EPA 200.8	mg/L	0.152	0.1	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	307	100	
Iron	SM 3030/EPA 200.8	mg/L	0.943	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	0.335	0.05	
Total Coliform	SM 9222	cfu/100mL	60		0
E.Coli	SM 9222D	cfu/100mL	2		0

MW21-06

Colour	SM 2120	TCU	7	5	
Turbidity	SM 2130	NTU	>4000	5	1
Alkalinity	SM 2320	mg/L as CaCO3	744	500	
Aluminum	SM 3030/EPA 200.8	mg/L	2.65	0.1	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
MW21-06 (continued)					
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	2710	100	
Iron	SM 3030/EPA 200.8	mg/L	9.29	0.3	
Manganese	SM 3030/EPA 200.8	mg/L	2.24	0.05	
Total Coliform	SM 9222	cfu/100mL	100		0
E.Coli	SM 9222D	cfu/100mL	< 5		0

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0584-NOV24	mg/L as CaCO3	2	< 2	2	20	104	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0265-NOV24	mg/L	0.04	<0.04	0	10	99	90	110	100	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8047-NOV24	mg/L	1	<1	ND	20	99	80	120	92	75	125
Sulphate	DIO8047-NOV24	mg/L	2	<2	0	20	102	80	120	101	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0679-NOV24	mg/L	0.3	<0.3	ND	20	100	90	110	98	75	125
Nitrite (as N)	DIO0679-NOV24	mg/L	0.03	<0.03	ND	20	101	90	110	99	75	125
Nitrate (as N)	DIO0679-NOV24	mg/L	0.06	<0.06	0	20	101	90	110	101	75	125
Bromide	DIO0683-NOV24	mg/L	0.3	<0.3	ND	20	97	90	110	105	75	125
Nitrite (as N)	DIO0683-NOV24	mg/L	0.03	<0.03	2	20	101	90	110	97	75	125
Nitrate (as N)	DIO0683-NOV24	mg/L	0.06	<0.06	1	20	101	90	110	104	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0004-DEC24	mg/L	1	<1	5	20	99	90	110	96	75	125
Dissolved Organic Carbon	SKA0258-NOV24	mg/L	1	<1	4	20	102	90	110	95	75	125
Total Organic Carbon	SKA0258-NOV24	mg/L	1	<1	4	20	102	90	110	95	75	125

Carbonate/Bicarbonate

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0584-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0584-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
OH	EWL0584-NOV24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0603-NOV24	TCU	3	< 3	3	10	95	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0584-NOV24	uS/cm	2	< 2	1	20	99	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0599-NOV24	mg/L	0.06	<0.06	0	10	101	90	110	100	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0075-NOV24	mg/L	0.00001	< 0.00001	ND	20	111	80	120	118	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0339-NOV24	mg/L	0.00005	<0.00005	ND	20	105	90	110	78	70	130
Aluminum (total)	EMS0339-NOV24	mg/L	0.001	<0.001	3	20	103	90	110	109	70	130
Arsenic (total)	EMS0339-NOV24	mg/L	0.0002	<0.0002	8	20	97	90	110	106	70	130
Barium (total)	EMS0339-NOV24	mg/L	0.00008	<0.00008	0	20	95	90	110	110	70	130
Beryllium (total)	EMS0339-NOV24	mg/L	0.000007	<0.000007	ND	20	96	90	110	98	70	130
Boron (total)	EMS0339-NOV24	mg/L	0.002	<0.002	2	20	102	90	110	95	70	130
Bismuth (total)	EMS0339-NOV24	mg/L	0.00001	<0.00001	ND	20	94	90	110	105	70	130
Calcium (total)	EMS0339-NOV24	mg/L	0.01	<0.01	2	20	102	90	110	106	70	130
Cadmium (total)	EMS0339-NOV24	mg/L	0.000003	<0.000003	ND	20	100	90	110	105	70	130
Cobalt (total)	EMS0339-NOV24	mg/L	0.000004	<0.000004	2	20	103	90	110	104	70	130
Chromium (total)	EMS0339-NOV24	mg/L	0.00008	<0.00008	17	20	98	90	110	89	70	130
Copper (total)	EMS0339-NOV24	mg/L	0.001	<0.001	2	20	105	90	110	113	70	130
Iron (total)	EMS0339-NOV24	mg/L	0.007	<0.007	5	20	101	90	110	125	70	130
Potassium (total)	EMS0339-NOV24	mg/L	0.009	<0.009	3	20	99	90	110	97	70	130
Magnesium (total)	EMS0339-NOV24	mg/L	0.001	<0.001	0	20	101	90	110	117	70	130
Manganese (total)	EMS0339-NOV24	mg/L	0.00001	<0.00001	0	20	99	90	110	114	70	130
Molybdenum (total)	EMS0339-NOV24	mg/L	0.0004	<0.0004	2	20	102	90	110	108	70	130
Sodium (total)	EMS0339-NOV24	mg/L	0.01	<0.01	1	20	105	90	110	112	70	130
Nickel (total)	EMS0339-NOV24	mg/L	0.0001	<0.0001	3	20	106	90	110	111	70	130
Lead (total)	EMS0339-NOV24	mg/L	0.00009	<0.00009	6	20	93	90	110	100	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0339-NOV24	mg/L	0.003	<0.003	0	20	100	90	110	NV	70	130
Antimony (total)	EMS0339-NOV24	mg/L	0.0009	<0.0009	ND	20	105	90	110	108	70	130
Selenium (total)	EMS0339-NOV24	mg/L	0.00004	<0.00004	15	20	98	90	110	122	70	130
Silicon (total)	EMS0339-NOV24	mg/L	0.02	<0.02	7	20	100	90	110	NV	70	130
Tin (total)	EMS0339-NOV24	mg/L	0.00006	<0.00006	ND	20	101	90	110	NV	70	130
Strontium (total)	EMS0339-NOV24	mg/L	0.00008	<0.00008	1	20	98	90	110	101	70	130
Titanium (total)	EMS0339-NOV24	mg/L	0.0001	<0.0001	14	20	95	90	110	NV	70	130
Thallium (total)	EMS0339-NOV24	mg/L	0.000005	<0.000005	8	20	96	90	110	100	70	130
Uranium (total)	EMS0339-NOV24	mg/L	0.000002	<0.000002	5	20	96	90	110	104	70	130
Vanadium (total)	EMS0339-NOV24	mg/L	0.00001	<0.00001	6	20	97	90	110	106	70	130
Zinc (total)	EMS0339-NOV24	mg/L	0.002	<0.002	2	20	98	90	110	104	70	130
Calcium (total)	EMS0356-NOV24	mg/L	0.01	<0.01	0	20	97	90	110	97	70	130
Magnesium (total)	EMS0356-NOV24	mg/L	0.001	<0.001	0	20	102	90	110	94	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9412-NOV24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9412-NOV24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9412-NOV24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0584-NOV24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0263-NOV24	mg/L	0.002	<0.002	ND	10	100	80	120	87	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0271-NOV24	mg/L	0.02	<0.02	ND	20	94	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0586-NOV24	mg/L	2	< 2	0	10	96	90	110	NA		
Total Suspended Solids	EWL0588-NOV24	mg/L	2	< 2	0	10	101	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0019-DEC24	mg/L	0.05	<0.05	3	10	102	90	110	111	75	125
Total Kjeldahl Nitrogen (N)	SKA0264-NOV24	mg/L	0.05	<0.05	ND	10	99	90	110	98	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0579-NOV24	NTU	0.10	< 0.10	0	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 034933

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page ____ of ____

Laboratory Information Section - Lab use only

Received By: ____ Received By (signature): ____
Received Date: NOV 27 2024 (mm/dd/yy) Custody Seal Present: Yes ☐ No ☐ Cooling Agent Present: Yes ☐ No ☐ Type: ____
Received Time: 18 : 00 (hr : min) Custody Seal Intact: Yes ☐ No ☐ Temperature Upon Receipt (°C) 8 . 9 . 10 LAB LIMS #: NOV15898

REPORT INFORMATION
Company: DM WILLS
Contact: LYNSEY TUTERS
Address: 150 JAMESON DRIVE
Phone: 289-385-6230
Fax: ____
Email: ltuters@dmwills.com

INVOICE INFORMATION
☑ (same as Report Information)
Company: ____
Contact: ____
Address: ____
Phone: ____
Email: accounts@dmwills.com

Quotation #: ____ P.O. #: 7549
Project #: 7549 Site Location/ID: ____

TURNAROUND TIME (TAT) REQUIRED
☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day
RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION
Specify Due Date: ____
*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS
☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☑ PWQO ☐ MMER ☐ CCME ☐ Other: ____ ☐ MISA ☑ ODWS Not Reportable *See note
Sewer By-Law: ☐ Sanitary ☐ Storm Municipality: ____

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP- metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg Extended ☐ General ☐	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	MW24-01-II	Nov 27/24	AM	14	GW	N													X			
2	MW24-02-II	↓	AM	↓	↓	↓													X			
3	MW24-03-I		AM																X			
4	MW21-06		PM				→ recieved 15 bottles												X			
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Observations/Comments/Special Instructions

Sampled By (NAME): CHRIS OSTIC / LYNSEY TUTERS Signature: [signature] Date: 11, 27, 24 (mm/dd/yy)
Relinquished by (NAME): LYNSEY TUTERS Signature: [signature] Date: 11, 27, 24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.



FINAL REPORT

CA40050-DEC24 R1

7549

Prepared for

D.M. Wills -Peterborough

FINAL REPORT

First Page

CLIENT DETAILS

Client	D.M. Wills -Peterborough
Address	150 Jameson Drive Peterborough, ON K9J 0B9. Canada
Contact	Lynsey Tuters
Telephone	289-385-6230
Facsimile	705-741-3568
Email	ltuters@dmwills.com
Project	7549
Order Number	
Samples	Surface Water (4)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40050-DEC24
Received	12/04/2024
Approved	12/11/2024
Report Number	CA40050-DEC24 R1
Date Reported	12/11/2024

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 034931

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

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Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	SW1	SW2	SW3	SW4
				Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
				Sample Date	04/12/2024	04/12/2024	04/12/2024	04/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
General Chemistry								
UV Transmittance	%T				59.1	64.9	60.6	60.5
Alkalinity	mg/L as CaCO3	2			222	212	224	221
Bicarbonate	mg/L as CaCO3	2			222	212	224	221
Carbonate	mg/L as CaCO3	2			< 2	< 2	< 2	< 2
OH	mg/L as CaCO3	2			< 2	< 2	< 2	< 2
Colour	TCU	3	5		37	31	38	27
Conductivity	uS/cm	2			430	414	409	413
Total Suspended Solids	mg/L	2			2	2	< 2	2
Turbidity	NTU	0.10	5	1	1.4	4.0	1.3	1.4
Organic Nitrogen	mg/L	0.05			0.30	0.20	0.22	0.25
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.35	0.22	0.28	0.31
Ammonia+Ammonium (N)	as N mg/L	0.04			0.05	< 0.04	0.06	0.06
Dissolved Organic Carbon	mg/L	1	5		6	5	5	6
Total Organic Carbon	mg/L	1			5	4	5	5

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	SW1	SW2	SW3	SW4
				Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
				Sample Date	04/12/2024	04/12/2024	04/12/2024	04/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics								
Fluoride	mg/L	0.06		1.5	< 0.06	< 0.06	< 0.06	< 0.06
Bromide	mg/L	0.3			< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	0.10	0.19	2.31	0.11
Sulphate	mg/L	2	500		3	4	3	3
Sulphide	mg/L	0.02			< 0.02	< 0.02	< 0.02	< 0.02
Hardness	mg/L as CaCO3	0.05			235	236	235	232
Aluminum (total)	mg/L	0.001			0.007	0.024	0.006	0.006
Arsenic (total)	mg/L	0.0002		0.01	0.0003	0.0003	0.0003	0.0003
Boron (total)	mg/L	0.002		5	0.007	0.006	0.006	0.006
Barium (total)	mg/L	0.00008		1	0.0789	0.0751	0.0790	0.0762
Beryllium (total)	mg/L	0.000007			< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (total)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001
Cobalt (total)	mg/L	0.000004			0.000032	0.000048	0.000030	0.000037
Calcium (total)	mg/L	0.01			89.9	90.6	90.3	89.1
Cadmium (total)	mg/L	0.000003		0.005	< 0.000003	0.000008	< 0.000003	< 0.000003
Copper (total)	mg/L	0.001	1		< 0.001	< 0.001	< 0.001	< 0.001
Chromium (total)	mg/L	0.00008		0.05	0.00012	0.00009	0.00009	0.00014
Iron (total)	mg/L	0.007	0.3		0.083	0.089	0.088	0.087
Potassium (total)	mg/L	0.009			0.752	0.667	0.670	0.667
Magnesium (total)	mg/L	0.001			2.45	2.27	2.34	2.28
Manganese (total)	mg/L	0.00001	0.05		0.0273	0.0239	0.0429	0.0401

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	SW1	SW2	SW3	SW4
				Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
				Sample Date	04/12/2024	04/12/2024	04/12/2024	04/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Molybdenum (total)	mg/L	0.0004			< 0.0004	< 0.0004	< 0.0004	< 0.0004
Nickel (total)	mg/L	0.0001			0.0002	0.0001	0.0001	0.0001
Sodium (total)	mg/L	0.01	200	20	6.90	5.90	4.86	4.75
Phosphorus (total)	mg/L	0.003			0.011	0.007	0.006	0.007
Lead (total)	mg/L	0.00009		0.01	< 0.00009	0.00014	< 0.00009	< 0.00009
Silicon (total)	mg/L	0.02			2.39	2.67	2.82	2.77
Silver (total)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (total)	mg/L	0.00008			0.201	0.192	0.194	0.193
Thallium (total)	mg/L	0.000005			< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin (total)	mg/L	0.00006			< 0.00006	< 0.00006	< 0.00006	< 0.00006
Titanium (total)	mg/L	0.0001			0.0005	0.0009	0.0003	0.0004
Antimony (total)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004		0.05	0.00005	0.00008	0.00006	0.00006
Uranium (total)	mg/L	0.000002		0.02	0.000090	0.000083	0.000086	0.000083
Vanadium (total)	mg/L	0.00001			0.00027	0.00021	0.00019	0.00020
Zinc (total)	mg/L	0.002	5		< 0.002	< 0.002	< 0.002	< 0.002
Cation sum	meq/L	-9999			5.02	5.00	4.94	4.87
Anion Sum	meq/L	-9999			4.87	4.59	4.80	4.71
Anion-Cation Balance	% difference	-9999			1.56	4.29	1.47	1.72
Ion Ratio	none	-9999			1.03	1.09	1.03	1.04
Total Dissolved Solids (calculated)	mg/L	-9999			250	240	246	241
Conductivity (calculated)	uS/cm	-9999			494	479	487	479

Client: D.M. Wills -Peterborough
Project: 7549
Project Manager: Lynsey Tuters
Samplers: Lynsey Tuters

MATRIX: WATER

L1 = ODWS_AO / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	7	8	9	10
				Sample Name	SW1	SW2	SW3	SW4
				Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
				Sample Date	04/12/2024	04/12/2024	04/12/2024	04/12/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Langeliers Index 4° C	@ 4° C	-9999			0.53	0.55	0.45	0.51
Saturation pH 4°C	pHs @ 4°C	-9999			7.65	7.66	7.64	7.65
Microbiology								
Total Coliform	cfu/100mL	0		0	11	120	29	21
E. Coli	cfu/100mL	0		0	0	20	3	2
Heterotrophic Plate Count (HPC)	cfu/1mL	0			126	176	115	123
Other (ORP)								
pH	No unit	0.05			8.18	8.21	8.09	8.16
Chloride	mg/L	1	250		13	10	8	8
Mercury (total)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenols								
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	< 0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
SW1					
Colour	SM 2120	TCU	37	5	
Turbidity	SM 2130	NTU	1.4		1
Dissolved Organic Carbon	SM 5310	mg/L	6	5	
Total Coliform	SM 9222	cfu/100mL	11		0
SW2					
Colour	SM 2120	TCU	31	5	
Turbidity	SM 2130	NTU	4.0		1
Total Coliform	SM 9222	cfu/100mL	120		0
E.Coli	SM 9222D	cfu/100mL	20		0
SW3					
Colour	SM 2120	TCU	38	5	
Turbidity	SM 2130	NTU	1.3		1
Total Coliform	SM 9222	cfu/100mL	29		0
E.Coli	SM 9222D	cfu/100mL	3		0
SW4					
Colour	SM 2120	TCU	27	5	
Turbidity	SM 2130	NTU	1.4		1
Dissolved Organic Carbon	SM 5310	mg/L	6	5	
Total Coliform	SM 9222	cfu/100mL	21		0
E.Coli	SM 9222D	cfu/100mL	2		0

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0090-DEC24	mg/L as CaCO3	2	< 2	1	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0049-DEC24	mg/L	0.04	<0.04	ND	10	99	90	110	96	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8006-DEC24	mg/L	1	<1	0	20	98	80	120	87	75	125
Sulphate	DIO8006-DEC24	mg/L	2	<2	1	20	103	80	120	100	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bromide	DIO0096-DEC24	mg/L	0.3	<0.3	ND	20	98	90	110	78	75	125
Nitrite (as N)	DIO0096-DEC24	mg/L	0.03	<0.03	ND	20	98	90	110	102	75	125
Nitrate (as N)	DIO0096-DEC24	mg/L	0.06	<0.06	0	20	99	90	110	97	75	125
Bromide	DIO0098-DEC24	mg/L	0.3	<0.3	ND	20	101	90	110	93	75	125
Nitrite (as N)	DIO0098-DEC24	mg/L	0.03	<0.03	ND	20	99	90	110	99	75	125
Nitrate (as N)	DIO0098-DEC24	mg/L	0.06	<0.06	ND	20	100	90	110	98	75	125

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0050-DEC24	mg/L	1	<1	2	20	101	90	110	100	75	125
Total Organic Carbon	SKA0050-DEC24	mg/L	1	<1	2	20	101	90	110	100	75	125

Carbonate/Bicarbonate

Method: SM 2320 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Carbonate	EWL0090-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0090-DEC24	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0090-DEC24	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

QC SUMMARY

Colour

Method: SM 2120 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0100-DEC24	TCU	3	< 3	9	10	100	80	120	NA		

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0090-DEC24	uS/cm	2	< 2	3	20	99	90	110	NA		

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0092-DEC24	mg/L	0.06	<0.06	0	10	102	90	110	99	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0009-DEC24	mg/L	0.00001	< 0.00001	ND	20	95	80	120	119	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0060-DEC24	mg/L	0.00005	<0.00005	ND	20	97	90	110	78	70	130
Aluminum (total)	EMS0060-DEC24	mg/L	0.001	<0.001	1	20	94	90	110	118	70	130
Arsenic (total)	EMS0060-DEC24	mg/L	0.0002	<0.0002	2	20	94	90	110	113	70	130
Barium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	0	20	95	90	110	94	70	130
Beryllium (total)	EMS0060-DEC24	mg/L	0.000007	<0.000007	ND	20	92	90	110	103	70	130
Boron (total)	EMS0060-DEC24	mg/L	0.002	<0.002	1	20	105	90	110	107	70	130
Bismuth (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	ND	20	94	90	110	110	70	130
Calcium (total)	EMS0060-DEC24	mg/L	0.01	<0.01	1	20	101	90	110	100	70	130
Cadmium (total)	EMS0060-DEC24	mg/L	0.000003	<0.000003	19	20	97	90	110	108	70	130
Cobalt (total)	EMS0060-DEC24	mg/L	0.000004	<0.000004	4	20	99	90	110	109	70	130
Chromium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	13	20	93	90	110	105	70	130
Copper (total)	EMS0060-DEC24	mg/L	0.001	<0.001	1	20	96	90	110	113	70	130
Iron (total)	EMS0060-DEC24	mg/L	0.007	<0.007	8	20	102	90	110	125	70	130
Potassium (total)	EMS0060-DEC24	mg/L	0.009	<0.009	1	20	105	90	110	98	70	130
Magnesium (total)	EMS0060-DEC24	mg/L	0.001	<0.001	2	20	100	90	110	95	70	130
Manganese (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	2	20	100	90	110	107	70	130
Molybdenum (total)	EMS0060-DEC24	mg/L	0.0004	<0.0004	2	20	102	90	110	123	70	130
Sodium (total)	EMS0060-DEC24	mg/L	0.01	<0.01	2	20	103	90	110	99	70	130
Nickel (total)	EMS0060-DEC24	mg/L	0.0001	<0.0001	2	20	93	90	110	97	70	130
Lead (total)	EMS0060-DEC24	mg/L	0.00009	<0.00009	7	20	95	90	110	103	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0060-DEC24	mg/L	0.003	<0.003	0	20	102	90	110	NV	70	130
Antimony (total)	EMS0060-DEC24	mg/L	0.0009	<0.0009	ND	20	97	90	110	112	70	130
Selenium (total)	EMS0060-DEC24	mg/L	0.00004	<0.00004	8	20	92	90	110	107	70	130
Silicon (total)	EMS0060-DEC24	mg/L	0.02	<0.02	4	20	97	90	110	NV	70	130
Tin (total)	EMS0060-DEC24	mg/L	0.00006	<0.00006	5	20	102	90	110	NV	70	130
Strontium (total)	EMS0060-DEC24	mg/L	0.00008	<0.00008	1	20	95	90	110	99	70	130
Titanium (total)	EMS0060-DEC24	mg/L	0.0001	<0.0001	10	20	98	90	110	NV	70	130
Thallium (total)	EMS0060-DEC24	mg/L	0.000005	<0.000005	15	20	96	90	110	105	70	130
Uranium (total)	EMS0060-DEC24	mg/L	0.000002	<0.000002	5	20	96	90	110	112	70	130
Vanadium (total)	EMS0060-DEC24	mg/L	0.00001	<0.00001	0	20	95	90	110	109	70	130
Zinc (total)	EMS0060-DEC24	mg/L	0.002	<0.002	1	20	96	90	110	119	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9074-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Heterotrophic Plate Count (HPC)	BAC9074-DEC24	cfu/1mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9074-DEC24	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0090-DEC24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0047-DEC24	mg/L	0.002	<0.002	ND	10	99	80	120	100	75	125

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0059-DEC24	mg/L	0.02	<0.02	ND	20	99	80	120	NA	75	125

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0088-DEC24	mg/L	2	< 2	9	10	93	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0056-DEC24	mg/L	0.05	<0.05	ND	10	100	90	110	99	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0084-DEC24	NTU	0.10	< 0.10	5	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 034931

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page _____ of _____

Laboratory Information Section - Lab use only

Received By: Siri Romard
Received By (signature): Siri Romard
Received Date: 12/04/24 (mm/dd/yy)
Received Time: 17:00 (hr : min)
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ICE
Temperature Upon Receipt (°C): 4.5.3
LAB LIMS #: CA-40050-DEC24 SR

REPORT INFORMATION	INVOICE INFORMATION
Company: D.M Wills	☑ (same as Report Information)
Contact: Lynsey Tuters	Company:
Address: 150 Jameson Dr. Peterborough, ON.	Contact:
Phone: 289-385-6320	Address:
Fax:	Phone:
Email: ltuters@dmwills.com	Email: accounts@dmwills.com

Quotation #:
P.O. #: 7549
Project #: 7549
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☑ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☑ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Ti,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Aroclor ☐ Total ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other	Other	Other	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg ☑ Extended ☐ General	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	SW1	DEC 4/24	PM	14	SW	N																✓			
2	SW2	↓	PM	14	SW	N																✓			
3	SW3		PM	14	SW	N																✓			
4	SW4	↓	PM	14	SW	N																✓			
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME):	Lynsey Tuters	Signature:	Lynsey Tuters	Date: DEC/04/2024 (mm/dd/yy)
Relinquished by (NAME):	Lynsey Tuters	Signature:	Lynsey Tuters	Date: DEC/04/2024 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.7
Date of Issue: 07 JUNE 2023

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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

Project : 7549

08-January-2025

D.M. Wills -Peterborough
Attn : Lynsey Tuters

150 Jameson Drive
Peterborough, ON
K9J 0B9, Canada

Phone: 289-385-6230
Fax:705-741-3568

Date Rec. : 05 December 2024
LR Report: **CA15454-DEC24**
Reference: Project#:7549, Lynsey Tuters

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: MAC	6: AO/OG	7: Well 5-72hr
Sample Date & Time					05-Dec-24 13:30
Temp Upon Receipt [°C]	***	***	***	***	***
Total Coliform [cfu/100mL]	06-Dec-24	09-Dec-24	0	---	0
E.coli [cfu/100mL]	05-Dec-24	09-Dec-24	0	---	0
HPC [cfu/1mL]	06-Dec-24	09-Dec-24	---		4
Fecal Coliform [cfu/100mL]	05-Dec-24	09-Dec-24			0
Residual Chlorine [mg/L]	11-Dec-24	12-Dec-24			< 0.02
Chlorine Demand [mg/L]	11-Dec-24	12-Dec-24			0.40
Chlorine Demand pH [no unit]	11-Dec-24	12-Dec-24			7.73
Chlorine Demand temp [°C]	11-Dec-24	12-Dec-24			21.3
UV Transmittance [%T]	06-Dec-24	06-Dec-24	---	---	92.0
Alkalinity [mg/L as CaCO3]	06-Dec-24	09-Dec-24	---	30-500	233
HCO3 [mg/L as CaCO3]	06-Dec-24	09-Dec-24	---	---	233
CO3 [mg/L as CaCO3]	06-Dec-24	09-Dec-24	---	---	< 2
OH [mg/L as CaCO3]	06-Dec-24	09-Dec-24			< 2
Colour [TCU]	06-Dec-24	06-Dec-24	---	5	21
Conductivity [uS/cm]	06-Dec-24	09-Dec-24	---	---	613
pH [No unit]	06-Dec-24	09-Dec-24	---	6.5-8.5	7.77
TSS [mg/L]	06-Dec-24	06-Dec-24	---	---	2
Turbidity [NTU]	05-Dec-24	06-Dec-24	1	5	0.20
Organic N [mg/L]	06-Dec-24	09-Dec-24	---	0.15	< 0.05
TKN [as N mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.05
NH3+NH4 [as N mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.04
DOC [mg/L]	06-Dec-24	09-Dec-24	---	5	2
TOC [mg/L]	06-Dec-24	09-Dec-24	---	---	2
Cl [mg/L]	06-Dec-24	06-Dec-24	---	250	50
F [mg/L]	06-Dec-24	06-Dec-24	1.5	---	< 0.06
Br [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.3
NO2 [as N mg/L]	06-Dec-24	09-Dec-24	1	---	< 0.03

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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : 7549

LR Report : **CA15454-DEC24**

Analysis	1: Analysis Start Date	3: Analysis Completed Date	5: MAC	6: AO/OG	7: Well 5-72hr
NO3 [as N mg/L]	06-Dec-24	09-Dec-24	10	---	4.46
SO4 [mg/L]	06-Dec-24	06-Dec-24	---	500	19
Sulphide [mg/L]	06-Dec-24	06-Dec-24	---	0.05	< 0.02
4AAP-Phenolics [mg/L]	06-Dec-24	09-Dec-24	---	---	0.002
Hg (tot) [mg/L]	09-Dec-24	09-Dec-24	0.001	---	< 0.00001
Hardness [mg/L as CaCO3]	06-Dec-24	09-Dec-24	---	80-100	293
Al (tot) [mg/L]	06-Dec-24	09-Dec-24	---	0.1	< 0.001
As (tot) [mg/L]	06-Dec-24	09-Dec-24	0.01	---	< 0.0002
B (tot) [mg/L]	06-Dec-24	09-Dec-24	5	---	0.021
Ba (tot) [mg/L]	06-Dec-24	09-Dec-24	1	---	0.158
Be (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.000007
Bi (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	0.00003
Co (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	0.000031
Ca (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	109
Cd (tot) [mg/L]	06-Dec-24	09-Dec-24	0.005	---	0.000004
Cu (tot) [mg/L]	06-Dec-24	09-Dec-24	---	1	< 0.001
Cr (tot) [mg/L]	06-Dec-24	09-Dec-24	0.05	---	0.00015
Fe (tot) [mg/L]	06-Dec-24	09-Dec-24	---	0.3	< 0.007
K (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	2.12
Mg (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	4.75
Mn (tot) [mg/L]	06-Dec-24	09-Dec-24	---	0.05	0.00006
Mo (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.0004
Ni (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.0001
Na (tot) [mg/L]	06-Dec-24	09-Dec-24	20*	200	31.7
P (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.003
Pb (tot) [mg/L]	06-Dec-24	09-Dec-24	0.01	---	< 0.00009
Si (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	3.57
Ag (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.00005
Sr (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	0.262
Tl (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	0.000053
Sn (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.00006
Ti (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	< 0.0001
Sb (tot) [mg/L]	06-Dec-24	09-Dec-24	0.006	---	< 0.0009
Se (tot) [mg/L]	06-Dec-24	09-Dec-24	0.05	---	0.00020
U (tot) [mg/L]	06-Dec-24	09-Dec-24	0.02	---	0.000158
V (tot) [mg/L]	06-Dec-24	09-Dec-24	---	---	0.00016
Zn (tot) [mg/L]	06-Dec-24	09-Dec-24	---	5	0.003
Cation Sum [meq/L]	---	---	---	---	7.29
Anion Sum [meq/L]	---	---	---	---	6.53
Anion-Cation Balance [% difference]	---	---	---	---	5.55
Ion Ratio [none]	---	---	---	---	1.12
TDS (calculated) [mg/L]	---	---	---	---	361
Conductivity (calc) [uS/cm]	---	---	---	---	691
Langelier's Index [@ 4° C]	---	---	---	---	0.21
Saturation pH [pHs @ 4°C]	---	---	---	---	7.56

MAC - Maximum Acceptable Concentration

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

Project : 7549

LR Report : **CA15454-DEC24**

AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.



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

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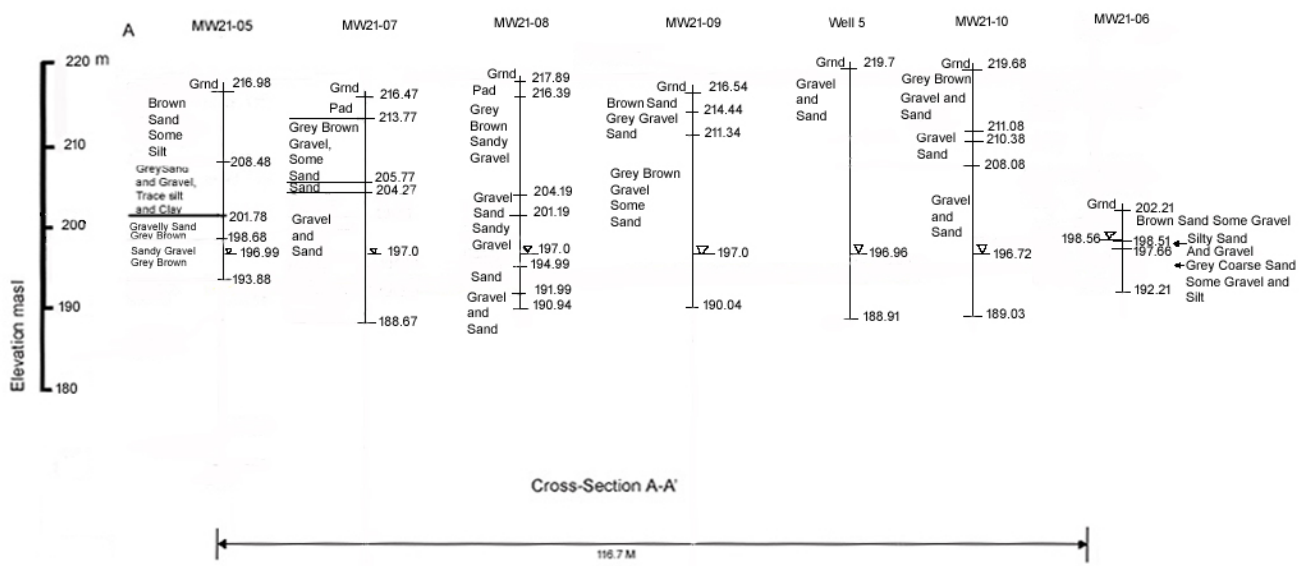
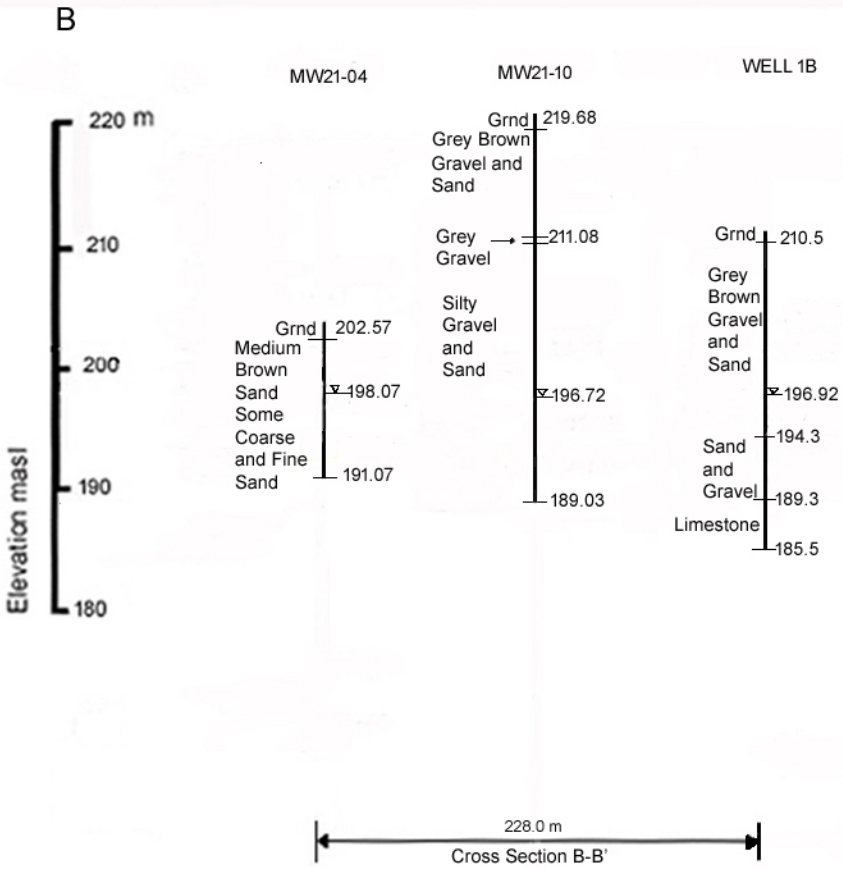
Appendix F

Cross Sections


A
MW21-05
MW21-07
MW21-08
MW21-09
Well 5
MW21-10
MW21-06
220 m
210
200
190
180
Elevation masl
Grnd 216.98
Brown Sand Some Silt
208.48
Grey Sand and Gravel, Trace silt and Clay
201.78
Gravelly Sand Grey Brown
198.68
Sandy Gravel Grey Brown
196.99
193.88
Grnd 216.47
Pad 213.77
Grey Brown Gravel, Some Sand
Sand 205.77
204.27
Gravel and Sand
197.0
188.67
Grnd 217.89
Pad 216.39
Grey Brown Sandy Gravel
Gravel 204.19
Sand 201.19
Sandy Gravel 197.0
194.99
Sand
Gravel and Sand 191.99
190.94
Grnd 216.54
Brown Sand Grey Gravel Sand 214.44
211.34
Grey Brown Gravel Some Sand
197.0
190.04
Grnd 219.7
Gravel and Sand
196.96
188.91
Grnd 219.68
Grey Brown Gravel and Sand
211.08
Gravel Sand 210.38
208.08
Gravel and Sand
196.72
189.03
Grnd 202.21
Brown Sand Some Gravel
198.56
198.51
Silty Sand And Gravel
197.66
Grey Coarse Sand Some Gravel and Silt
192.21
Cross-Section A-A'
116.7 M


B
B'
MW21-04
MW21-10
WELL 1B
220 m
210
200
190
180
Elevation masl
Grnd 202.57
Medium Brown Sand Some Coarse and Fine Sand
198.07
191.07
Grnd 219.68
Grey Brown Gravel and Sand
Grey Gravel
211.08
Silty Gravel and Sand
196.72
189.03
Grnd 210.5
Grey Brown Gravel and Sand
196.92
194.3
Sand and Gravel
189.3
Limestone
185.5
228.0 m
Cross Section B-B'

Appendix G

2026 Conceptual Model Development Summary

2026 Norwood Water Supply Model Development

Before 2017, the Municipal Well Field consisted of Well 1, Well 2, and Well 3. Wells 1 and Well 2 were installed in the surficial deposits (silt, sand, gravel and trace clay) overlying bedrock.

Well 3 was installed mostly in the surficial deposits but with the screen 0.9 m into bedrock. Depths range from 20.9 m/189.5 masl (Well 1), 22.3 m/189.4 masl (Well 2), and 30.5 m/188.0 masl (Well 3). Bedrock was only encountered in Well 3 at a depth of 29.6 m/188.9 masl.

In 2017/2018 two new municipal wells were installed at locations on top of the esker - TW17-01 (later designated Well 4) and TW17-02(later designated Well 1b). Both wells were drilled into the bedrock. In Well 4 bedrock was encountered at a depth of 29.26 m/188.9 masl and the bottom of the well is at a depth of 30.79 m/187.36 masl. The 8 inch diameter screen length is 3.7 m and was installed from 191.7 to 188.0 masl. The static water level (swl) after installation of the well screen was 21.49 m/197.85 masl.

Well 1b was installed on the southeast side of the esker adjacent to Well 1 and was drilled into the bedrock as sufficient water was not found in the overlying surficial silty sand and gravel deposits. Bedrock was encountered at a depth of 21.2 m/189.3 masl. The borehole was drilled to 25.0 m (3.8 m into the bedrock at an elevation of 185.5 masl). A casing was installed into the top of bedrock with an open hole within the bedrock to allow water to enter.

Both of these new wells were tested in short term variable rate step pumping tests. The hydraulic conductivity (K) was determined from the data obtained from these tests. Existing Well 2 and Well 3 were also subjected to step tests. Results for Wells 4, 3, 2, and 1b were $3x10^{-2}$ m/sec (2,590 m/d), $4x10^{-3}$ m/sec (346 m/d), $1x10^{-3}$ m/sec (86.4 m/d) and $3x10^{-4}$ m/s (25.9 m/d) respectively.

These tests give approximations of K values, but the results indicate the K of Well 4, with the screen in the basal sand and gravel as well as the bedrock is significantly higher than Well 3 and Well 2. However, the K derived from testing on Well 1b indicated a relatively low K value. These results were interpreted to show that bedrock may exhibit significant fracturing in some areas contributing to well yield but not in other areas. The presence of karst features (solution enhanced fractures, disappearing and reappearing streams) mapped in 2025 confirmed this.

The conclusions derived from this testing were that there are certain areas of the bedrock which have significantly higher K values than other areas and that the surficial deposits overlying bedrock have variable K values which seem to indicate permeable core deposits (areas around Well 3 and Well 4 and less permeable flank deposits (areas around Well 2 and Well 1b).

Well 5 was drilled and installed in 2025. This 10-inch (0.25 m) diameter well was installed near the new water tower on top of the esker with a ground elevation of 219.7 masl. The static water level at the time of testing was 23.65 mbgs (196.05 masl). The depth of

the well is 30.79 m (188.91 masl) which is the elevation of the top of bedrock. The screen was installed from 27.74 m to 30.79 m, a length of 3.05 m. Beginning on December 2, 2024, the well was tested at a constant rate of 1,853.28 m^3/day for 72 hours with a maximum drawdown of 1.0 m.

In 2024, three monitoring wells were installed in Mill Pond to determine the characteristics of the pond bottom and depth to bedrock in the area. Two hand-driven piezometers were installed along the Ouse River upstream of the inlet on the Ouse River. An additional piezometer was installed near the outlet of the Ouse River from Mill Pond.

The conceptual models formulated for the 2018 modelling exercise was somewhat similar to the original conceptual model (2006). This was comprised of the sands and gravels of the Norwood Esker being the primary water source with glaciolacustrine deposits which flanked the esker deposits contributing groundwater to the esker as the water moved south from higher ground to the north. This was modified in 2018 to include a relatively high-K narrow core (which in the vicinity of the Municipal Well Field is in the area around Well 4) which extended along the esker from north to south.

Two nested monitoring wells (one in overburden and one in bedrock) were installed in 2025 as part of the Norwood waste disposal site environmental monitoring program - MW25-01-I&II and MW25-02-I&II. MW25-02 is northeast of MW25-01. The ground elevation of MW25-01 is 212.27 masl and MW25-02 is 216.87 masl. MW25-01 has 10.65 m of sand and gravel with thin layers of sandy gravel and sand and gravel till over bedrock which was encountered at elevation 201.62 masl. 0.65m of weathered limestone bedrock overlies competent limestone. The monitoring well screen is within the bedrock and static water level after drilling was 203.22 masl. This is within the sand and gravel deposits.

MW25-02 has 11.90 m of sand and gravel to gravel overlying limestone bedrock. The overburden monitoring well which monitors the basal sand and gravel was dry at the time of drilling and has been consistently dry on subsequent monitoring dates. The deep monitoring well which monitors the limestone bedrock reported a static water level of 203.88 masl, which is below the bedrock surface. Subsequent monitoring confirmed this result.

Based on the results from these two monitoring wells, the esker deposits become dry at some point between MW25-01 and MW25-02. Groundwater sinks below the bedrock surface underlying the esker between and northeast of these monitoring wells.

All previous numerical and conceptual models were reviewed in the preparation of the 2026 conceptual model. In the area on the northeast edge of the waste disposal site, the results from MW25-01 and MW25-02 indicate that groundwater likely flows predominantly in the bedrock northeast of MW25-02. It is possible that with seasonal variations, the groundwater level could rise to or above the bedrock surface for parts of the year.

The map of the bedrock surface shows a deep south trending bedrock valley beginning just east of Highway 7 where it crosses the Asphodel 10th Line. A cross section through the area from west of Highway 7 east through the bedrock valley shows the

elevation of the bedrock varies from a high of 220 masl in the west where the Ouse River west of Mill Pond makes a right-angle turn to the southeast to 201 masl in the east over a distance of approximately 800-900 m. This valley appears to be presently occupied by the pond east of Mill Pond. This bedrock valley likely influences groundwater flow and directs that flow from the esker to the north to east of Mill Pond and from there south into the Ouse River as is flows south of Mill Pond roughly parallel to the trend of the esker.

Site inspections for the presence of karst features was carried out in 2025. Disappearing and emerging streams were encountered on the Ouse River west and south of the waste disposal site before the Ouse River enters Mill Pond. It is likely that karst features are common and extensive in the area. A possible scenario could involve karst features in the bedrock extending from southwest of Well 4 to northeast of the landfill. High flow conditions in the karst features in the bedrock under the ice during the last warming phase of the last ice age could be the reason the esker formed in this location. The high K encountered in Well 4 could be due to the presence of enlarged fractures and/or a conductive weathered zone at the bedrock surface rather than due to the permeable sand and gravel.

Previous Modelling

The initial attempts to model the Norwood Municipal Well System including Wells 1, 2 and 3, were carried out by XCG Limited in 2006 and 2010 and presented in the Wills 2018 report on updated modelling. This report included a detailed description of the process of updating the 2006/2010 groundwater model with simulated Well Head Protection Areas (WHPA) and vulnerability zones. (20180810-7128 Norwood Municipal Wells Updated Modelling, Township of Asphodel-Norwood. D. M. Wills Associates Limited, Peterborough, Ontario, November, 2018)

When it became apparent that deficiencies in the 2006 & 2010 XCG models, and lack of data for the 2010 model, would not be adequate to produce WHPAs for the existing Norwood system and the new wells, TW17-01 (Well 4) and TW17-02 (Well 1B), it was decided that the grid, elevation, and boundary conditions (with the exception of recharge) from the 2006 XCG model could be used to construct a model using USGS MODFLOW2000 and MODFLOW2005 versions of the model. MODFLOW2000 and 2005 are identical except for a few added flow packages in MODFLOW2005 which are not relevant to the Norwood model. The MODFLOW2000 model was run in MODFLOW2005 with no changes.

4.2 Construction of the 2018 Updated Model

The 1-layer model generated in MODFLOW96 alluded to above, was used to construct a 4-layer model in MODFLOW2005 (hereafter called the 2018 updated model) using the graphical user interface Visual Modflow (Waterloo Hydrogeologic). Municipal wells 1, 2 and 3 plus new wells TW17-01 (Well 4) and TW17-02 (Well 1B) were added to the model. The grid extents were the same as the 2006 XCG model but the rectangular grid spacing was refined in the area of the municipal wells to approximately 6 by 7 m. This would give better resolution in the area of the wells both for more accurate groundwater contours and backward tracking pathlines.

Changes were also made to layer 4 in the vicinity of TW17-02 (Well 1B) and this layer made to represent the bedrock in the vicinity of this well. The layer thickness in the vicinity of TW17-02 was shrunk to the open hole length in the well by subdividing the layer as this would make simulation of the step tests more representative. Layer 4 in the vicinity of wells which spanned the bedrock contact such as Well 3 and TW17-01 (Well 4), was represented as a hybrid layer consisting of permeable overburden and fractured bedrock.

The storativity and effective porosity of layer 4 bedrock was reduced to 0.0001 and 0.01 respectively, which is more representative of fractured rock. The storativity value is very important for matching the step test results. The effective porosity (connected porosity) is used in the particle tracking model MODPATH and directly affects the extent of the capture zones.

The top of the model, layer 1, is the ground surface (the same as the top of layer 2 in the 2006 XCG model) which was reportedly constructed from a digital elevation model (DEM). The bottom of layer 4 in the updated model, was the same as the bottom of layer 2 in the 2006 XCG model and reportedly represents a surface 2 m below the bedrock surface. As described above, changes were made to this representation in the 2018 updated model to enable the simulation of a bedrock/overburden layer.

The general head boundaries in the 2006 XCG model, which represented the wetlands and open surface water except rivers, were imported into the updated model. The heads (water levels) assigned to these boundaries were at the ground surface (top of layer 1). The conductance term was adjusted to a much lower value after a few model runs and this produced better results.

Conductance describes a term that represents the ease of transfer from the groundwater to the boundary or from the boundary to groundwater.

Constant head boundaries from the 2006 XCG model were imported into the appropriate layer in the updated model. River boundaries were added in the updated model with a relatively low conductance, which was adjusted during several model runs as is usually done.

Hydraulic conductivities from the 2006 XCG model were imported into the 2018 updated model and were adjusted in accordance with the results of the recent hydrogeological review (Rannie 2018).

The 2006 XCG report K values for the esker ranged from 846 m/day for the core of the esker to 43 m/day for the flanks of the esker. Results from the recent hydrogeological review indicate that the esker core is approximately three times more permeable than as represented in the 2006 XCG model. However, in defense of the 2006 XCG model, K values were estimated from the literature.

The core of the esker in the 2018 updated model is represented with a K value of 2,592 m/d. The K values of the flanks of the esker range from 345.6 to 43.2 m/d. Well 2 is surrounded by a small area of 125 m/d but with a more general surrounding area of 100 m/d. Some of these values were arrived at after small adjustments in some areas,

when attempting to match the simulated step test drawdowns with the observed drawdowns.

Model Reconstruction 2026

The 2006 and 2018 models were constructed in local coordinates without reference to the UTM grid. The current reconstructed model was constructed using a grid referenced to UTM coordinates as required by regulatory agencies.

The basemap for the model was the roads network for an area around the Village of Norwood to the area of Havelock to encompass the bulk of the Norwood Esker which trends from southwest of Norwood to just west of Havelock. Superimposed on the basemap were the bedrock elevations in UTM format and the overlying drift thickness. In the local area of Norwood Village, these elevations were adjusted based on drilling logs from monitoring wells around the municipal wells and monitoring wells in the waste disposal site just northwest of the Village on the west flank of the esker.

Boundary conditions (rivers, lakes, wetlands and recharge) for the model were derived from topographic maps and adapted from previous boundary conditions in the 2018 model. Recharge was adjusted slightly during calibration.

Hydraulic conductivity values were available from previous aquifer testing (Rannie, 2018), and Wills' field work during 2021-2025. These were discussed in the section on aquifer testing and under the conceptual model section.

Since monitoring wells installed in field programs consist of high quality elevation data, formation contacts from the borehole logs were extracted and contoured in the Surfer contouring software program. The data included elevation of the bedrock surface and the ground surface as well as the elevation of the organic bottom layer in Mill Pond. These surfaces were entered into the model to improve local formation elevations.

The monitoring wells and the average static water levels were used as calibration points in the model.

4.3 Calibration of the Model

Model calibration refers to a demonstration that the model is capable of producing field-measured heads and flows which are the calibration values. Calibration is accomplished by finding a set of parameters, boundary conditions, and stresses that produce simulated heads and fluxes that match field-measured values within a pre-established range of error (Anderson and Woessner, 1992).

The field work carried out between 2018 and 2026 included installation of groundwater monitoring wells in the area of the municipal well field as well as on the northeast edge of the waste disposal site north of Mill Pond and adjacent to Mill Pond. In addition, three monitoring wells were installed in the Mill Pond and three drive-point piezometers were installed one 0.2 km upstream of Mill Pond on the Ouse River, one where the Ouse River enters Mill Pond, and one at the eastern end of Mill Pond where it flows into the Ouse

River to the south. The average static water elevations measured in these drive-point piezometers were used as calibration points in the model.

The pumping tests on municipal wells in 2017/2018, 2022, and 2025 produced results in terms of aquifer parameters which were used in the models.

4.4 Model Verification

There is always a level of uncertainty in model construction due to lack of data. The set of parameter values used in the model may not accurately represent field values. A model is verified if its accuracy and predictive capability have been proven to lie within acceptable limits of error by tests independent of the calibration data (Anderson and Woessner, 1992). In a typical verification exercise, values of parameters and hydrologic stresses (such as pumping groundwater) determined during calibration are used to simulate a transient response for which a set of field data exist. Transient data sets include pumping test data and changes in water levels in response to drought or to long-term pumping.

Transient models were run for the step test data sets during the 2018 updated modelling. Using the same model, transient models were also set up once the pumping test data on Well 1B, 2, 3, and 4 were analyzed. These models produced acceptable results in terms of simulated versus observed drawdowns in the pumping and Observation Wells.

The model update in 2023 used the pumping test results to assign modified aquifer parameters and groundwater elevations in the monitoring wells installed in the 2022 program were used as calibration points. Pumping tests on Wells 1B, 2, 3, and 4 comprised the data sets with which the model was verified.

The 2026 updated model was used to simulate the pumping test on Well 5. A transient model was adapted from the steady-state model with nine stress periods. The first stress period was with no wells pumping and produced a simulated static water level in Well 5. The second to ninth stress period mirrored the pumping test specifications for Well 5. Stress period 2 to 9 covered a period of 72 hours with Well 5 pumping at 1,853.28 m^3/d. The municipal wells 1 and 2 were also pumping on and off during the pumping test on Well 5 and these were included in the model.

In Well 5, the simulated static water level was 198.74 masl; the simulated pumping level was 198.32 masl. A correction (Peaceman correction) is carried out which translates the simulated water level elevation in the model cell to a simulated water level elevation in the well. The simulated and corrected drawdown in Well 5 after 72 hours of pumping was 0.46 m. The actual drawdown was 0.9-1.0 m. This corrected drawdown assumes a 100% efficient well which is very unlikely. Therefore, the simulated corrected drawdown is reasonably close to the actual drawdown when well efficiency is considered.

Appendix H

PTTW 7130-BMCT9C

AMENDED PERMIT TO TAKE WATER
Ground Water
NUMBER 7130-BMCT9C

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

The Corporation of the Township of Asphodel-Norwood
2357 County Road 45
Norwood, Ontario, K0L 2V0
Canada

For the water taking from: Norwood Municipal Supply Wells:
Well 1, Well 2, Well 3 & Well 4

Located at: Lot 17, Concession 8, Geographic Township of Asphodel
Asphodel-Norwood, County of Peterborough

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment, Conservation and Parks.

(d) "District Office" means the Peterborough District Office.

(e) "Permit" means this Permit to Take Water No. 7130-BMCT9C including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means The Corporation of the Township of Asphodel-Norwood.

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated November 12, 2019 and signed by Kyle Beacock, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act*, S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act*, and the *Environmental Protection Act*, and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that

contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **March 3, 2030**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Well 1	Well Drilled	Municipal	Water Supply	455	24	655,000	365	18 262509 4918512
2	Well 2	Well Drilled	Municipal	Water Supply	455	24	655,000	365	18 262480 4918495
3	Well 3	Well Drilled	Municipal	Water Supply	455	24	655,000	365	18 262390 4918463
4	Well 4	Well Drilled	Municipal	Water Supply	455	24	655,000	365	18 262383 4918678
						Total Taking:	1,965,000		

3.3 The Permit Holder shall ensure the total combined water taking for all wells does not exceed 1,965,000 litres per day.

4. Monitoring

4.1 The Permit Holder shall, on each day water is taken under the authorization of this

Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit or as otherwise accepted by the Director. A separate record shall be maintained for each source. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the daily water taking data collected and recorded for the previous year to the ministry's Water Taking Reporting System.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, as amended, provides that the Notice requiring the hearing shall state:

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
Email: ERTTribunalsecretary@ontario.ca

AND

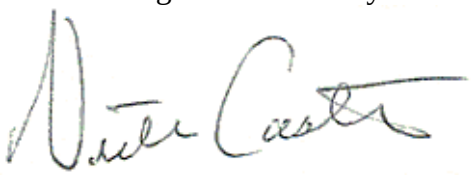
The Director, Section 34.1,
Ministry of the Environment, Conservation and Parks
1259 Gardiners Rd, PO Box 22032
Kingston, ON
K7P 3J6

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

This Permit cancels and replaces Permit Number 1360-98RPXS, issued on 2013/06/18.

Dated at Kingston this 4th day of March, 2020.



Victor Castro
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule “A” forms part of Permit To Take Water 7130-BMCT9C, dated March 4, 2020.