

Hydrogeological Investigation & Terrain Analysis Proposed Residential Severance 930 Smith Road Ottawa, Ontario



Submitted to:

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1.0 INTRODUCTION

GEMTEC Consulting Engineers and Scientists (GEMTEC) Limited was retained by Hierarchy Development and Design Inc. (HDD) to complete a hydrogeological investigation and terrain analysis in support of a residential development located at 930 Smith Road, Ottawa, Ontario. The Site Plan, Figure 1 is provided following the text of this report.

It is understood that the existing site located at 930 Smith Road, herein referred to as the 'Site', has a total area of approximately 5.46 hectares. Based on the Concept Plan provided (Appendix A), a total of seven residential lots are proposed.

The Site consists of agricultural lands and sparse tree and bush cover. The Site is bounded to the east and south by Smith Road, and residential dwelling to the north and west.

The objective of the investigation presented herein is:

- To demonstrate that the construction of any new well on the severed parcels is in accordance with the MECP;
- To demonstrate that the quality of the well water meets the Ontario Drinking Water Standards and maximum treatable limits prescribed in Ontario Ministry of Environment, Conservation and Parks (MECP) Procedure D-5-5;
- To demonstrate that the quantity of water meets the MECP requirements; and,
- To demonstrate the septic impact assessment meets the MECP requirements.

The hydrogeological investigation and terrain analysis was completed in general accordance with the City of Ottawa Hydrogeological and Terrain Analysis Guidelines (City of Ottawa, 2021), technical consultation with City of Ottawa hydrogeologist Michel Kearney on June 21, 2022 and City of Ottawa review comments titled "Phase 3 Pre-Consultation: Review Feedback, Proposed Zoning By-law Amendment and Consent Application – 930 Smith Road" and dated May 10, 2024.

This report is subject to the *Conditions and Limitations of This Report* provided following the text of this report, which are considered an integral part of this report.

2.0 TERRAIN ANALYSIS

2.1 Site Geology

Surficial geology maps (Ontario Geologic Survey, 2010) indicate that the site is split diagonally by a fluvial terrace, which is aligned in the northeast-southwest direction. The northeast section of the site is mapped as coarse-textured glaciomarine deposits of sand, gravel and minor silt and clay. The southwest section of the site is mapped as fine-textured glaciomarine deposits of



silt and clay, and minor sand and gravel. Drift thickness mapping indicate the overburden soils range from 10 to 25 meters thick (Gao et al, 2006).

Paleozoic bedrock geology maps (Armstrong and Dodge 2007) indicate the bedrock geology beneath the subject site consists of shale and minor limestone of the Billings Formation from the Upper Ordovician Period. Underlying the Upper Ordovician Period formations are the Simcoe Group of the of the Middle Ordovician, and the Beekmantown Group of the Lower Ordovician. The Simcoe Formation consists broadly of limestone, dolostone, shale and sandstone units. The Beekmantown Group consists of the Oxford Formation, which is described as a dolostone with shaly and sandy interbeds, which is underlain by the March Formation, an interbedded grey quartz sandstone, dolomitic quartz sandstone, and blue-grey sandy dolostone and dolostone.

Available karst mapping (Brunton and Dodge, 2008), does not indicate any areas of any inferred or potential karstic features.

2.2 Subsurface Conditions

The subsurface conditions at the site were characterized as part of the geotechnical investigation of the site (GEMTEC, 2024). A total of four boreholes (numbered 21-01, 21-02A, 21-02B, and 21-03) were advanced.

The boreholes were advanced to depths ranging from about 6.7 to 8.8 metres below ground surface. Samples of the soils encountered were recovered using a 50-millimetre diameter split barrel sampler. Well screens were sealed in the overburden at all borehole locations (except borehole 20-02B) to measure the groundwater levels and for hydraulic conductivity testing.

Descriptions of the subsurface conditions logged in the boreholes are provided on the Record of Borehole sheets in Appendix B. The approximate locations of the test holes are shown on the Detailed Site Plan, Figure 2.

The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or because of construction activities in the area.

The following presents a summary of the subsurface conditions encountered in the boreholes advanced during the geotechnical investigation (GEMTEC, 2024).

2.2.1 Topsoil

A layer of topsoil was encountered at the ground surface at the borehole locations with a thickness ranging from about 130 to 180 millimetres.



2.2.2 Silty Sand

A native deposit of silty sand was encountered below the topsoil in borehole 21-02A and 21-02B with a thickness of about 150 millimetres.

2.2.3 Silty Clay

Native deposits of silty clay were encountered in all of the boreholes. The silty clay was not fully penetrated in all the boreholes but was proven to depths ranging from about 5.3 to 8.8 metres below ground surface.

The upper part of the silty clay in the boreholes is weathered to a grey-brown crust. The weathered silty clay crust has a thickness ranging from about 2.8 to 5.2 metres and extends to depths ranging from about 3.1 to 5.3 metres below the existing ground surface.

Grain size distribution tests were undertaken on one sample of the weathered silty clay crust from borehole 21-01. The results are provided in Appendix C and are summarized in Table 1.

Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
21-01	3	1.5 – 2.1	0	1	21	78

Table 1 – Summary of Grain Size Distribution Test (Weathered Crust)

Below the weathered zone, the silty clay is grey in colour. The silty clay was not fully penetrated in all the boreholes but was proven to depths ranging from about 5.3 to 8.8 metres below ground surface.

2.2.4 Glacial Till

A deposit of glacial till was encountered below the silty clay in borehole 21-03. The glacial till was not fully penetrated in the borehole but was proven to depth of about 6.1 metres below ground surface.

The glacial till is a heterogeneous mixture of all grain sizes, which at this site, can be described as grey silty sand with some gravel and clay. Although not encountered in the borehole directly, the glacial till deposits in this area are known to contain cobbles and boulders.

One grain size distribution test was undertaken on a sample of the glacial till from borehole 21-03. The results are provided in Appendix C and are summarized in Table 2.



Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
21-03	8	5.3 – 5.9	16	44	24	16

Table 2 – Summary of Grain Size Distribution Test (Glacial Till)

2.2.5 Auger Refusal

Auger refusal was encountered in borehole 21-02A at a depth of about 8.2 metres below ground surface (elevation of about 72.7 metres, geodetic).

2.2.6 Groundwater Levels

Well screens were installed in the overburden at boreholes 21-01, 21-02A, and 21-03. The groundwater levels measured in the wells are summarized in Table 3.

Borehole No.	Ground Surface Elevation (metres)	Groundwater Depth (metres)	Groundwater Elevation (metres)	Date of Reading
21-01	78.94	3.7	75.2	September 13, 2021
21-02A	80.95	2.1	78.9	September 13, 2021
21-03	80.08	> 6.1	< 74.0	September 13, 2021

Table 3 – Groundwater Depth and Elevation

The groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation. Based on the groundwater levels measured on September 13, 2021, the overburden groundwater flow direction is to the south, following topography.

2.2.7 Hydraulic Test Results

The results of the hydraulic testing carried out in select monitoring wells are provided in Appendix D. A summary of the recovery measurements made during the hydraulic testing carried out by introducing/removing a slug into the well screens is provided in Table 4.

Borehole	Borehole Depth (metres)	Geological Material Tested	Static Groundwater Depth (metres)	Falling Head Test ¹	Calculated <i>k</i> Falling Head (m/s) ²
21-01	7.32	Silty clay	3.7	73% in 90 minutes	1 x 10 ⁻⁷
21-02A	8.18	Silty clay	3.0	7% in 60 minutes	3 x 10⁻ ⁸
21-03	6.10	Silty clay	dry	-	-

Table 4 – Summary of Falling Head and Rising Head Test Results

Notes:

1. Falling head test were completed by inserting a slug with a known displacement (0.60 metre). The water level was monitored manually using a water level meter and electronically using a VanEssen Diver Datalogger, recording at 0.5 minute intervals.

2. The hydraulic conductivities were calculated using the Hvorslev solution in an unconfined aquifer.

3. The recovery in the monitoring wells was too slow to complete a rising head test.

The falling head tests (i.e. inserting a slug) recorded a recovery of about 73 percent at 21-01 and about 7 percent at 21-02A. Considering this to be slow to very slow recovery of groundwater levels the rising head tests were not performed at these two test locations. Based on the low permeability silty clay at the screened interval at monitoring wells 21-01 and 21-02A, the minimal recovery is reasonable for the encountered soil type.

In areas within the site where a saturated granular soil layer is encountered, higher hydraulic conductivity values should be expected.

2.3 MECP Water Well Records

A search of the Ministry of Environment, Conservation and Parks (MECP) water well records (https://www.ontario.ca/environment-and-energy/map-well-records) returned 55 water well records within 500 metres of the Site, refer to Site Location Plan (Figure 1). A summary of the relevant well construction details from the 55 water well records is provided in Appendix E. The well depths range from 13.7 to 61.1 metres below ground surface, with an average well depth of 23.3 metres. The depth to bedrock ranges from 12.2 to 37.5 meters below ground surface, with an average value of 20.2 metres.

The bedrock lithology is generally classified as shale, slate, and limestone in the MECP well records, with most records indicating shale or slate. It is noted that the MECP well records provide a general description of the bedrock encountered, and given the similarities between some geologic units, e.g. slate and shale, the well records may not be suitable to distinguish between geologic formations of the water supply aquifer.

2.4 Topography and Drainage

Topographic mapping data indicates that elevations across the Site range from approximately 71 to 80 metres above sea level. The Site elevation generally increases from the south to north

and has a topographic low point in the southwest corner of the site. The drainage of the subject is expected to follow topography and drain generally to the south.

3.0 GROUNDWATER QUALITY AND QUANTITY

The hydrogeological investigation was carried out in accordance with MECP Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment, to determine the quantity and quality of groundwater available for domestic water supply. The results of the groundwater supply investigation are summarized in the following sections.

3.1 Homeowner Well Water Quality Sampling

Between 2022 and 2023, GEMTEC completed homeowner questionnaires and water quality sampling from several residential dwellings located within 100 meters of the Site (Figure 1). The wells identified as PW-903 (well tag # 1515221), PW-939 (well tag # 1511704), PW-1014 (well tag # 1512793), and PW-959 (No well tag #) were sampled as part of this assessment based on homeowner availability, relative proximity, comparable surrounding land-use, and comparable geological setting. It should be noted that none of the private wells had well tags affixed to the steel casings and the well tag numbers were obtained from a search of MECP well records. The available water well records for the private wells sampled are provided in Appendix E and a summary of the well construction details are provided in Table 5.

	PW939	PW903	PW1014
Well Tag Number ¹	1515221	1511704	1512793
Date of Drilling	Oct. 26, 1971	Sept. 24, 1975	April 5, 1965
Depth to Bedrock (m)	18.3	13.7	25.9
Length of Well Casing Below Ground Surface (m)	18.3	13.1	25.9
Static Water Level (m btoc) ²	8.22	0.30	4.57
Depth Water Found ³ (m)	20.4	15.8	26.5
Total Well Depth (m)	20.4	15.8	26.5

Table 5 – Well Construction Details – Sampled Private Wells



	PW939	PW903	PW1014
Open Interval (m)	2.10	2.70	0.61
Bedrock Aquifer Description ⁴	Brown Slate	Grey Slate	Brown Slate

Notes:

1. No well tag affixed to steel casing, well ID's based on MECP well record database.

2. 'mbtoc' - Meters below top of casing. Water levels reported on the water well record.

The groundwater samples were collected from the pressure tank bypass after running the coldwater tap for a minimum of 10 minutes. Water quality samples were submitted for laboratory analysis of 'subdivision package' parameters on February 2, 2022 and April 7, 2022. The field and laboratory water quality results are provided in Appendix F.

In addition to the sampled wells, homeowner interviews were also completed at three homeowners on private services within 500m of the site were interviewed; relevant interview notes are provided in Table 6 below.

Test Well ID	Homeowner Water Quality Rating ¹	Water Quantity Comments	Water Quality / Septic Comments
PW-903	Good	No reported groundwater quantity issues	Sulfur smellWater filtration system in place
PW-939	Good	No reported groundwater quantity issues	Sulfur SmellWater filtration system in place
PW-1014	Poor	No reported groundwater quantity issues	 Water filtration and chlorination system in place. Sulfur smell
PW-959	Fair	No reported groundwater quantity issues	Sulfur smellNo treatment systems

Table 6 – Homeowner Interviews

^{3.} Water found depth as reported on MECP water well record. Corresponds to the depth below ground surface of the water bearing fractures encountered at the time of drilling.

^{4.} The bedrock aquifer is defined as the geologic unit corresponding with the major water bearing zones encountered at time of drilling.

Test Well ID	Homeowner Water Quality Rating ¹	Water Quantity Comments	Water Quality / Septic Comments
PW-900	Very Good	No reported groundwater quantity issues	 High sulfur Aerator and filtration system in place
PW-908	Very Good	No reported groundwater quantity issues	 No treatment systems in place
PW-917	Poor	No reported groundwater quantity issues	 Sulfur and bacteria presence Chlorination system in place

Notes: Water quality rating based on a scale of 1 (poor), 2 (fair), 3 (good), 4 (very good), and 5 (excellent).

Two homeowners rated their groundwater quality as 'poor' with one indicate possible bacteria presence, although no justification or additional information was provided. Six of the seven homeowners interviewed reported sulfur smell in their groundwater.

3.2 Test Well Construction

A total of six test wells were utilized in the hydrogeological investigation, consisting of five onsite and one off-site test well. The six test wells can be separated into two categories: three deep test wells completed in the bedrock aquifer (PW21-01, TW22-01 and TW22-02) and three test wells completed in the interface aquifer consisting of gravel overburden and/or upper bedrock (TW22-03, TW22-04 and TW24-05). The MECP water well records for the test wells utilized for the hydrogeological investigation are provided in Appendix E, and the construction details are summarized in Table 7. The locations of the water wells are provided on the Detailed Site Plan (Figure 2).

	PW21-01	TW22-01	TW22-02	TW22-03	TW22-04	TW24-05
	(A313191)	(A342174)	(A342173)	(-) ¹	(A342479)	(A395575)
Date of	Jan 7,	Jan 13,	Jan 21,	unknown	Aug 17,	December
Drilling	2021	2022	2022		2022	07, 2024
Depth to Bedrock (m)	17.7	18.3	17.1	-	13.7	18.6

Table 7 – Well Construction Details – Test Wells



	PW21-01 (A313191)	TW22-01 (A342174)	TW22-02 (A342173)	TW22-03 (-) ¹	TW22-04 (A342479)	TW24-05 (A395575)
Length of Well Casing Above Ground Surface ² (m)	0.63	0.66	0.66	0.56	0.76	0.61
Length of Well Casing Below Ground Surface (m)	19.5	21.3	20.1	18.2	13.1	18.9
Static Water Level (m btoc) ³	8.7	9.5	11.1	9.0	3.4	8.8
Depth Water Found ⁴ (m)	120	89.6	98.8	-	12.8	19.8
Total Well Depth (m)	122	91.4	101	20.0	14.9	24.4
Open Interval (m)	19.5 – 122	21.3 – 91.4	20.1 - 101	18.2 – 20.0 (slotted screen)	13.1 – 14.9	18.9 – 24.4
Bedrock Aquifer Description ⁵	Limestone	Limestone	Limestone	Gravel / Bedrock Aquifer ⁶	Gravel / Bedrock Aquifer	Gravel / Black Shale Aquifer ⁷

Notes:

1. No Water well record is available for the TW22-3, well construction details based on well camera inspection completed by Air Rock Drilling Ltd.

2. As measured by GEMTEC staff during on site investigations if available.

3. 'mbtoc' - Meters below top of casing.

4. Water found depth as reported on MECP water well record. Corresponds to the depth below ground surface of the water bearing fractures encountered at the time of drilling.

5. The bedrock aquifer is defined as the geologic unit corresponding with the major water bearing zones encountered at time of drilling.

6. TW22-03 assumed to be completed in the gravel/bedrock interface aquifer based on observed slotted screen and geological information from TW22-02 located approximately 50 metres from TW22-03.

7. TW24-05 was hydro fracked is assumed to be receiving water from the gravel/bedrock interface aquifer.

3.3 Groundwater Quantity

3.3.1 Pumping Test Details

Constant rate pumping tests were completed in all six on-site test wells. The three deep test wells (PW21-01, TW22-01, and TW22-02) sustained pumping rates of 44 to 96 litres per minute over a six-hour period with minimal drawdown, i.e., less than 14% of available drawdown. Due to Ontario Drinking Water Quality Standards (ODWQS) maximum acceptable concentration exceedances, discussed in section 3.4 below, the deep-water supply aquifer is not proposed as the preferred water supply aquifer and as such, aquifer properties are not discussed in detail.

Three on-site test wells were completed in the proposed water supply aquifer, TW22-03, TW22-04 and TW22-05, screened across the overburden gravel and / or upper bedrock aquifer.

Constant rate pumping tests were completed in all three test wells. The water from the pumping test was discharged to the ground surface approximately 10 metres away from the test well such that the discharge flow was away from the well head. Water level and flow rate measurements were taken at regular intervals throughout the pumping test. Water levels were also taken during the recovery phase of the pumping test (after the pump was turned off) until the well to reached 95% recovery (compensated for barometric pressure). The pumping test drawdown and recovery graph is provided in Appendix G.

A summary of the pumping test details is provided in Table 8 below.

Parameter	PW21-01 (A313191)	TW22-01 (A342174)	TW22-02 (A342173)	TW22-03 (No Tag #)	TW22-04 (A342479)	TW24-05 (A395575)
Date	Nov 18, 2021	Feb 1, 2021	Feb 2, 2021	April 28, 2022	Sep 1, 2022	Jan 18, 2024
Duration (minutes)	360	360	360	360	450	360
Flow Rate (litres per minute)	45	44	96	23	15	19
Static Water Level (m TOC ¹)	9.32	9.45	10.77	8.97	2.76	8.78
Static Water Level (m BGS ²)	8.69	8.79	10.11	8.40	2.00	8.28

Table 8 – Pumping Test Details

Parameter	PW21-01 (A313191)	TW22-01 (A342174)	TW22-02 (A342173)	TW22-03 (No Tag #)	TW22-04 (A342479)	TW24-05 (A395575)
Available Drawdown ³ (m)	109.6	79.6	87.9	11.6	9.2	15.12
Water Level at End of Pumping (m TOC)	14.11	20.59	8.55	18.94	7.11	11.34
Pumping Duration (hours)	6	6	6	6	7.5	6
Observed Drawdown at End of Pumping (m)	4.79	11.14	2.22	9.97	4.35	3.06
Percent Drawdown Utilized (%)	4	14	3	86	47	20

Notes:

1. TOC = top of casing; 2. BGS = below ground surface

3. Available drawdown (water column above pump) assumes pump is set 3 metres above bottom of the well for deep test wells PW21-01, TW22-01 and TW22-2 and 1 metre for test wells TW22-03, TW22-04, and TW24-05.

Test wells TW22-03 and TW22-05 were pumped at rates of at least 18.75 litres per minute, which is the minimum pumping rate to meet peak demands for a four-bedroom dwelling (i.e. 3.75 litres x number of bedrooms plus one = 18.75 litres per minute). Test well TW22-04 was pumped at a rate of 15 litres per minute, which meets peak demand requirements for a 3bedroom dwelling. To account for the lower pumping rate, the pumping test of TW22-04 was extended to 7.5 hours, such that an equivalent groundwater volume could be pumped when compared to a six hour test at a rate of 18.75 litres per minute.

3.3.2 Pumping Test Analysis

The pumping test for wells completed in the proposed water supply aquifer were analyzed and the transmissivity of the water supply aquifer was estimated from the pumping test drawdown data using Agtesolv (Version 4.5), a commercially available software program from HydroSOLVE Inc. The results of the Aqtesolv analyses are provided in Appendix G.

The Papadopulous-Cooper and Theis Recovery analyses estimate the transmissivity of the water supply aquifer to be 3.8 and 0.8 m²/day respectively for TW22-03. The Papadopulous-Cooper methodology accounts for wellbore storage, that was evident at the start of the pumping test. The maximum drawdown of the well was approximately 9.9 meters following 6 hours of

pumping at a flow rate of 27 litres per minute, with 1.0 meters of available drawdown remaining. The well recovered to 95% within 1 hour of pump shut off.

The Theis and Theis Recovery analyses estimate the transmissivity of the water supply aquifer to be 2.8 and 1.9 m²/day respectively for TW22-04. The maximum drawdown of the well was approximately 4.35 meters following 7.5 hours of pumping at a flow rate of 15 litres per minute, with 4.85 meters of available drawdown remaining. The well recovered to 95% within 11 hours of pump shut off.

The Cooper-Jacob and Theis Recovery analyses indicate that the transmissivity of the water supply aquifer is calculated to be 8.2 m²/day and 2.4 m²/day, respectively for TW24-05. The maximum drawdown of the well was approximately 3.06 metres following 6 hours of pumping at a flow rate of 19 litres per minute, with 12 metres of available drawdown remaining. The well recovered to 95% within 30 minutes of pump shut off. Based on these results, the test wells are capable of repeat pumping at pumping rates of at least 15 litres per minute.

It is noted that the pumping test results from both test wells TW22-04 and TW24-05 have decreasing drawdowns towards the end of the pumping tests indicating potential 'recharge' conditions. This is inferred to be groundwater contribution from the overlying gravel layer, of variable thickness, over the upper fractured bedrock. The conceptual model indicates that the upper fractured bedrock is connected to the overburden gravel layer atop the bedrock and given the test wells are completed into the rock, groundwater contribution from the gravel layer is expected and can be observed as 'recharge' during the pumping test.

3.4 Groundwater Quality

In addition to the homeowner water quality sampling discussed in section 3.1, the groundwater quality assessment included sampling from the six test wells: PW21-01, TW22-01, TW22-02, TW22-03, TW22-04 and TW24-05. A summary of the groundwater quality sampling events and parameters analyzed are provided in Table 9 below.

Test Well ID	Date of Sampling	Exceedances	Aquifer Type
PW21-01	Nov 18, 2021	Hardness, Sulphide	Deep Bedrock
TW22-01	Feb 1, 2021	Hardness, Sulphide, Turbidity, Organic Nitrogen, Color, pH, Fluoride, Aluminum, Iron	Deep Bedrock

Table 9 – Water Quality Sampling Summary

Test Well ID	Date of Sampling	Exceedances	Aquifer Type
TW22-02	Feb 2, 2021	Hardness, pH, Sulphide, Fluoride, Aluminum	Deep Bedrock
TW22-03	April 28, 2022	Iron, Sulphide, Hardness, Turbidity, Colour, pH, Aluminum	Gravel
TW22-04	Dec 19, 2023	Hardness, pH, Sulphide	Gravel-Shallow Bedrock Interface
TW24-05	Jan 24, 2024	Hardness, pH, Sulphide	Gravel-Shallow Bedrock Interface

Deep bedrock wells PW21-01, TW22-01 and TW22-02 are not considered representative of the proposed water supply aquifer, which is anticipated to be the shallow bedrock-gravel interface water bearing zone. Furthermore, TW22-03 was not further developed and tested, because the age and construction details of the well is currently unknown and not considered to be representative of future on-site wells. It is noted that excluding exceedances in turbidity and turbidity-related exceedances such as color, aluminum and iron (Table 9), TW22-03 displayed similar water quality when compared to TW22-04 and TW24-05. TW22-03 is not further discussed in the following sections.

The water quality sample for PW21-01, TW22-01, TW22-02 and TW22-04 were collected from the discharge hose at the middle and end of the 6-hour pumping tests and submitted for analysis of subdivision package parameters and unfiltered and filtered trace metals (PW21-01 excepted). TW24-05 was not sampled after 6-hours of pumping due to elevated turbidity levels. TW22-04 was further developed for 1 week and resampled on December 19, 2023, while TW24-05 was further developed for 2 days and resampled on January 24, 2024. For the additional well development, test wells TW22-04 and TW24-05 were pumped at the same rates as during the pumping tests, approx 15 l/min for TW22-04 and 19 l/min for TW24-05.

The Laboratory Certificates of Analysis are provided in Appendix F. Field measurements of temperature, pH, electrical conductivity, total dissolved solids, turbidity, filtered colour, unfiltered colour and total chlorine were measured at the time of sampling. A summary of the measured field parameters is provided in Appendix F.

3.4.1 Summary of Water Quality Exceedances for Deep Bedrock Aquifer

Based on the lab results, elevated fluoride concentrations were identified in two of the three deep bedrock test wells, TW22-01 and TW22-02 with concentrations ranging from 2.6 to 3.3 mg/L (Appendix F). The fluoride concentrations exceed the ODWQS maximum acceptable concentration of 1.5 mg/L and as such, the deep bedrock water supply is not suitable for consumption. The deep aquifer also exceeded the operational guideline for hardness, and esthetic objectives of sulphide, colour, and iron.

These exceedances are not further discussed as the deep aquifer is not considered to be representative of the proposed water supply aquifer for the development.

3.4.2 Summary of Water Quality Exceedances for Gravel/Shallow Bedrock Interface Aquifer

As previously mentioned, the gravel/shallow bedrock interface water bearing unit is the proposed water supply aquifer. The ODWQS exceedances and notable parameters of this aquifer are discussed in detail below, based on water quality samples collected from on-site test wells TW22-04 and TW24-05 and technically representative homeowner wells PW903, PW939 and PW1014.

3.4.3 Bacteriological Results

Total and free chlorine measurements at the time of bacteriological sampling confirmed that total and free chlorine concentrations in the groundwater were non-detectable.

The shallow test wells TW22-04 and TW24-05 had elevated turbidity levels at the time of sampling, which may interfere with bacteriological analyses. Bacteriological testing was not completed on TW22-04 and TW24-05 during the pumping test due to elevated turbidity levels. Following further development and re-sampling, water quality results for TW22-04 reported non-detectable concentrations of E.coli, fecal coliform, and total coliform, while TW24-05 had non-detectable concentrations of E.coli and fecal coliform with total coliform count of 1 CFU/100mL.

Although the total coliform concentrations exceed the ODWWS maximum acceptable concentration of 0 CFU/100mL, the total coliform concentrations detected meet the MECP Procedure D-5-5 limit of less than 6 counts per 100 mL for Total Coliform bacteria, with non-detectable indicator species of e.coli and fecal coliform. Further, testing of neighbouring existing water well users did not identify and bacteriological exceedances through sampling and homeowner interviews.

Based on the bacteriological testing, the water is suitable for consumption.



3.4.4 Chemical Results

The results of the chemical testing on the water samples indicate that hardness is below the operational guideline for hardness and the warning level for persons on sodium restricted diets exceeded the ODWQS but is well within the aesthetic objective.

Aesthetic objective exceedances from private wells and on-site test wells include iron, sulphide, pH, aluminum, turbidity, and colour. The above noted exceedances are discussed in the following sections:

3.4.4.1 Hardness

Hardness exceedances for TW22-04 and TW24-05 were reported to be 6.7 and 31.7 mg/L as $CaCO_3$, respectively, which is below the ODWQS operational guideline of 80 – 100mg/L. Hardness levels between 80 and 100 mg/L as calcium carbonate (CaCO3) are considered to provide an acceptable balance between corrosion and incrustation. Water with hardness below 80 mg/L may cause accelerated corrosion of water pipes.

3.4.4.2 Sulphide

Sulphide concentrations ranged from 0.05 mg/L to 4.61 mg/L in the on-site shallow test wells and private wells sampled. PW-939, PW-1014, TW22-03, TW22-4 and TW24-05 exceed the ODWQS aesthetic guideline of 0.05 mg/L as hydrogen sulphide. Sulphide can be related to an unpleasant odour and taste, and can produce black stains on laundered items, pipes, and fixtures. Although ingestion of large quantities of hydrogen sulphide can produce toxic effects on humans, it is not likely that an individual would ingest a harmful dose in drinking water because of the taste and odour.

Low levels of sulphide can be removed effectively using aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration. According to the MECP Procedures D-5-5: Private Wells: Water Supply Assessment, there is no maximum treatable limit for sulphide.

3.4.4.3 Turbidity

Turbidity was reported to be 93.9 NTU in TW22-04, after 6 hours of continuous pumping, which exceeds the ODWQS aesthetic guideline of 5 NTU. Field measured turbidity was reported to be 99.6 NTU and 152 NTU in TW22-04 and TW24-05 respectively, after 6 hours of pumping. The elevated turbidity concentrations may be the result of naturally occurring sediments around the interval of the borehole open to the aquifer.

Following further well development, the turbidity concentrations decreased to 0.5 NTU and 1.4 NTU, at TW22-04 and TW24-05 respectively.

3.4.4.4 Colour

Colour was reported to be 11 TCU and 27 TCU in TW22-03 and TW22-04 respectively after 6 hours of pumping, which exceeds the ODWQS aesthetic objective of 5 TCU, and the maximum concentration considered reasonably treatable of 7 TCU. The elevated colour is attributed to the elevated turbidity.

Following further development, color was reported to be 2 TCU at TW22-04 and TW24-05.

3.4.4.5 pH

The pH ranges from 8.4 to 9.4 in the on-site test wells and private wells sampled. TW22-04, T24-05, PW-903 and PW-1014 exceed the ODWQS operational guideline objective of 8.5. The primary objective of controlling pH is to produce water that is not corrosive and does not produce incrustation. At pH levels above 8.5, incrustation and bitter tastes may occur. Additionally, a decrease in efficiency of chlorine disinfection and alum coagulation can occur. Treatment methods for high pH include pH adjustment using sulfuric acid.

Although the MECP Procedure D-5-5 does not have a maximum acceptable concentration or treatability limit for pH, the Guidelines for Canadian Drinking Water Quality indicate an acceptable pH range of 7.0 to 10.5 for drinking water and to control leaching of metals from materials (Health Canada, 2015).

3.4.4.6 Aluminum

Aluminum was reported to be 0.762 mg/L at TW22-04 after 6 hours of pumping, which exceeds the ODWQS operational guideline of 0.1 mg/L. The elevated aluminum can be attributed to elevated turbidity at the time of sampling. Aluminum is commonly found in water as fine particles of alumino-silicate clay, which can be removed in coagulation/filtration.

Following further development and sampling, aluminum was reported to be 0.047 mg/L and 0.05 mg/L at TW22-04 and TW24-05, respectively which is below to aesthetic objective of 0.1 mg/L.

3.4.4.7 Sodium

Sodium concentration of 110 mg/L and 85.5 mg/L was identified at TW22-04 and TW24-05. Sodium exceeds warning level for persons on sodium restricted diets of 20 mg/L. Sodium is well within the aesthetic objective of 200 mg/L. The local medical officer of health should be notified.

4.0 SEPTIC IMPACT ASSESSMENT

The potential risk to groundwater resources on and off the subject site was assessed in accordance with MECP Procedure D-5-4: Technical Guideline for Individual Site Sewage



Systems: Water Quality Impact Risk Assessment. To evaluate the groundwater impacts, the Three-Step Assessment Process outlining in MECP D-5-4 was followed.

4.1 Sewage Disposal Systems

This section discusses the results of the terrain evaluation as they relate to the feasibility of installing sewage disposal systems on the subject site for onsite wastewater treatment and disposal.

It should be noted that the following information is provided for general guidance purposes only and that all septic systems installed on the subject site should be designed on a lot-by-lot basis using a lot specific investigation involving test holes to determine the actual subsurface conditions at the location of the proposed septic system. In all cases, the septic system design must conform to the Ontario Building Code (OBC) requirements.

4.1.1 Class IV Septic Sewage Disposal Systems

This section discusses the results of the terrain evaluation as they relate to the feasibility of installing Class IV septic sewage disposal systems on the subject site.

The septic system envelope area (septic envelope) represents the area on a lot set aside for the construction of the leaching bed and is for the leaching bed only. It does not include that area required for the septic tank or the isolation/separation distances required by the Ontario Building Code (OBC). The size of the septic system envelope is a function of the percolation rate of the native soil in the vicinity of the septic envelope (or the fill used for the construction of a septic bed) and the daily effluent loading to the septic bed.

The maximum expected septic system envelope required to service a single-family dwelling at this site is calculated to be 750 m², assuming a design flow of 3,000 litres/day and a loading rate of 4 L/m²/day (fully raised beds over clay soils).

A 750 m² septic envelope corresponds to 16% area cover based on the smallest proposed lot size of 4,613 m² (0.46 hectare). Typical septic envelope dimensions would be 30 metres in length by 25 metres in width. The septic system envelope should be readily accommodated on the lot sizes that are proposed. Prior to establishing the actual septic envelope (leaching bed) location on any particular lot, test holes should be excavated to determine the actual subsurface conditions in the area of the proposed leaching bed.

The septic leaching bed design must ensure that the bottom of the absorption trenches is at least 0.9 metres above low permeability soils (such as silty clay), bedrock, and the seasonally high groundwater table. Based on the low permeability clay soils, it is expected that all of the septic leaching beds at this site will be fully raised.



4.2 Three-Step Assessment: Step 1 - Lot Size Considerations

Lot sizes of 1.0 hectares or larger are assumed to be sufficient for attenuative processes to reduce nitrate-nitrogen to acceptable concentrations in groundwater below adjacent properties. The retained land parcel is less than 1.0 hectares in size, and therefore doe does not satisfy the MECP D-5-4 lot size requirements, and as such, GEMTEC has carried on with steps 2 of the MECP process.

4.3 Three-Step Assessment: Step 2 – System Isolation Considerations

Where proposed lot sizes are less than 1.0 hectares, the risk of sewage effluent contamination must be assessed. As per Procedure D-5-4, it is required to:

- Evaluate the most probable groundwater receiver for sewage effluent; and,
- Define the most probable lower hydraulic or physical boundary of the groundwater receiving the sewage effluent.

The groundwater supply aquifer is considered to be isolated if separated from surficial sources by a 10 metres thick, low permeability layer with a hydraulic conductivity less than 1×10^{-5} m/s that is laterally continuous for 100 metres from the Site.

The boreholes advanced as part of the geotechnical investigation (GEMTEC, 2023) identified low permeability units of silty clay underlying the Site to depths of up to 8.3 metres below ground surface. Hydraulic testing performed in monitoring wells installed in boreholes 21-01 and 21-02 that are screened through the silty clay, estimated the hydraulic conductivity to be 3×10^{-7} m/s and 3×10^{-8} m/s respectively.

Test wells advanced on-site indicate that the overburden thickness ranged from 12.2 meters to 18.3 meters and MECP water well records within 500 metres of the Site indicate overburden thickness ranges from 12.2 to 37.5 metres. Based on TW22-04 located at the southern end of the Site, the thickness of clay decreases to approximately 5.2 metres and is underlain by "sand and boulders" to a depth of 10.3 metres, which is interpreted to be glacial till based on geotechnical boreholes advanced on-site (GEMTEC, 2023).

The proposed water supply aquifer is considered to be at least partially isolated from surficial impacts based on the presence of 5+ metres of low permeability clay. Given the underlying glacial till at the southern portion of the Site has not been assessed, nitrate dilution calculations were carried out to confirm the acceptability of septic impacts for the proposed severed lots.

4.4 Three-Step Assessment: Step 3 - Nitrate Dilution Calculations

Where it cannot be demonstrated that the effluent is hydrogeologically isolated from the water supply aquifer, the risk of individual septic systems will be assessed using nitrate-nitrogen contaminant loading for commercial/industrial properties. The maximum allowable concentration

of nitrate in the groundwater at the boundaries of the subject property is 10 milligrams per litre as per the Ministry of the Environment, Conservation and Parks guideline D-5-4, dated August 1996.

The nitrate concentration at the Site boundaries was calculated using the following information:

- Site area of 54,592 m²;
- Hard surface area of 5,459 m² (estimated to be 10% of total Site area, which accounts for house and driveway footprint)
- Infiltration factors and water holding capacity of soils (WHC) based on information obtained from Table 3.1 of the Ministry of Environment Stormwater Management Planning and Design Manual, dated March 2003;
- Soil Factor of 0.15, which represents combination of clay and some loam;
- Cover Factor of 0.1 which represents cultivated lands;
- Topography Factor of 0.17, representative of rolling land with an average slope of 10 m/km.
- Water holding capacity: 75 mm for urban lawns / shallow rooted crops, clay;
- An annual water surplus of 0.380 metres/year for soils with a water holding capacity of 75 mm; and,
 - Ottawa International Airport Weather Station (1939-2020). Water surplus datasheet provided in Appendix H.
- Negligible background nitrate concentration in the receiving aquifer.

The predictive assessment is conducted using a mass balance calculation to determine the sewage loading for nitrate at the property boundary (see equation below).

$$C_{Nitrate} = \frac{Mass}{Volume} = \frac{Annual Nitrate Loading(grams/year)}{Annual Dilution Volume(cubic metres/year)} = \frac{grams}{cubic metre} = \frac{mg}{L}$$

The nitrate dilution calculations are provided in Appendix H. The calculated nitrate concentration at the Site boundary, assuming seven residential lots was calculated to be 9.83 mg/L. The Site can support up to seven residential lots. The total site area was considered for the proposed residential lots.

The nitrate impact assessment for the Site meets the acceptable nitrate impact requirement of 10 mg/L established by the MECP. The background nitrate concentration is considered to be negligible based on non-detectable (<0.20 mg/L) nitrate concentrations in the receiving aquifer.



4.5 Background Nitrate Concentrations

The nitrate concentrations were measured in the low permeability overburden soils (MW21-1 and MW21-2), the receiving gravel / upper bedrock aquifer (PW939, PW903, PW1014, TW22-03 and TW22-04) and deep bedrock aquifer (PW21-01, TW21-01 and TW21-02). The nitrate concentrations in the receiving gravel / upper bedrock aquifer and deep bedrock aquifer ranged from non-detectable (<0.1 mg/l) to 0.2 mg/L. The nitrate concentrations in on-site monitoring wells were 5.8 mg/L and 6.6 mg/L in MW21-1 and 0.3 mg/L in MW21-2. The locations of the private wells, test wells and monitoring wells are displayed on Figure 1 - Site Plan.

The elevated nitrate in MW21-1 is likely associated with the historic use of fertilizers, as the Site is crop covered. This is supported by the low nitrate concentrations (0.3 mg/L) in MW21-2, which is located on the upgradient portion of the Site (refer to Figure 2). Further, MW21-2 is located immediately downgradient of multiple residential properties serviced with on-site septic systems and does not have elevated nitrate concentrations.

The elevated nitrate concentrations in MW21-1 are not considered to be representative of the nitrate concentrations in the receiving aquifer, taken to be the gravel / upper bedrock aquifer, as MW21-1 is completed in low permeability silty clay. Down gradient shallow water supply wells TW22-04 (14.9 metres deep) and PW903 (15.8 metres deep), had low nitrate concentrations measured to be 0.2 mg/L and <0.1 mg/L respectively.

4.6 Surface Water Impacts

The discussion provided herein, in relation to surface water impacts to adjacent surface water features, is concerned primarily with septic effluent discharging from on-site septic systems. Phosphorus is known to be the primary contaminant of concern for aquatic systems impacted by septic effluent. As such, the discussion provided below is focused on the potential for phosphorus to impact adjacent surface water features.

Phosphorus attenuation in septic system leaching fields utilizes a combination of biotic and abiotic process including sorption/precipitation reactions, plant uptake, and mineralization/immobilization by microbes, however the dominant attenuation mechanisms are sorption/precipitation mechanisms (Wilhelm, et al., 1996). A 30-metre setback is considered to be sufficient for phosphorous attenuation.

The closest surface water feature to the site is McKinnons Creek, located east of the Site (Figure 1). McKinnons Creek is greater than 30 metres from the proposed septic systems (refer to Concept Plan in Appendix A) and as such, no impacts to surface water features from the proposed on-site septic systems are anticipated.



5.0 CONCLUSIONS

Based on the results of this investigation, the following conclusions and professional opinions are provided:

5.1 Hydrogeological Conceptual Model

- The soils encountered generally consist of a thin layer of topsoil underlain by low permeability silty clay, glacial till and gravel above shale bedrock. The silty clay was not fully penetrated by the geotechnical boreholes on site but was proven to range from 5.3 to 8.3 metres below ground surface in test wells.
- The proposed water supply aquifer is the overburden bedrock interface aquifer, consisting of a gravel layer of variable thickness and extent over upper fractured bedrock.
 - The thickness and extent of the gravel layer is expected to vary across the Site, as not all well records indicate the presence of gravel above the bedrock. A review of available water well records indicate that many neighbouring water wells are completed in interface aquifer (i.e., gravel and / or upper fractured bedrock).
 - The deeper bedrock aquifer is not considered suitable due to ODWQS maximum acceptable concentration exceedances of fluoride.
- The proposed water supply aquifer is not considered to be highly vulnerable to contamination from surficial sources, e.g. septic system effluent, agricultural, or road salt.
 - On-site test wells do not display evidence of impacts from surficial sources i.e. low to non-detectable nitrate concentrations, E.coli, fecal coliform, tannins and lignins or organic nitrogen, and low chloride and sodium concentrations.
 - No notable surface impacts (e.g., septic, road salt or softener salt) observed in the two neighbouring private wells within 100 meters of the Site, which have favourable water quality.
 - The gravel / upper bedrock interface aquifer is expected to be overlain by greater than five meters of low permeability silty clay material, based on the conditions logged during the on-site borehole drilling and water well records of the on-site test wells.
 - Slug testing was performed in monitoring wells installed in boreholes 21-01 and 21-02, which are screened through the silty clay overburden unit reported hydraulic conductivity values of 3x10⁻⁷ m/s and 3x10⁻⁸ m/s.
 - Elevated nitrate concentrations in on-site monitoring well MW21-01 are likely related to on-site agricultural activities rather than septic systems, given the low nitrate concentrations in upgradient MW21-02, located immediately downgradient

of existing residential septic systems. Further, downgradient water supply wells TW22-04, TW24-05 and PW903 had low to non-detectable nitrate concentrations (<0.1 mg/L to 0.2 mg/L).

- Off-site groundwater impacts from the proposed seven residential lots are not anticipated, as the calculated nitrate concentration of 9.83 mg/L is within the maximum allowable nitrate concentration of 10 mg/L at the property boundary, as required by MECP Procedure D-5-4.
 - The Site can support a maximum of seven residential lots based on the nitrate dilution calculations.
 - The Site is considered to be partially isolated from surficial sources given the presence of greater than five metres of low permeability (< 10⁻⁵ m/s) silty clay soils.
 - Proposed septic systems are expected to be fully raised and sized to accommodate sand mantle over clay soils, allowing for treatment of septic effluent.
- Off-site surface water impacts from the proposed on-site septic systems are not anticipated as the closest surface water feature, McKinnons Creek is located greater than 30 metres from the proposed on-site septic systems.
- The quantity of groundwater available from the proposed water supply aquifer (TW22-04 and TW24-05) is sufficient for residential use and will sustain repeated pumping at the test rate and duration at 24-hour intervals over the long term.
 - TW22-05 was initially unable to meet the MECP Procedure D-5-5 minimum required flow rate and was hydrofractured by a licensed well technician. Following hydrofracking, the well yield in TW24-05 was increased to approx. 19 litres per minute. Hydrofracking may be required to enhance the productivity of low-yield wells. Test wells TW22-03 sustained pumping rates of 23 litres per minute and TW22-05 sustained pumping rates of 18.8 litres per minute, both suitable to supply a 4-bedroom dwelling.
 - TW22-04 sustained a constant pumping rate of 15 litres per minute over a 7.5 hour period. The pumping rate of 15 litres per minute is sufficient to meet peak demands for a 3-bedroom dwelling and supplemental storage may be required to meet peak demands in a 4-bedroom home. The pumping test of TW22-04 was extended from 6 to 7.5 hours such that the total water withdrawal was equivalent to a pumping test completed at 18.8 litres per minute, confirming that all on-site wells meet the minimum daily water demand requirements to support a 4-bedroom dwelling.

- TW22-03 was able to sustain pumping rates of 23 litres per minute over a six hour period; however, the well may not be sustainable at the pumping rate over the long term due to the limited available drawdown of approx. one metre at the end of the pumping test. Nonetheless, TW22-03 is not considered to be technically representative of future water supply wells, as the previously constructed well is likely screened solely across the gravel layer.
- Based on homeowner interviews of seven neighbouring properties, no water quantity issues were reported. It should be noted that neighbouring properties are developed at a higher density than the proposed development and as such, unacceptable groundwater interference between on-site or neighbouring well users is not anticipated.
- Where future well yields are only 15 litres per minute, supplemental storage may be required to meet peak demands in houses greater than 3 bedrooms.
- The well yields determined in the course of the investigation are representative of the yields which residents of the development are likely to obtain from their wells in the long term.
- Interference between drinking water wells is expected to be acceptable under typical usage for residential developments.
 - Maximum drawdown of 0.2 metres observed in observations well during pumping (0.2 metre drawdown in TW22-03 and negligible drawdown in TW22-04 during pumping of TW24-05). Negligible interference between on-site and neighbouring test wells is anticipated.
 - Homeowner interviews of neighbouring lot owners, which are developed at a higher density of 0.14 hectares per lot did not report any water quantity issues. In comparison, the smallest proposed lot size is 0.46 hectares.

5.2 Water Quality

- The results of the physical, chemical and bacteriological groundwater indicate that the water quality in the proposed water supply aquifer (gravel / upper bedrock) meets the ODWQS maximum acceptable concentrations and maximum concentrations considered to be reasonably treatable.
 - Aesthetic objective and operational guideline exceedances of: pH, hardness, and sulphide. Unpleasant odour and taste, and black stains on laundered items, pipes, and fixtures may be encountered due to the sulphide and pH exceedances.
 - Turbidity, colour and aluminum aesthetic objective and operational guideline exceedances were encountered following well drilling; however, it was

demonstrated that through extended well development, turbidity and associated colour and aluminum could be reduced to within ODWQS aesthetic objective and operational guideline limits.

 Homeowner interviews of 7 neighbouring well owners did not indicate any water quality issues attributed to elevated turbidity suggesting that newly constructed wells, once fully developed, will meet aesthetic objectives for turbidity.

6.0 **RECOMMENDATIONS**

The following recommendations regarding well construction specifications and water quality treatment are provided below.

6.1 Water Supply Recommendation

- Any new water well should be constructed in accordance with local and MECP regulations (O.Reg 903).
- Test wells TW22-04 and TW24-05 are considered technically representative of future water supply wells.
 - Different methodologies were used in the construction of TW22-04 and TW22-05, both of which straddle the bedrock interface. A local well driller should be retained who has experience drilling and grouting wells within the bedrock interface. Future well casings should straddle the bedrock interface, ranging from approximately 0.6 metres above to 0.3 metres below the bedrock surface.
 - Hydrofracking may be required to increase well production.
 - Extended well development will be required to reduce turbidity and associated colour and aluminum to acceptable levels.
 - Future wells should not extend greater than six metres into bedrock, as wells completed at greater depths may encounter fluoride concentrations above the ODWQS maximum acceptable concentrations.
 - Where lower well yields are encountered (i.e., yields of approx 15 litres per minute), supplemental storage may be required for houses that are greater than 3-bedrooms.
- As per the City of Ottawa review comments (May 10, 2024), in order to ensure compliance with the report recommendations, 0.3 m reserves are required in front of each lot. A <u>Well Inspection Report</u> will be required for each lot prepared by a Qualified Professional and should include the following information:



- The well grouting inspection should be conducted under the supervision and sealed by a licensed professional engineer or professional geoscientist, qualified to practice geoscience.
- Confirm that the well construction meets O.Reg 903 requirements and recommendations within this report, specifically that the well casing straddles the bedrock interface, ranging from approximately 0.6 meres above to 0.3 metres below the bedrock interface and that the well is not drilled more than six metres into bedrock.
- Confirm that the well yield is at least 18.75 litres per minute, and if not, demonstrate that adequate supplemental storage can be accommodated based on the size of the proposed dwelling. The determination of well yield should also indicate whether hydrofracking was completed.
- Extended well development should be anticipated to reduce turbidity and associated colour concentrations to acceptable levels. Newly drilled wells should be pumped until a Qualified Professional has confirmed that the field measured turbidity and colour are below their respective ODWQS aesthetic objectives of 5 NTU and 7 TCU respectively. The instruments used shall be described and calibration records provided.
- The separation distance between drinking water wells and on site or neighbouring septic systems should be at least 15 metres and up to 18 metres to account for fully raised septic beds. Future water supply wells should be located upgradient from septic beds.
- Any unused on-site test wells should be abandoned by a licensed well technician in accordance with O.Reg 903. Test wells not used for future residential use should be abandoned, including TW22-01 (tag # A342174), TW22-02 (tag # A342173) and TW22-03 (no tag #). If test wells TW22-04 (tag # A342479) and TW22-05 (tag # A395575) are not utilized by future lot owners, they should be abandoned.
- A water quality treatment specialist should be consulted by future owners for the implementation of any treatment systems. The following treatment systems may be considered for future property owners:
 - Sulphide can be treated at low concentrations via aeration (oxidation with filtration) or chlorination followed by sand or multimedia filtration.
 - pH levels over 8.5 may be treated through pH adjustment using sulfuric acid.
 - No treatment is recommended for hardness as the water is naturally soft. To note, water with hardness below 80 mg/L may cause accelerated corrosion of water pipes.



 It is recommended that the property owners construct, maintain and test their drinking water well in accordance with the Ministry of the Environment and Climate Change document "Water Supply Wells - Requirements and Best Management Practices, Revised April 2015".

The following recommendations are provided regarding septic system design:

Septic System Recommendations

- The proposed lots will be serviced by individual Class IV septic sewage disposal systems designed according to the Ontario Building Code. A site-specific visit should be conducted on the lot for septic system design requirements.
- The septic system should be designed and installed by a licensed contractor in accordance with Ontario Building Code (Part 8) specifications. It is recommended that septic systems be located a minimum of 15 metres (or up to 18 metres for fully raised septic beds) from any on-site or neighbouring water supply wells.
- It is recommended that the property owners construct, maintain and check their onsite septic system in accordance with the Ontario Building Code and best management practices (Ministry of Municipal Affairs and Housing, 2021). The homeowner shall consult the following guides available at: <u>https://www.oowa.org/homeowner-resources/</u>.

7.0 CLOSURE

We trust this report provides sufficient information for your present purposes. The report is subject to the *Conditions and Limitations of This Report*, provided following the text of this report. If you have any questions concerning this report, please do not hesitate to contact our office.

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awetas

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Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

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- 9. Reliance on Provided Information: The evaluation and conclusions contained in this report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations. information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of misstatements, omissions, misrepresentations. or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- 10. **Investigation Limitations:** Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions but even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions.

The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. Accordingly, GEMTEC does not warrant or guarantee the exactness of of the subsurface descriptions.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination-or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

In addition, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

- 11. **Sample Disposal:** GEMTEC will dispose of all uncontaminated soil and/or rock samples 60 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.
- 12. **Follow-Up and Construction Services:** All details of the design were not known at the time of submission of GEMTEC's report. GEMTEC should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of GEMTEC's report.

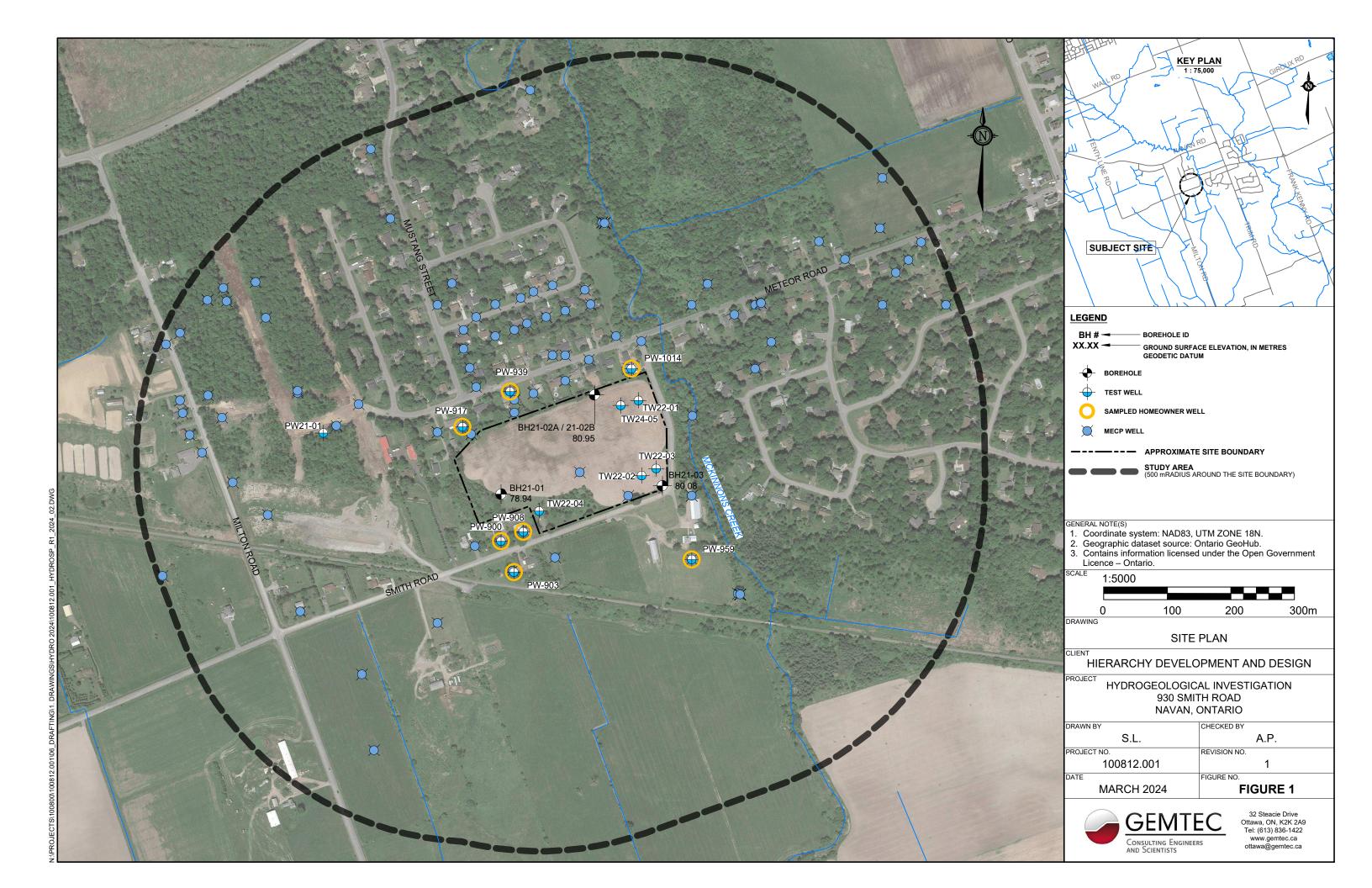
During construction, GEMTEC should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not



materially differ from those interpreted conditions considered in the preparation of GEMTEC's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in GEMTEC's report. Adequate field review, observation and testing during construction are necessary for GEMTEC to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, GEMTEC's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

- 13. **Changed Conditions:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that GEMTEC be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that GEMTEC be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.
- 14. **Drainage:** Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. GEMTEC takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.





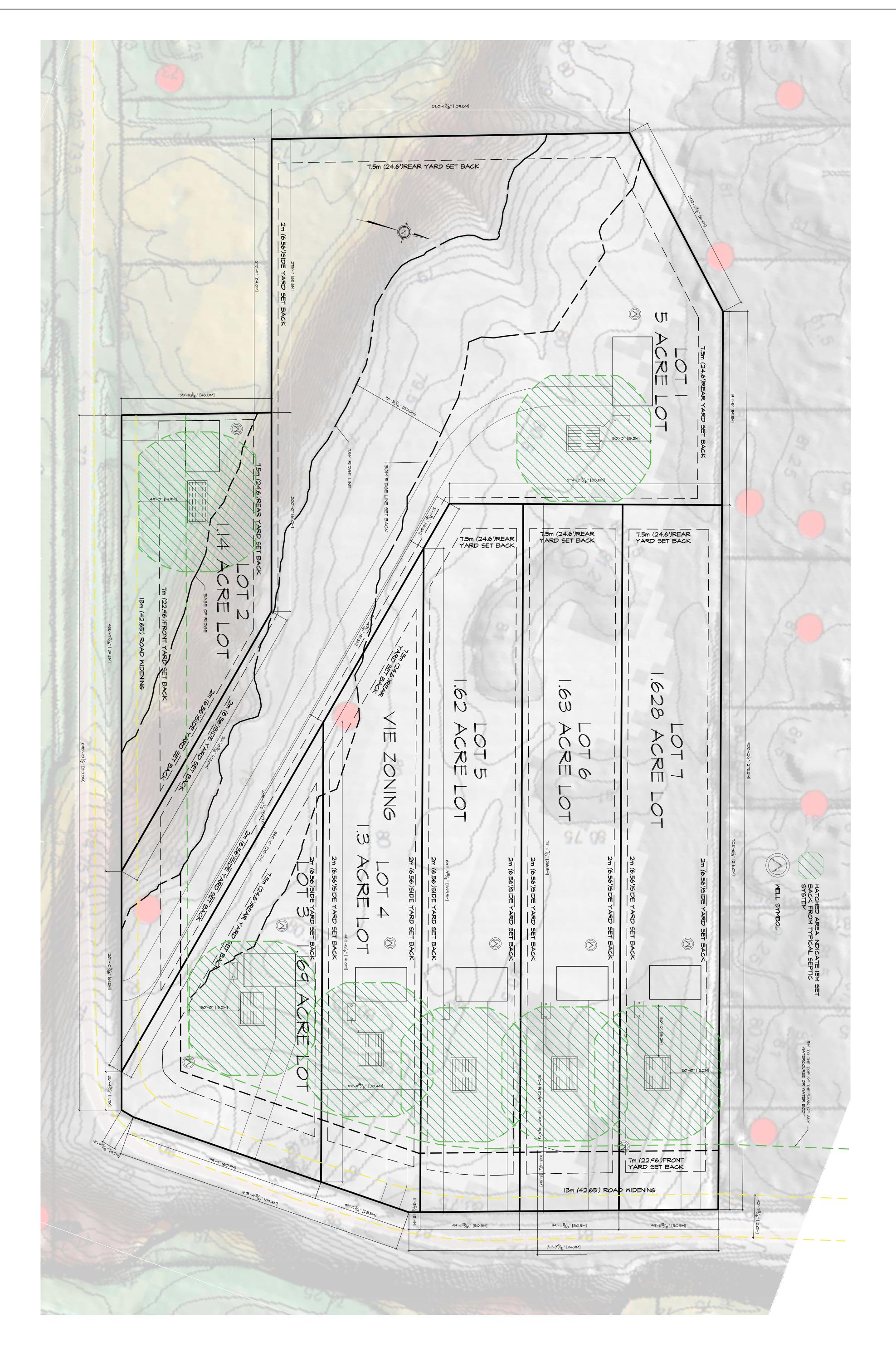


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E .		Consulting Engineer	ERS ottawa@gemtec.ca



Concept Plan

SITE PLAN NOT TO SCALE

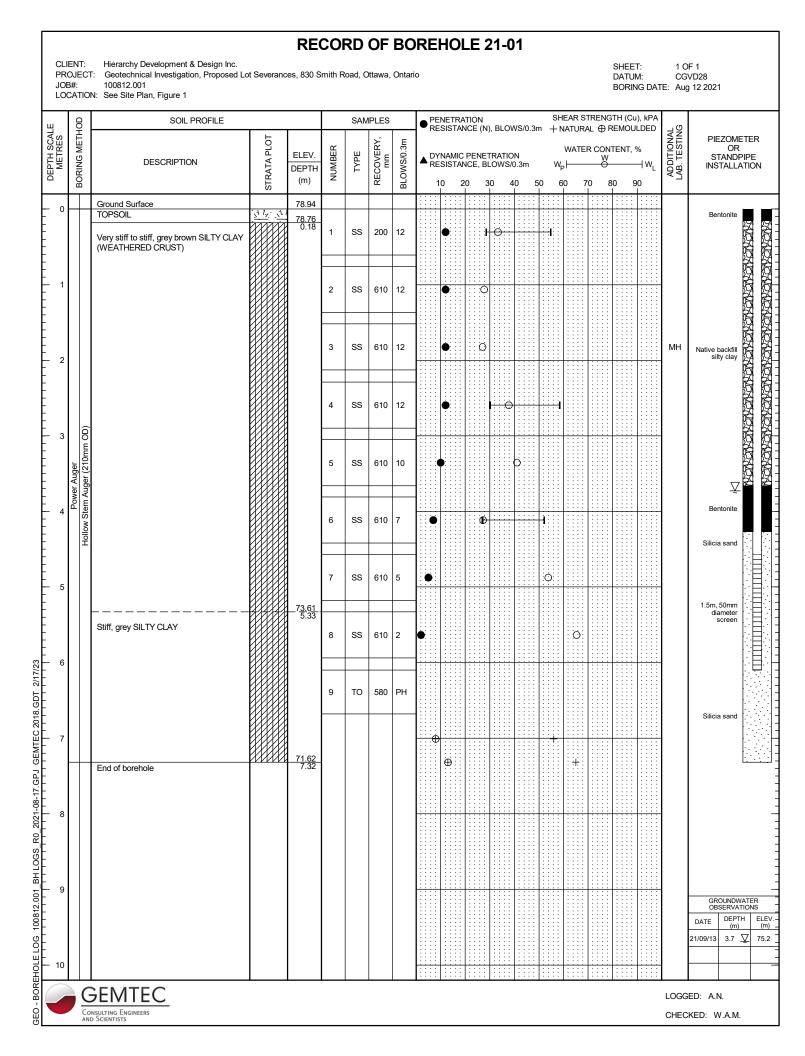


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APPENDIX B

Borehole Logs

Report to: Hierarchy Development and Design Inc. Project: 100812.001 (May 15, 2024)



	<u>o</u>	SOIL PROFILE				SAM	IPLES		●PIR	ENE ESIS		TION	I), BLC	ws/0).3m	SН + N	EAR :	STRE	NG1 ⊕ RI	TH (Cu EMOL	ı), kPA ILDED	, ,	
	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	ТҮРЕ	RECOVERY, mm	BLOWS/0.3m	▲ ^D _R			PENE ICE, B	TRATI LOWS			W _F	wati ↓──			ENT,		TION	PIEZOME OR STANDP INSTALLA
		Ground Surface	ୖ୰	80.95				-							::				::				
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				0.28	1	SS	560	4															
		Very stiff to stiff, grey brown SILTY CLAY (WEATHERED CRUST)																					
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ŀ	+	Ground Surface TOPSOIL	1	80.95 80.82								::				:::			: :	· · · ·		-	Ľ
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		Note: Soil statigraphy inferred from Borehole 21-02A										· · ·				· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		-	
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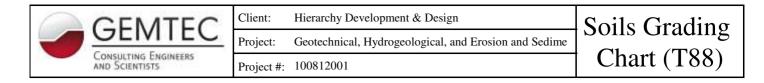
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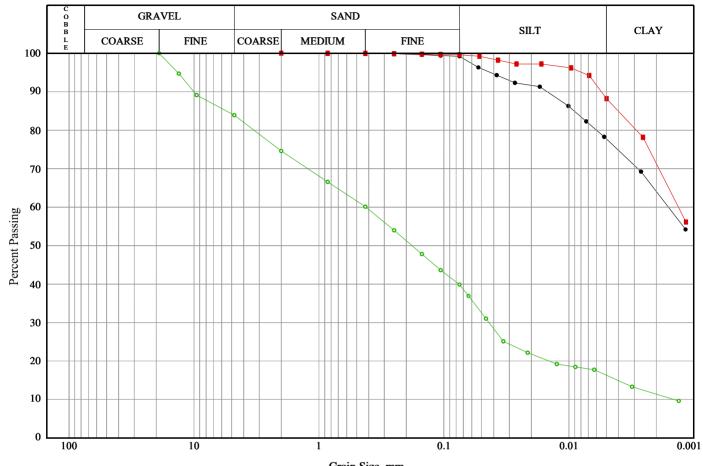
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-	_	100812.001 N: See Site Plan, Figure 1			r							TION			SHE	ARS				g 12 2021
		SOIL PROFILE	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	SAN JAPE	RECOVERY, SAT	BLOWS/0.3m			AMIC STAI	PENE NCE, B	TRATI	3m - 50	+ NA	ATUR/ VATE	NL⊕ R COI W	DULDED	ADDITIONAL LAB. TESTING	PIEZOMETI OR STANDPIP INSTALLATI
,		Ground Surface	- 1 7 - 1	80.08					:::	: :	:::			: ::			: : :			
		TOPSOIL Very stiff to stiff, grey brown SILTY CLAY (WEATHERED CRUST)		79.90 0.18	1	SS	400	14			•									Bentonite
1					2	ss	610	16			•	0	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·						
2					3	SS	610	12					C	• • • • • •						Native Backfill
ger	(210mm OD)				4	SS	610	9		•	· · · · · · · · · · · · · · · · · · ·		0	· · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ·						Native Backfill
Power Auger	Hollow Stem Auger (210mm OD)				5	SS	610	9		•		C	>	• • • • • •			· · · · · ·	• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •		
1	Ŧ				6	SS	610	5						0						Bentonite
5				7 <u>5.20</u> 4.88	7	SS	610	2	•	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	ł	0				
		Compact, grey SILTY SAND, some gravel, some clay, with cobbles and boulders (GLACIAL TILL)		74.75 5.33	8	SS	225	28		0				· · · · · · · · · · · · · · · · · · ·					МН	1.5m, 50mm diameter screen
6		End of borehole		7 <u>3.98</u> 6.10						· · · · · · · · · · · · · · · · · · ·							N N N N N N		
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APPENDIX C

Grain Size Curves





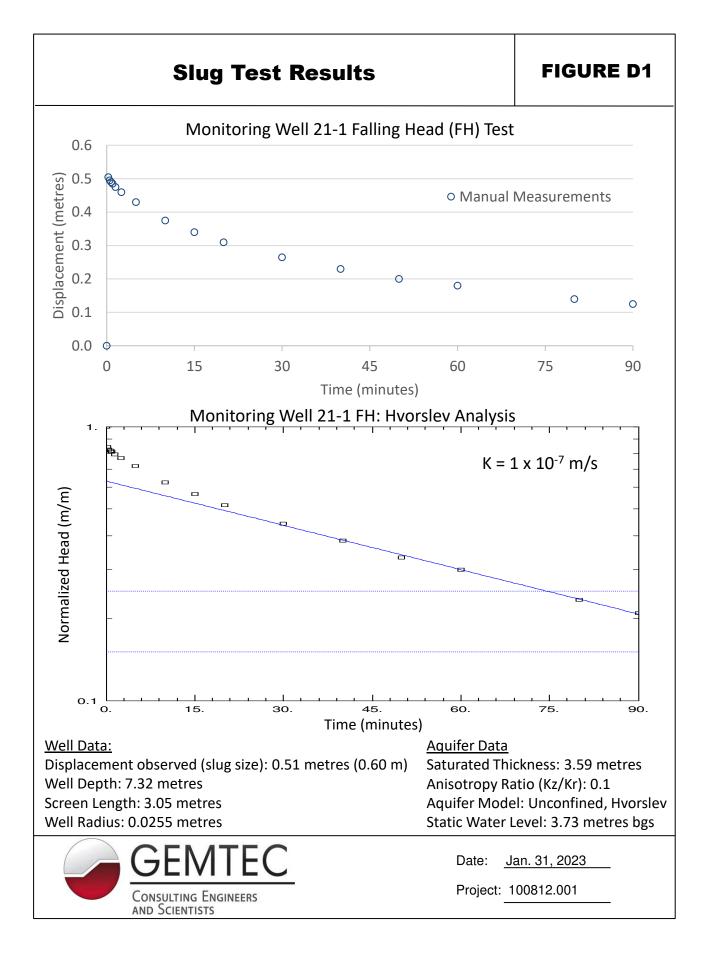
- Limits Shown: None

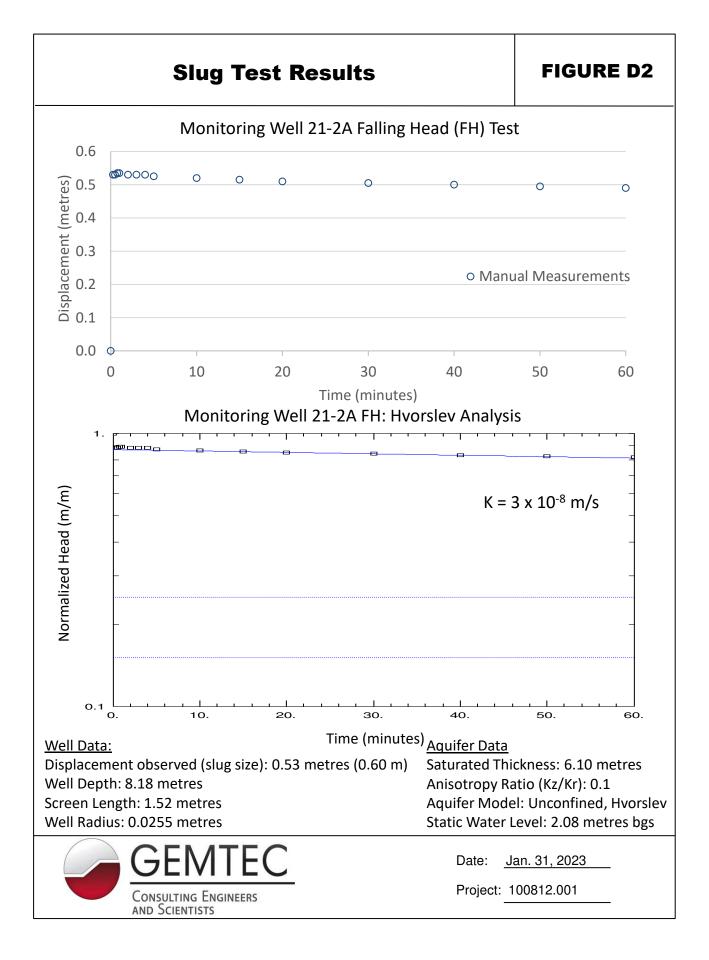
Grain Size, mm

Line Symbol	Sample		Boreh Test l			nple mber		Depth		6 Cob. Grave		% Sand	% Sil		% Clay
•	SILT CLAY (WEATHERED CRUST	Γ)	21-0	1	S	A 3		1.52-2.13		0.0		0.8	21.	.5	77.7
	SILTY CLAY			2A	S	A 7	1	6.09-6.71		0.0		0.4	11.	.4	88.2
o	GLACIAL TILL		21-0	13	S	A 8		5.33-5.94		16.1		44.0	23.	.6	16.3
Line Symbol	CanFEM Classification		SCS nbol	D ₁	0	D ₁₅		D ₃₀	D ₅	0	D ₆₀) I	85	% :	5-75µm
•	Silty clay , trace sand	N	/A		-					-	0.00	0 0	.01		20.9
	Clay , some silt , trace sand	N	/A		-					-	0.00	0 0	.00		11.4
o	Silty sand , some gravel, some clay	N	/A	0.0	00	0.00)	0.04	0.1	8	0.42	2 5	.51	51 23.6	

APPENDIX D

Hydraulic Conductivity Testing





APPENDIX E

MECP Water Well Records

MECP Water Well Record Compilation (930 Smith Road- 500 m search radius)

		Depth	Depth to	Static Water	Water Found		
WELL ID	Completed	(m)	Bedrock (m)	Level (m bgs)	(m bgs)	Water Detail	Well Use
1511160	3/4/1971	29	20.1	7.9	29	FR	DO
1511703	12/7/1971	19.8	17.7	8.5	19.8	FR	DO
1511704	10/28/1971	20.4	18.3	8.2	20.4	FR	DO
1511705	10/26/1971	20.4	18.3	8.2	20.4	FR	DO
1511706	10/6/1971	18.6	16.8	8.2	18.6	UK	DO
1512324	5/17/1972	24.4	20.4	6.1	24.4	FR	DO
1512338	5/9/1972	20.4	18.3	6.1	18.3	FR	DO
1512340	5/3/1972	21.3	18.3	6.1	19.8	FR	DO
1512345	10/17/1972	20.1	19.8	6.1	20.1	FR	DO
1512410	11/15/1972	20.7	19.2	6.1	20.7	FR	DO
1512423	2/11/1972	21.3	20.1	7.6	21.3	UK	DO
1512424	12/19/1972	18	16.8	6.1	18	FR	DO
1512425	12/12/1972	19.8	19.2	6.1	19.8	FR	DO
1512426	12/14/1972	20.4	-	6.1	20.4	FR	DO
1512427	11/1/1972	21.3	18	7.6	21.3	FR	DO
1512428	10/26/1972	21.3	18.9	6.1	21.3	FR	DO
1512429	7/19/1972	18.9	18.3	7.6	18.9	FR	DO
1512430	2/10/1972	22.9	20.7	7.6	21.3	UK	DO
1512431	2/7/1972	22.9	20.4	7.6	22.9	FR	DO
1512432	10/20/1972	20.7	20.1	6.1	20.7	FR	DO
1512433	7/20/1972	18.6	18.3	7.6	18.3	FR	DO
1512793	4/5/1965	26.5	25.9	4.6	26.5	FR	DO
1512794	9/2/1965	28.3	12.2	0.9	28.3	FR	DO
1512795	8/27/1968	18.3	-	9.4	18.3	FR	DO
1514500	3/29/1974	13.7	12.2	0.9	13.7	FR	DO
1515205	7/17/1975	15.8	14.6	2.4	15.8	FR	DO
1515221	11/24/1975	15.8	13.7	0.3	15.8	FR	DO
1515471	3/18/1976	21.9	17.4	7.3	21.9	FR	DO
1517593	8/18/1981	16.8	-	10.4	16.5	FR	DO
1517830	6/10/1982	26.2	25.6	19.8	25.9	FR	DO
1517832	6/30/1982	24.1	-	11.9	-	#N/A	DO
1517833	7/2/1982	21.9	-	8.8	21.9	FR	DO
1517916	8/13/1982	25	-	10.7	25	FR	DO
1518048	10/27/1982	22.9	-	7.6	22.9	FR	DO
1518052	10/27/1982	25.9	-	12.2	25.9	FR	DO
1518054	10/21/1982	26.8	-	16.8	26.8	FR	DO
1519284	8/7/1984	19.5	17.4	8.5	19.2	SU	DO
1519631	10/14/1980	22.6	19.8	6.7	21.6	SU	DO
1519988	12/12/1984	24.4	23.8	10.7	23.8	FR	DO
1522522	6/30/1988	22.6	-	9.8	22.6	SU	DO
1522998	10/27/1988	15.2	-	7.6	15.2	FR	DO
1524312	1/23/1990	29.3	19.2	8.5	27.4	FR	DO
1525585	8/1/1991	30.5	22.9	7.6	29.6	FR	DO
1525782	8/19/1991	29.9	19.5	13.7	20.4	FR	DO
1526061	11/28/1991	22.9	22.3	8.5	22.9	SU	DO
1527019	11/20/1992	21.9	21.9	10.7	21.9	SU	DO
1527222	7/8/1993	18.3	18.3	9.1	16.5	UK	DO
1528725	3/17/1995	29.6	29.6	13.7	-	SU	DO
1529701	10/2/1997	32	32	13.7	21.6	SU	DO
1529702	9/25/1997	61.6	61.6	12.2	39.6, 53.3	FR	DO
1534079	8/21/2003	37.5	37.5	12.2	34.4, 35.1	UK	DO
1536075	11/7/2005	22.7	22.7	10.1	18.9	FR	DO
7294262	8/31/2017	-	-	-	-	-	-
7311540	5/17/2018	-	-	-	-	-	-
7363368	7/10/2020	-	-	-	-	-	-

https://www.ontario.ca/page/map-well-records LEGEND

Not Available

- -'
- "Well Use"DODomesticSTLivestockIRIrrigationINIndustrial

"Water Detail" FR SA SU MN



CO	Commercial
MN	Municipal
PS	Public
AC	Cooling and A/C
NU	Not Used
ОТ	Other
ΤН	Test Hole
DE	Dewatering
MO	Monitoring
MT	Monitoring Test

Project: 100227.023 Date: November 2022

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PRIVATE WELL RECORDS

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Length of screen	Du	ration of test	pumping	3 hrs.	
Depth to top of screen	Wa	ater clear or o	cloudy at end of	test Clear	
Diameter of finished hole 51	Re	commended	pumping rate	6	G.P.M.
	wit	th pump setti	ing of 25!	feet belo	w ground surface
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Yellow sand		0	2		
Blue clay Boulder & sand		2 I 40	40 85		
Brown slate		85	87	87	Fresh
For what purpose(s) is the water to be used?			Location		
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	<u> </u>		EN AND BED		MATER	IALS (SEE)	NSTRUCTIONS)			
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BLUE	CLAY	BOULDE	DC						14	57
BLACK	SAND GRAVEL	DOULDE	<u>K</u>						84	85
DLICK	OFUIDEL									
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						<u> </u>	P			
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(31) 00	14528 1 000	<u>19305 </u>	78482813		20,858					
	ATER RECORD		& OPEN HO		CORD		54 (S) OF OPENING DT NO)	31-33 D	5	75 80 LENGTH 39-40
WATER FOUND AT - FEET	KIND OF WATER	INSIDE DIAM MATERIAL INCHES	WALL THICKNESS INCHES	DEP FRUM	TH - FEET		ERIAL AND TYPE		INCHES DEPTH TO TOP OF SCREEN	FEET 41-44 30
0085 2	FRESH 3 ULPHUR SALTY 4 MINERAL	140-11 1 1 STEEL 2 GALVANIZ 1 CONCRET		С	4085					FEET
2	FRESH 3 [] SULPHUR ' SALTY 4 [] MINERAL 24	06 4 OPEN HO			20	0-23 DEPTH	SET AT FEET			MENT GROUT
2	FRESH ³ SULPHUR ²⁴ SALTY ⁴ MINERAL 29 29	1 GALVANI 1 GALVANI 1 CONCRET 4 0 OPEN HO	ε				10-13 14-17			
2	☐ FRESH 3 ☐ SULPHUR ² ☐ SALTY 4 ☐ MINERAL 34	24-25 1 🗌 STEEL 2 🗌 GALVANIZ	26 Zed		27	• 30	18-28 22-25 26-29 30-33	80		
	G FRESH 3 G SULPHUR 34	3 🗌 CONCRET 4 🗌 OPEN HO	LE							
71 PUMPING TEST M	AETHOD 10 PUMPING RA	1000811-14 DURATION	15-16 //	17-18		,	LOCATION			
	PUMPING	LEVELS DURING	PUMPING				LOW SHOW DISTA IDICATE NORTH B		LL FROM ROAD	AND
TES	26	-28 29-31 EET 074 FEET 080	32-34	35-37 FEET	A					
	38-41 PUMP INTAK	E SET AT WATER AT	END OF TEST	42 J D Y	T		A.L D	и/		
	PUMP	· · · · · · · · · · · · · · · · · · ·	0006	66-49 GPM		_	NAVA	10		
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OF WELL	A D RECHARGE WELL					FOR	FST LEA	TRIM		
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USE C		• COOLING OR AIR	CONDITIONING	2	RCHT	105 3				
METHOD	57 1 CABLE TOOL 2 CABLE TOOL 2 ROTARY (CONVE	€ ☐ BORI NTIONAL) 7 ☐ DIAM			No.					
OF DRILLING		9 🗌 DRIV		-		MARKE				
			LICENCE NUMBER		DRILLERS RE			9-62 Dang ng	۳*** ۲	Q G." "
HOLD ADDRESS		ELL DRILLIN		<u> </u>	DATE OF	INSPECTION	2351	OR .		
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AN HAME OF DRI NAME OF DRI V/OY SIGNATURE O	V GENIEL	SUBMISSION D	2351		OFFICE					
Dipre	marte	ner DAY 27	MO YR	62	ō				FORM NO. 05	CS. RS
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ON-SITE DEEP BEDROCK TEST WELL RECORDS

Measure	ments record	ied in:] Metric	Imperial	2	A342173	1			Page)	0
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First Nam	ie		Last Name/				E-mail Addres	SS		[Well	
Mailing A	ddress (Street	t Number/Na	ame)	ohn Bo	isvert	Municipality	Province	Postal Code	e	Telephone	by We No (inc.	_
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Well Loc	cation	, 4										ŝ,
	of Well Location)		Township		Lot Q		Concessio	°/i	1
County/Di	istrict/Municip	ality	riu)			City/Town/Village			Provi	nce	Postal	10
	tawa Ca			la stituta a		Navan Municipal Plan and Suble	at Number		Other	tario		_
	rdinates Zone		1939	Northing	dale 1	Municipal Plan and Subl	or Number		Other			
						cord (see instructions on the	ne back of this form)					
General (Colour	Most Com	nmon Materia	il 👘	C	Other Materials	Ge	eneral Description	1		Dep	h
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			Grav	rel					_		50	
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Grey	& Black		Lime	stone			-			-	220	1
Grey	& Black		Lime	stone							294	1
			-00	11	1	50						
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70 /	. 60 /	Neat o	cement			15.6	Other, specify	-Not tester	(min)	(m/ft)	(min)	
60 /	01	Bento	nite slurry			21	If pumping discontin	nued, give reason:	Static Level	314"	1	
							X		1	42	1	
							Pump intake set at (2	47.8	2	
, DA-4	hod of Con	-ttion			Well U		280 Pumping rate (I/min	(CEM)	.3	52.7	3	
Cable To		Diamond	d . D Pu	blic	Comm		12 .		4	56.8	4	
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	(and a second	Driving		ontaals	Toot He			min 🦷	5			
Baring	Reverse)	Driving		estock gation	Test Ho		final water level end				10	-
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Cable Tool Rotary (Convention Rotary (Reverse) poing Air percussion Other, specify inside immeter Convention (Galver (G	Diamono Diamono Diamono Diving Driving Digging Drowing Digging Construction R Hole OR Material anized, Fibreglass, ete, Plastic, Steel) ef en Hole Construction R Material Galvanized, Steel) Water Dete th Kind of Water: as Other, speat th Kind t		Comme Municip Test Ho Cooling / / To / 66 / / 330 / / Deth (m/ft) To / / 66 / / / Bept From d d d d d d d d d d d d d d d	ercial Not used Pal Dewatering le Monitoring & Air Conditioning & Air Conditioning & Air Conditioning	280 Pumping rate (l/min / 6 20 + Duration of pumping 1 hrs + 0 n Final water level end o 43.4 * If flowing give rate (l/min Recommended pump n (l/min(GPM)) Re	PM) f pumping (m/R) vGPM) depth (m(R)) rate + PM) + Map of We	3 4 5 10 15 20 25 30 40 50 60	42.2 42.5 42.6 43 43.1 43.2 43.2 43.3 43.3 43.3 43.4 é	3 4 5 10 15 20 25 30 40 50 60	37 36 36 36 36 36 36 36 36 36
Cable Tool Rotary (Convention Rotary (Reverse) poing Air percussion Other, specify inside iameter (Galva (Galv	Diamone Diamone Diamone Driving Driving Digging Driving Digging Construction R Hole OR Material anized, Fibreglass, ete, Plastic, Steel) ef en Hole Construction R Material Galvanized, Steel) Water Dete th Kind of Water: as Other, spec th	Commestic Civestock Civestock Civestock Civestock Conductive	Comme Municip Test Ho Cooling / / / / / / / / / / / / / / / / / / /	ercial Not used hal Dewatering le Monitoring & Air Conditioning & Aeandoned Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Abandoned, Poor Water Quality Abandoned, Other, specify D ther, specify D ther, specify D ther, specify 0 ther	280 Pumping rate (l/min / € 20 + Duration of pumping 1 hrs + 0 n Final water level end o 43.4 * If flowing give rate (l/min Recommended pumpin (l/min(GPM)) Recommended (l/	PM) f pumping (m/R) vGPM) depth (m(R)) rate + PM) + Map of We	3 4 5 10 15 20 25 30 40 50 60	42.2 42.5 42.6 43 43.1 43.2 43.2 43.3 43.3 43.3 43.4 é	3 4 5 10 15 20 25 30 40 50 60	37 36 36 36 36 36 36 36 36 36
Cable Tool Rotary (Convention Rotary (Reverse) poing Air percussion Other, specify inside immeter Convention (Galver (G	Diamono Diamono Diamono Diving Driving Digging Drowing Digging Construction R Hole OR Material anized, Fibreglass, ete, Plastic, Steel) ef en Hole Construction R Material Galvanized, Steel) Water Dete th Kind of Water: as Other, speat th Kind t	Commestic Civestock Civestock Civestock Civestock Conductive	Comme Municip Test Ho Cooling / / / / / / / / / / / / / / / / / / /	arcial Dewatering be Monitoring & Air Conditioning & Alter Supply Becharge Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Abandoned, Orber, Specify D ther, specify D ther, specify Cother, specify Contractor's Licence No. 7681 Contractor's Licence No. 768	280 Pumping rate (I/min / @ 20 + Duration of pumping 1 hrs + 0 m Final water level end o 43.4 If flowing give rate (I/min Recommended pump r Recommended pump r (I/min(PPM)) Recommended pump r Recommended	PIN) in f pumping (m/R) v(GPM) depth (men) rate + imm) Amap of We below followin We fee SMU SMU SMU SMU	3 4 5 10 15 20 25 30 40 50 60 60 60 60 60 60 60 60 60 6	$\begin{array}{c} 42.2 \\ 42.5 \\ 42.6 \\ 43 \\ 43.1 \\ 43.2 \\ 43.3 \\ 43.3 \\ 43.3 \\ 43.3 \\ 43.4 \\ \hline \\ 43.4 \\ \hline \\ 43.4 \\ \hline \\ 60 \\ \hline \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 6 \\ \hline \\ \hline$	3 4 5 10 15 20 25 30 40 50 60 60 F7 7 7 7 7 7 7 7 7 7 7 7 7 7	38 37, 36, 36, 36, 36, 36, 36, 36, 36, 36, 36
Cable Tool Rotary (Convention Rotary (Reverse) poining Air percussion Other, specify inside inside inside inside inside inside ameter (Galwa Concr (Galwa (Gal			Comme Municip Test Ho Cooling / / To / 66 / / 330 / / / 66 / / / / / / / / / / / / / / /	arcial Dewatering bal Dewatering bal Monitoring & Air Conditioning & Mexican Conditioning & Mexican Conditioning & Abandoned, Hole & Ataration (Construction) Abandoned, Poor Water Quality Abandoned, Other, specify & Other, specify & Other, specify & Other, specify & Contractor's Licence No. 7681 & Contractor's Licence No. Contractor's Licence No.	280 Pumping rate (l/min / @ 20 + Duration of pumping 1 hrs + 0 m Final water level end o 43.4 * Recommended pump r Recommended pump r (l/min/PM) Recommended pump r (l/min/PM) Recommended pump r Recommend	PI() in f pumping (m/R) v(GPM) depth (met) rate + EM) + Map of We below followin we teo Smi Smi CNO Smi	3 4 5 10 15 20 25 30 40 50 60 60 60 60 60 60 60 60 7 7 7 7 7 7 7 7 7 7 7 7 7	$\begin{array}{c} 42.2 \\ 42.5 \\ 42.6 \\ 43 \\ 43.1 \\ 43.2 \\ 43.2 \\ 43.3 \\ 43.3 \\ 43.3 \\ 43.3 \\ 43.4 \\ \hline \\ 43.4 \\ \hline \\ 43.4 \\ \hline \\ 43.4 \\ \hline \\ 60 \\ \hline \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 6 \\ \hline \\ \hline \\ 6 \\ \hline \\ \hline \\ 6 \\ \hline \\ \hline \\ \hline$	3 4 5 10 15 20 25 30 40 50 60 60 F7 7 7 7 7 7 7 7 7 7 7 7 7 7	37 36 36 36 36 36 36 36 36 36
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PROPOSED AQUIFER (SHALLOW BEDROCK-GRAVEL) TEST WELL RECORDS

Mall Owner's	ecorded in:	Metric	Imperial		A342479		Regulation		Page		of
wen owner s	Information	Case C					en e				
First Name		Last Name/Or				E-mail Address			1		Construct
Mailing Address (Street Number/Na		hn Bois	vert	Municipality	Province	Postal Code		Telephone		
	aple Grove	Road			Stittsville	ON	K2S	OM7			
Vell Location	ocation (Street Nu	mber/Name)		<u> 1888 -</u>	Township		Lot		Concessio	4 00	
	Road (No Ci				Cumberland City/Town/Village		9	Provin	10	111	Code
								Onta		- I Usta	
	Zone Easting	No	orthing		Municipal Plan and Subl	ot Number		Other			
NAD 8 3 Verburden an		784 rials/Abando	50201 nment Se		ord (see instructions on th	e back of this form)					
General Colour	Most Com	mon Material		Ot	ther Materials	Gene	ral Description			From	th (m)
		Clay	-					51		0 -	17
		Sand		9	Boulder	5				17	34
			8	-			+ 1 Aut	** **	24	1	
		Grave						n ng Silangal	34	-8	45
Grey & Bro		Shale			Sectors - 4		. 17. 1. die	1	14°A 4	45	49
	•										1
	a	Annular	and the second second				Results of We	CLUMPS AND ADDA	ACOUNT PROPERTY AND		
Depth Set at (m From To	>	Type of Seal (Material and			Volume Placed (m(fi3)	After test of well yield, Clear and sand fr		Time	Water Leve	Time	ecovery Water Lev
13 / 33	Neat c	ement		н	10.92	Other, specify	Not teste	(min) Static	(m/ft)	(min)	(m/ft)
33 0.	Bento	nite slurry			4.2	If pumping discontinue	u, give reason.	Level	11,7	1	26.34
						Pump intake set at (In/		2	- 15.5		23.
						35	-	3	17.1	-	21.
and the second	Construction			Well Us	and the second	Pumping rate (Vmin)		4	18.4		20.0
] Cable Tool] Rotary (Convention		Boom	estic	Comme	al Dewatering	Duration of pumping		5	19.4	-	19.(
Rotary (Reverse) Boring	Driving	Lives		Test Hol Cooling	le 🗌 Monitoring & Air Conditioning	Final water level end of		10	20.2	1	18.0
Other, specify		Indus									
jourer, specity		_ Othe	r, specify			26.3 "	n An ann an a				16
j Oulei, specily	Construction R			and the second	Status of Well	26.3 If flowing give rate (I/mir	n An ann an a	15	24.1	15	14.0
Inside Open Diameter (Galva	Hole OR Material anized, Fibreglass,	ecord - Casir Wall	ng Depth	-	Vater Supply	26.3 "	VGPM) (1995)	15 20	24.1 25	15	14.0
Inside Oper Diameter (Galva (cm/jm) Conci	Hole OR Material anized, Fibreglass, rete, Plastic, Steel)	Wall Wall Thickness (cmm)	ng Depth From	То	Replacement Well	26.3 If flowing give rate (l/mir Recommended pump of Recommended pump r	VGPM)	15 20 25	24.1 25 25.3	15 20 25	14.9 13.9 12.8
Inside Diameter (cm/) 0 1/4 Ste	Hole OR Material anized, Fibreglass, rete, Plastic, Steel)	ecord - Casir Wall	Depth From +21	To 43'	Vater Supply Replacement Well Test Hole Recharge Well Dewatering Well	1f flowing give rate (Umir Recommended pump of Recommended pump r (Umin/GPM)5	/GPM) lepth (r	15 20 25 30	24.1 25 25.3 25.8	15 20 25 30	14.9 13.9 12.8 11.9
Inside Diameter (cm/jo) Conci Conci Conci	Hole OR Material anized, Fibreglass, rete, Plastic, Steel)	Wall Wall Thickness (cmm)	ng Depth From	То	Vater Supply Replacement Well Test Hole Recharge Well Dewatering Well Observation and/or - Monitoring Hole	26.3 If flowing give rate (l/mir Recommended pump of Recommended pump r	/GPM) lepth (r	15 20 25 30 40	24.1 25 25.3 25.8 26.3	15 20 25 30 40	14.0 13.0 12.0 11.0 11.0
Inside Diameter (cm/jo) Conci Conci Conci	Hole OR Material anized, Fibreglass, rete, Plastic, Steel)	Wall Wall Thickness (cmm)	Depth From +21	To 43'	Vater Supply Replacement Well Test Hole Recharge Well Dewataring Well Observation and/or Monitoring Hole Alteration (Construction)	26.3 " If flowing give rate (I/mir Recommended pump of Recommended pump of (I/min/GPM) 5 Well production (I/min/G DiamTexted?	/GPM) lepth (r	15 20 25 30	24.1 25 25.3 25.8 26.3 26.3	15 20 25 30 40 50	14.9 13.9 12.9 11.9 11.4
Inside Diameter (cm/jo) 0 1/4 5 5 5 6 7 4 5 5 5 6 7 4 5 5 5 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7	Hole OR Material anized, Fibreglass, rete, Plastic, Steel)	ecord - Casir Wall Thickness (cmb) .188	ng Depth From +21 43.1	To 43'	Vater Supply Replacement Well Test Hole Recharge Well Dewatering Well Observation and/or Monitoring Hole Alteration (Construction) Abandoned, Insufficient Supply	26.3 * If flowing give rate (l/mir Recommended pump r (l/min/GPM) Well production (l/min/G	/GPM) lepth (r	15 20 25 30 40 50 60	24.1 25 25.3 25.8 26.3 26.3 26.3	15 20 25 30 40	14.9 13.9 12.9 11.9 11.4
Inside Diameter (Galva Condi 2 /4 Ste 2 ··· Op	Hole OR Material anized, Fibreglass, rete, Plastic, Steel) en Hole Construction R Material	ecord - Casir Wall Thickness (cmfb) .188 r .188	ng Depth From +21 43 / 43 /	To 43' 45' (m/it)	Vater Supply Replacement Well Test Hole Recharge Well Dewatering Well Observation and/or Monitoring Hole Atteration (Construction) Abandoned, Insufficient Supply Abandoned, Poor Water Quality	26.3 " If flowing give rate (I/mir Recommended pump of Recommended pump of (I/min/GPM) 5 Well production (I/min/G DiamTexted?	VGPM) tepth (TAD) ate	15 20 25 30 40 50 60 II Local	24.1 25 25.3 25.8 26.3 26.3 26.3 26.3 100	15 20 25 30 40 50 €60	14.9 13.9 12.9 11.9 11.4
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APPENDIX F

Water Quality Results and Laboratory Certificate Forms

Summary of Measured Field Parameters Private Wells

Well ID	Date of Sampling	Time Since Initiation of Pumping (hours)	Temp (°C)	рН (-)	EC ¹ (mS/cm)	Turbidity ² (NTU)	TDS ³ (ppm)	Chlorine (mg/L)	Colour (ACU⁴)	Colour (TCU⁵)
PW-939	2-Feb-22	0.16	10.2	8.71	373	1.14	242	<0.02	<5	-
PW- 1014	2-Feb-22	0.16	9.34	8.92	609	3.19	390	<0.02	<5	-
PW-903	7-Apr-22	0.25	8.6	9.19	520	0.82	260	<0.02	<5	-
PW-959	13-Oct-23	0.25	12.8	9.27	456	1.39	227	-	<5	-
PW-900	13-Oct-23	0.25	11.8	9.75	463	0.8	231	-	<5	-
PW-969	13-Oct-23	0.25	12.2	7.95	301	0.79	152	-	<5	-
PW-908	13-Oct-23	0.25	11.1	9.45	476	0.82	234	-	<5	-

Notes:

EC: Electrical Conductivity
 Turbidity is taken to be the average of three consecutive measurements.
 TDS: Total Dissolved Solids (Calculated as 0.5 × EC)
 ACU: Actual Colour Units (Infiltered)
 TCU: True Colour Units (field-filtered using 0.45-micron filter)

6. '-': Not Measured

7. TW22-04 pumped at a rate of approx 15 litres per minute

8. TW24-05 pumped at a rate of approx 19 litres per minute

Summary of Measured Field Parameters Test Wells

Well ID	Date of Sampling	Time Since Initiation of Pumping (hours)	Temp (°C)	рН (-)	EC ¹ (mS/cm)	Turbidity ² (NTU)	TDS ³ (ppm)	Chlorine (mg/L)	Colour (ACU⁴)	Colour (TCU⁵)
		1	4.2	8.78	476	9.92	238	-	-	-
		2	9.4	8.69	478	4.62	238	-	-	-
		3	9.8	8.56	475	4.82	237	<0.02	<5	<5
TW21-01	18-Nov-21	4	9.6	8.52	476	4.63	236	-	-	-
		5	9.5	8.54	476	4.96	237	-	-	-
		6	9.4	8.55	474	3.9	235	< 0.02	<5	<5
		1	12.44	8.81	636	-	406	-	-	-
		2	9.07	9.08	671	-	429	-	-	-
TIN 00 04	0.5.1.00	3	8.24	9.07	662	-	424	<0.02	-	-
TW22-01	2-Feb-22	4	7.92	9.07	763	-	488	-	-	-
		5	8.33	9.12	793	-	508	-	-	-
		6	8.18	9.08	818	-	524	-	-	-
		1	6.38	9.3	766	6.92	491	-	-	-
		2	-	-	-	-	-	-	-	-
TW 22-02	1-Feb-22	3	6.83	9.58	781	4.65	502	<0.02	24	<5
10022-02	I-Feb-22	4	7.8	9.75	818	6.61	524	-	-	-
		5	6.83	9.75	838	3.74	536	-	-	-
		6	6.77	9.68	871	3.71	555	<0.02	51	<5
		1	8.8	9.68	610	39.7	300	-	-	-
		2	10.2	9.57	580	43.6	300	-	-	-
	28-Apr-22	3	10	9.51	580	50.9	290	<0.02	371	<5
TW22-03	20-741-22	4	-	-	-	-	-	-	-	-
		5	9.7	9.6	580	71.5	290	-	-	-
		6	9.7	9.47	570	58.9	280	<0.02	<5	<5
	7-Apr-22	1	9.3	9.76	0.67	15.3	0.4	<0.02	0	<5
		1	11.9	9.71	560	1000	280	-	-	-
		2	13.4	8.44	540	377	270	-	-	-
	28-Apr-22	3	12.3	9.27	540	242	270	<0.02	>500	<5
TW22-04	20710122	4	13	9.21	530	157	270	-	-	-
		5	14	9.1	540	134	270	-	-	-
		6	13.5	9.23	540	99.6	270	<0.02	>500	<5
	19-Dec-23	168 (7)	10	9.34	482	2.33	241	<0.02	<5	<5
		1	11.9	9.71	560	1000	280	-	-	-
		2	13.4	8.44	540	377	270	-	-	-
	18-Jan-24	3	12.3	9.27	540	242	270	<0.02	>500	<5
TW24-05	10-0a11-2- 1	4	13	9.21	530	157	270	-	-	-
		5	14	9.1	540	134	270	-	-	-
		6	13.5	9.23	540	99.6	270	<0.02	>500	<5
	24-Jan-24	48 (8)	11.59	8.14	459	0.38	298	<0.02	<5	<5

Notes:

1. EC: Electrical Conductivity

2. Turbidity is taken to be the average of three consecutive measurements.

3. TDS: Total Dissolved Solids (Calculated as 0.5 × EC)

4. ACU: Actual Colour Units (unfiltered)

5. TCU: True Colour Units (field-filtered using 0.45-micron filter)

6. '-': Not Measured

7. TW22-04 pumped at a rate of approx 15 litres per minute

8. TW24-05 pumped at a rate of approx 19 litres per minute



Water Quality Summary Private Wells

Parameters	Units				959 Smith Road 2341381-01 10/13/2023 09:30			
GEMTEC ASSIGNED	WELL ID	PM PW-939	PM PW-1014	PM PW-903	AM PW-959	AM PW-900	AM PW-969	PM PW-908
Microbiological Para								
	FU/100m	ND (1)	ND (1)	ND (1)	-	-	-	-
	FU/100m FU/100m	ND (1) ND (1)	ND (1) ND (1)	ND (1) 1	-	-	-	-
Heterotrophic Plate C	CFU/mL	ND (1)	ND (1)	-	-	-	-	-
General Inorganics	CI O/IIIE	ND (10)	ND (10)					
Alkalinity, total	mg/L	172	241	224	-	-	-	-
Ammonia as N	mg/L	0.53	0.31	0.47	_	-	_	_
Dissolved Organic Car	mg/L	1.1	ND (0.5)	1.6	_	-	-	-
Colour	TCU	3	5	6	2	ND (2)	3	ND (2)
Colour, apparent	ACU	5	13	9	7	3	18	8
Conductivity	uS/cm	384	572	462	-	-	-	-
Hardness	mg/L	39.2	6.33	27.7	-	-	-	-
рН	pH Units	8.4	9.0	8.6	-	-	-	-
Phenolics	mg/L	ND (0.001)	ND (0.001)	ND (0.001)	-	-	-	-
Total Dissolved Solids	mg/L	208	324	250	-	-	-	-
Sulphide	mg/L	1.12	4.61	0.90	-	-	-	-
Tannin & Lignin	mg/L	ND (0.1)	ND (0.1)	ND (0.1)	-	-	-	-
Total Kjeldahl Nitroge	mg/L	0.6	0.3	0.5	-	-	-	-
Organic Nitrogen	mg/L	0.07	0	0.03	-	-	-	-
Turbidity	NTU	1.2	2.0	0.8	0.8	0.4	0.9	1.0
Anions	/	10	20	10	10			22
Chloride	mg/L	13 0.6	39	18 0.7	40 0.8	14 0.5	11 0.3	22 0.8
Fluoride Nitrate as N	mg/L	ND (0.1)	1.1 ND (0.1)	ND (0.1)	ND (0.1)	0.5 ND (0.1)	ND (0.1)	0.8 ND (0.1)
Nitrite as N	mg/L mg/L	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	ND (0.1) -	ND (0.1) -	ND (0.1) -	ND (0.1) -
Sulphate	mg/L	ND (0.03)	3	3	-	-	-	-
Metals	IIIg/L		5	5		-		
Aluminum	mg/L	-	-	-	-	-	-	
Antimony	mg/L	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	-	-	-	-	-
Calcium	mg/L	7.0	1.8	7.5	-	-	-	-
Chromium	mg/L	-	-	-	-	-	-	-
Cobalt	mg/L	-	-	-	-	-	-	-
Copper	mg/L	-	-	-	-	-	-	_
Iron	mg/L	ND (0.1)	0.2	0.2	0.1	ND (0.1)	0.4	ND (0.1)
Lead	mg/L	-	-	-	-	-	-	-
Magnesium	mg/L	5.3	0.4	2.1	-	-	-	-
Manganese	mg/L	ND (0.005)	ND (0.005)	0.017	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-
Potassium Selenium	mg/L mg/L	5.2 -	1.5 -	3.2	-	-	-	-
Silver	mg/L mg/L	-	-	-	-	-	-	-
Sodium	mg/L	- 64.8	- 124	- 86.0	-	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	-	-
Tin	mg/L			-		-		-
Titanium	mg/L	_	_	_	-	_	-	-
Tungsten	mg/L	_	-	-	-	-	-	-
Uranium	mg/L	-	-	-	-	-	-	-
Zinc	mg/L	-	-	-	-	-	-	-

Water Quality Summary Deep Test Wells

Parameter	Units	TW21-01 3hr Lab ID: 2147532- 01	TW21-01 3hr (Filtered) Lab ID: 2147532-	TW21-01 6hr Lab ID: 2147532- 02	TW21-01 6hr (Filtered) Lab ID: 2147532-	TW22-1 3hr Lab ID: 2206352- 01	TW22-1 6hr Lab ID: 2206352- 02	TW22-1 6hr (Filtered) Lab ID: 2206352-	TW22-1 Lab ID: 2208183- 01	TW22-2 3hr Lab ID: 2206260- 01	TW22-2 6hr Lab ID: 2206260- 02	TW22-2 6 hr (Filtered) Lab ID: 2206260-
Sample Date		11/18/2021	01 11/18/2021	11/18/2021	02 11/18/2021	02/02/2022	02/02/2022	03 02/02/2022	02/14/2022	02/01/2022	02/01/2022	03 02/01/2022
(m/d/y)		11:40 AM	11:40 AM	02:40 PM	02:40 PM	11:20 AM	02:20 PM	02:20 PM	03:30 PM	11:30 AM	02:30 PM	02:30 PM
GEMTEC ASSIGN	IED WELL ID		PW	21-1			TW	22-1			TW22-2	
Microbiological I												
E. Coli	CFU/100mL	ND (1)	-	ND (1)	ND (1)	ND (10)	ND (10)	-	-	ND (1)	ND (1)	-
Fecal Coliforms Total Coliforms	CFU/100mL CFU/100mL	ND (1) ND (1)	-	ND (1) ND (1)	ND (1) ND (1)	ND (10) ND (10)	ND (10) ND (10)	-	-	ND (1) ND (1)	ND (1) ND (1)	-
Heterotrophic Pla	CFU/mL	-	-	-	-	10	ND (10)	-	-	ND (10)	ND (10)	-
General Inorgan										(- <i>I</i>	(/	
Alkalinity, total	mg/L	224	-	223	223	327	353	-	-	319	348	-
Ammonia as N	mg/L	0.55	-	0.57	0.57	0.37	0.38	-	-	0.29	0.30	-
Dissolved Organi	mg/L	1.8	-	1.4	1.4	1.5	1.5	-	-	1.3	0.7	-
Colour	TCU	5	-	4	4	9	14	-	-	3	3	-
Colour, apparent	ACU	14	-	11	11	764	1000	-	-	24	26	-
Conductivity Hardness	uS/cm	508 45.7	-	476 45.6	476 45.6	706 10.8	828 13.6		-	816 10.7	855 12.1	-
pH	mg/L pH Units	8.4	-	45.6 8.3	45.6 8.3	9.2	9.1	-	-	9.0	8.9	-
Phenolics	mg/L	ND (0.001)	-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	-	-	ND (0.001)	ND (0.001)	-
Total Dissolved S	mg/L	264	-	250	250	436	472	-	-	452	468	-
Sulphide	mg/L	0.29	-	0.31	0.31	1.77	3.75	-	-	2.78	3.08	-
Tannin & Lignin	mg/L	0.2	-	0.2	0.2	0.3	0.3	-	-	ND (0.1)	ND (0.1)	-
Total Kjeldahl Nit	mg/L	0.6	-	0.6	0.6	0.5	0.6	-	-	0.4	0.4	-
Organic Nitrogen	mg/L	0.05	-	0.03	0.03	0.13	0.22	-	-	0.11	0.1	-
Turbidity	NTU	1.5	-	0.8	0.8	140	190	-	-	4.0	4.2	-
Anions												
Chloride	mg/L	19	-	17	17	28	41	-	-	53	55	-
Fluoride	mg/L	0.6	-	0.6	0.6	2.6	3.0	-	3	2.7	3.3	-
Nitrate as N Nitrite as N	mg/L mg/L	ND (0.1) ND (0.05)	-	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	-	-	ND (0.1) ND (0.05)	ND (0.1) ND (0.05)	-
Sulphate	mg/L	5	-	4	4	ND (0.03)	1	-	-	5	7	-
Metals	1115/ 2	5				110 (1)	-			5	,	
Mercury	mg/L	-	-	-	-	-	-	-	-	-	ND (0.0001)	ND (0.0001)
Aluminum	mg/L	-	-	-	0.023	-	1.59	0.282	-	-	0.194	0.003
Antimony	mg/L	-	-	-	ND (0.0005)	-	ND (0.0005)	0.0006	-	-	ND (0.0005)	0.0012
Arsenic	mg/L	-	-	-	ND (0.001)	-	ND (0.001)	ND (0.001)	-	-	0.002	0.002
Barium	mg/L	-	-	-	0.241	-	0.277	0.142	-	-	0.184	0.169
Beryllium	mg/L	-	-	-	-	-	ND (0.0005)	ND (0.0005)	-	-	ND (0.0005)	ND (0.0005)
Boron	mg/L	-	-	-	0.31	-	0.45	0.53	-	-	0.44	0.53
Cadmium	mg/L	-	-	-	ND (0.0001)	-	ND (0.0001)	ND (0.0001)	-	-	ND (0.0001)	ND (0.0001)
Calcium Chromium	mg/L	-	-	-	- ND (0.001)	2.7	3.3 ND (0.001)	2.0 ND (0.001)	-	2.7	3.0 ND (0.001)	2.9 ND (0.001)
Cobalt	mg/L mg/L	-	-	-	ND (0.001)	-	ND (0.001)	ND (0.001)	-	-	ND (0.001)	ND (0.001)
Copper	mg/L	-	-	-	ND (0.0005)	-	ND (0.0005)	0.0005	-	-	ND (0.0005)	ND (0.0005)
Iron	mg/L	-	ND (0.1)	-	ND (0.1)	1.3	0.9	ND (0.1)	-	0.2	0.2	ND (0.1)
Lead	mg/L	-	-	-	ND (0.0001)	-	0.0005	ND (0.0001)	-	-	ND (0.0001)	ND (0.0001)
Magnesium	mg/L	-	7.1	-	7.0	1.0	1.3	0.6	-	1.0	1.1	0.9
Manganese	mg/L	-	0.007	-	0.006	0.015	0.017	ND (0.005)	-	ND (0.005)	ND (0.005)	ND (0.005)
Molybdenum	mg/L	-	-	-	-	-	0.0014	0.0019	-	-	0.0014	0.0018
Nickel	mg/L	-	-	-	-	-	ND (0.001)	ND (0.001)	-	-	ND (0.001)	ND (0.001)
Potassium	mg/L	-	7.8	-	7.5	2.8	3.1	1.9	-	2.3	2.6	2.2
Selenium Silver	mg/L	-	- 80.4	-	ND (0.001) 79.9	-	ND (0.001) ND (0.0001)	ND (0.001) 0.0003	-	-	0.001 ND (0.0001)	ND (0.001) ND (0.0001)
Silver Sodium	mg/L mg/L	-	-	-	79.9	160	173	146	-	- 163	184	162
Strontium	mg/L	-	-	-	-	- 190	0.21	0.17	-	-	0.26	0.28
Thallium	mg/L	-	-	-	-	-	ND (0.001)	ND (0.001)	-	-	ND (0.001)	ND (0.001)
Tin	mg/L	-	-	-	-	-	ND (0.01)	ND (0.001)	-	-	ND (0.01)	ND (0.001)
Titanium	mg/L	-	-	-	-	-	0.083	ND (0.005)	-	-	0.008	ND (0.005)
Tungsten	mg/L	-	-	-	-	-	ND (0.01)	ND (0.01)	-	-	ND (0.01)	ND (0.01)
Uranium	mg/L	-	-	-	ND (0.0001)	-	0.0003	0.0002	-	-	0.0003	0.0004
Vanadium	mg/L	-	-	-	-	-	0.0022	0.0005	-	-	ND (0.0005)	ND (0.0005)
Zinc	mg/L	-	-	-	ND (0.005)	-	0.006	ND (0.005)	-	-	ND (0.005)	ND (0.005)

Water Quality Summary Proposed Water Supply Wells

Parameter	Units	TW22-03	TW22-03	TW22-03 6hr	TW22-03 6hr	TW22-04 6hr	TW22-04 6hr	TW22-4	TW24-5	TW24-5 (Filtered)
Sample Date		Lab ID: 2209298-01 02/24/2022 10:55 AM	Lab ID: 2215531-01 04/07/2022 01:00 PM	Lab ID: 2218541-02 04/28/2022 03:15 PM	(Filtered) 04/28/2022 03:15 PM	Lab ID: 2236417-02 09/01/2022 04:00 PM	(Filtered) 09/01/2022 04:00 PM	Lab ID: 2351202-01	Lab ID: 2404291-01 01/24/2024 02:25 PM	Lab ID: 2404291-02 01/24/2024 02:25 PM
(m/d/y) GEMTEC ASSIG								, , , , , , , , , , , , , , , , , , , ,		
GEINTEC ASSIG	INED WELL		TW	22-3			TW22-4		TW2	4-5
Microbiologica	l Parameters									
E. Coli	CFU/100mL	-	ND (1)	ND (1)	-	-	-	ND (1)	ND (1)	N/A
Fecal Coliforms	CFU/100mL	-	ND (1)	ND (1)	-	-	-	ND (1)	1	N/A
Total Coliforms	CFU/100mL	-	ND (1)	ND (1)	-	-	-	ND (1)	ND (1)	N/A
Heterotrophic P		-	-	-	-	-	-	10	ND (10)	N/A
General Inorga										
Alkalinity, total	mg/L	-	227	218	-	239	-	252	189	N/A
Ammonia as N Dissolved Orgar	mg/L mg/L	-	0.31	0.34	-	0.37	-	0.36	0.45	N/A N/A
Colour	TCU	-	1.5	1.8	-	29	-	2	2	N/A N/A
Colour, apparer	ACU	-	100	289	-	474	-	5	12	N/A
Conductivity	uS/cm	-	516	544	-	481	-	516	480	N/A
Hardness	mg/L	-	11.4	15.6	-	12.6	-	6.69	31.7	N/A
рН	pH Units	-	9.2	9.2	-	8.9	-	9.4	8.8	N/A
Phenolics	mg/L	-	ND (0.001)	ND (0.001)	-	ND (0.001)	-	ND (0.001)	ND (0.001)	N/A
Total Dissolved	mg/L	-	304	306	-	308	-	268	248	N/A
Sulphide	mg/L	-	1.48	2.31	-	0.05	-	0.23	2.34	N/A
Tannin & Lignin	mg/L	-	ND (0.1)	1.5	-	0.2	-	ND (0.1)	0.4	N/A
Total Kjeldahl N	mg/L	-	0.4	0.4	-	0.4	-	0.3	0.4	N/A
Organic Nitroge Turbidity	mg/L NTU	-	18.1	54.6	-	93.9	-	0.5	1.4	- N/A
Anions	NIU	-	10.1	54.0	-	55.5	-	0.5	1.4	11/74
Chloride	mg/L	22	35	39	-	8	-	15	29	N/A
Fluoride	mg/L	1.3	1.4	1.3	-	1.3	-	1.1	0.8	N/A
Nitrate as N	mg/L	ND (0.1)	ND (0.1)	ND (0.1)	-	0.2	-	ND (0.1)	ND (0.1)	N/A
Nitrite as N	mg/L	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.10)	-	ND (0.05)	ND (0.05)	N/A
Sulphate	mg/L	-	2	2	-	ND (1)	-	ND (1)	8	N/A
Metals				ND (0.0004)	NE (0.0004)	ND (0.0004)	ND (0.0004)	NID (0.0004)	ND (0.0004)	ND (0.0004)
Mercury	mg/L	-	-	ND (0.0001) 0.573	ND (0.0001) 0.007	ND (0.0001) 0.762	ND (0.0001) 0.028	ND (0.0001) 0.047	ND (0.0001) 0.050	ND (0.0001) 0.023
Aluminum Antimony	mg/L mg/L	-	-	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Arsenic	mg/L	-	-	ND (0.001)	ND (0.001)	ND (0.0003)	ND (0.001)	ND (0.001)	ND (0.0003)	ND (0.001)
Barium	mg/L	_	-	0.044	0.027	0.077	0.053	0.052	0.151	0.137
Beryllium	mg/L	-	-	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Boron	mg/L	-	-	0.33	0.33	0.44	0.46	0.36	0.27	0.24
Cadmium	mg/L	-	-	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)
Calcium	mg/L	-	3.3	4.5	1.7	3.2	1.4	1.7	8.2	7.4
Chromium	mg/L	-	-	0.001	ND (0.001)	0.001	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Cobalt	mg/L	-	-	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Copper Iron	mg/L mg/L	-	- 0.3	ND (0.0005) 0.9	ND (0.0005) ND (0.1)	0.0009	0.0013 ND (0.1)	ND (0.0005) ND (0.1)	ND (0.0005) ND (0.1)	ND (0.0005) ND (0.1)
Lead	mg/L	-	-	0.0001	ND (0.1)	0.0005	ND (0.1)	0.0002	ND (0.1) ND (0.0001)	ND (0.1)
Magnesium	mg/L	-	0.8	1.1	0.5	1.1	0.5	0.6	2.8	2.7
Manganese	mg/L	-	0.012	0.027	ND (0.005)	0.026	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Molybdenum	mg/L	-	-	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	0.0005	ND (0.0005)
Nickel	mg/L	-	-	ND (0.001)	ND (0.001)	0.001	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Potassium	mg/L	-	1.3	1.4	1.2	1.6	1.4	1.6	3.3	3.3
Selenium	mg/L	-	-	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Silver	mg/L	-	-	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)
Sodium	mg/L	109	106	98.7 0.12	97.0 0.11	93.9 0.08	95.8	110 0.09	85.5	85.4
Strontium Thallium	mg/L mg/L	-	-	0.12 ND (0.001)	0.11 ND (0.001)	0.08 ND (0.001)	0.07 ND (0.001)	ND (0.001)	0.45 ND (0.001)	0.41 ND (0.001)
Tin	mg/L	-	-	ND (0.001) ND (0.01)	ND (0.001) ND (0.01)	-	-	-	10.001)	(0.001)
Titanium	mg/L	-	-	0.040	ND (0.01)	-	-	-		
Tungsten	mg/L	-	-	ND (0.01)	ND (0.003)	-	-	-		
Uranium	mg/L	-	-	ND (0.0001)	ND (0.0001)	0.0001	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)
Vanadium	mg/L	-	-	0.0016	ND (0.0005)	0.0019	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
	mg/L	-	-	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)



RELIABLE.

300 - 2319 St. Laurent Blvd Ottawa, ON, K1G 4J8 1-800-749-1947 www.paracellabs.com

Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 13240

Report Date: 24-Nov-2021 Order Date: 19-Nov-2021

Order #: 2147532

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2147532-01 2147532-02

Client ID TW21-01 3hr TW21-01 6hr

Comment: TW21-01 in this COC is identified PW21-01 in the report

Approved By:

Dale Robertson, BSc Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Analysis Summary Table

Order #: 2147532

Report Date: 24-Nov-2021 Order Date: 19-Nov-2021 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	22-Nov-21	22-Nov-21
Ammonia, as N	EPA 351.2 - Auto Colour	23 - Nov-21	23-Nov-21
Anions	EPA 300.1 - IC	19 - Nov-21	19-Nov-21
Colour	SM2120 - Spectrophotometric	19 - Nov-21	19-Nov-21
Colour, apparent	SM2120 - Spectrophotometric	19 - Nov-21	19-Nov-21
Conductivity	EPA 9050A- probe @25 °C	22-Nov-21	22-Nov-21
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	22-Nov-21	22-Nov-21
E. coli	MOE E3407	19 - Nov-21	19-Nov-21
Fecal Coliform	SM 9222D	19 - Nov-21	19-Nov-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	19 - Nov-21	19-Nov-21
рН	EPA 150.1 - pH probe @25 °C	22 - Nov-21	22-Nov-21
Phenolics	EPA 420.2 - Auto Colour, 4AAP	22 - Nov-21	22-Nov-21
Hardness	Hardness as CaCO3	19 - Nov-21	19-Nov-21
Sulphide	SM 4500SE - Colourimetric	22 - Nov-21	22-Nov-21
Tannin/Lignin	SM 5550B - Colourimetric	22-Nov-21	22-Nov-21
Total Coliform	MOE E3407	19 - Nov-21	19-Nov-21
Total Dissolved Solids	SM 2540C - gravimetric, filtration	22 - Nov-21	23-Nov-21
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	22 - Nov-21	22-Nov-21
Turbidity	SM 2130B - Turbidity meter	19 - Nov-21	19-Nov-21



Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 24-Nov-2021 Order Date: 19-Nov-2021

Project Description: 100812.001

	Client ID: Sample Date: Sample ID:	TW21-01 3hr 18-Nov-21 11:40 2147532-01	TW21-01 6hr 18-Nov-21 14:40 2147532-02	-	-
Microbiological Parameters	MDL/Units	Drinking Water	Drinking Water	-	-
E. coli	1 CFU/100mL	ND [1]		-	
Fecal Coliforms	1 CFU/100mL	ND [1]	ND [1]		-
Total Coliforms	1 CFU/100mL	ND (41	ND	-	-
General Inorganics	I OI O/ IOOME	ND [1]	ND [1]	-	-
Alkalinity, total	5 mg/L	224	223	-	-
Ammonia as N	0.01 mg/L	0.55	0.57		
Dissolved Organic Carbon	0.5 mg/L	1.8	1.4	-	-
Colour	2 TCU	5	4		-
Colour, apparent	2 ACU	14	11	-	-
Conductivity	5 uS/cm			-	-
	mg/L	508	476	-	-
Hardness	0.1 pH Units	45.7	45.6	-	-
pH	0.001 mg/L	8.4	8.3	-	-
Phenolics		<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	264	250	-	-
Sulphide	0.02 mg/L	0.29	0.31	-	-
Tannin & Lignin	0.1 mg/L	0.2	0.2	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.6	0.6	-	-
Turbidity	0.1 NTU	1.5	0.8	-	-
Anions			1 1		
Chloride	1 mg/L	19	17	-	-
Fluoride	0.1 mg/L	0.6	0.6	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	5	4	-	-
Metals	i		·i		
Aluminum	0.001 mg/L	-	0.023	-	-
Antimony	0.0005 mg/L	-	<0.0005	-	-
Arsenic	0.001 mg/L	-	<0.001	-	-
Barium	0.001 mg/L	-	0.241	-	-
Boron	0.01 mg/L	-	0.31	-	-
Cadmium	0.0001 mg/L	-	<0.0001	-	-
Calcium	0.1 mg/L	6.7	6.7	-	-
Chromium	0.001 mg/L	-	<0.001	-	-
Copper	0.0005 mg/L	-	<0.0005	-	-
Iron	0.1 mg/L	<0.1	<0.1	-	-
			•		



Order #: 2147532

Report Date: 24-Nov-2021

Order Date: 19-Nov-2021

Project Description: 100812.001

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

	-		-	-	
	Client ID:	TW21-01 3hr	TW21-01 6hr	-	-
	Sample Date:	18-Nov-21 11:40	18-Nov-21 14:40	-	-
	Sample ID:	2147532-01	2147532-02	-	-
	MDL/Units	Drinking Water	Drinking Water	-	-
Lead	0.0001 mg/L	-	<0.0001	-	-
Magnesium	0.2 mg/L	7.1	7.0	-	-
Manganese	0.005 mg/L	0.007	0.006	-	-
Potassium	0.1 mg/L	7.8	7.5	-	-
Selenium	0.001 mg/L	-	<0.001	-	-
Sodium	0.2 mg/L	80.4	79.9	-	-
Uranium	0.0001 mg/L	-	<0.0001	-	-
Zinc	0.005 mg/L	_	<0.005	_	-



Potassium

Selenium

Sodium

Uranium

Microbiological Parameters

Zinc

E. coli

Fecal Coliforms

Total Coliforms

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Blank

		Reporting				%REC	RPD	
Analyte	Result	Limit	Units	Source Result	%REC	Limit	RPD	Limit
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	тču					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NŤU					
Metals								
Aluminum	ND	0.001	mg/L					
Antimony	ND	0.0005	mg/L					
Arsenic	ND	0.001	mg/L					
Barium	ND	0.001	mg/L					
Boron	ND	0.01	mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Copper	ND	0.0005	mg/L					
Iron	ND	0.1	mg/L					
Lead	ND	0.0001	mg/L					
Magnesium	ND	0.2	mg/L					
Manganese	ND	0.005	mg/L					
Dituri	ND	0.4						

0.1

0.001

0.2

0.0001

0.005

1

1

1

mg/L

mg/L

mg/L

mg/L

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

ND

ND

ND

ND

ND

ND

ND

ND

Order #: 2147532

Report Date: 24-Nov-2021

Notes

Order Date: 19-Nov-2021



Method Quality Control: Duplicate

		Reporting		Source		%REC		RPD	
Analyte	Result	Limit	Units	Result	%REC	Limit	RPD	Limit	Notes
A minung									
Anions									
Chloride	618	5	mg/L	614			0.7	10	
Fluoride	0.16	0.1	mg/L	0.17			4.5	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	158	1	mg/L	153			3.3	10	
General Inorganics									
Alkalinity, total	290	5	mg/L	293			1.1	14	
Ammonia as N	0.070	0.01	mg/L	0.052			NC	17.7	
Dissolved Organic Carbon	ND	0.5	mg/L	ND			NC	37	
Colour	4	2	TCU	4			0.0	12	
Colour, apparent	14	2	ACU	14			0.0	12	
Conductivity	2680	5	uS/cm	2760			2.8	5	
pH	7.0	0.1	pH Units	7.2			2.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	74.0	10	mg/L	72.0			2.7	10	
Sulphide	0.29	0.02	mg/L	0.29			2.4	10	
Tannin & Lignin	0.1	0.1	mg/L	0.1			8.6	11	
Total Kjeldahl Nitrogen	0.60	0.1	mg/L	0.63			5.0	16	
Turbidity	1.6	0.1	NTU	1.5			3.9	10	
Metals									
Aluminum	0.044	0.001	mg/L	0.043			1.5	20	
Antimony	0.0008	0.0005	mg/L	ND			NC	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.008	0.001	mg/L	0.008			2.0	20	
Boron	0.34	0.01	mg/L	0.34			0.3	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	0.3	0.1	mg/L	0.3			0.0	20	
Chromium	ND	0.001	mg/L	ND			NC	20	
Copper	0.0059	0.0005	mg/L	0.0062			5.6	20	
Iron	ND	0.1	mg/L	ND			NC	20	
Lead	0.0004	0.0001	mg/L	0.0003			10.1	20	
Magnesium	ND	0.2	mg/L	ND			NC	20	
Magnese	ND	0.005	mg/L	ND			NC	20	
Potassium	0.1	0.1	mg/L	ND			NC	20	
Selenium	ND	0.001	mg/L	ND			NC	20	
Sodium	97.8	0.2	mg/L	102			4.4	20	
Uranium	ND	0.0001	mg/L	ND			NC	20	
Zinc	0.009	0.005	mg/L	ND			NC	20	
Microbiological Parameters	0.000	0.000	ing/L	ND			NO	20	
E. coli	ND	1	CFU/100mL	ND			NC	30	BAC14
E. coll Fecal Coliforms	ND	1	CFU/100mL CFU/100mL	ND			NC	30 30	
Total Coliforms	ND ND	1		ND ND				30 30	BAC14
	טא	I	CFU/100mL	ND			NC	30	

Report Date: 24-Nov-2021

Order Date: 19-Nov-2021



Method Quality Control: Spike

Report I

Report Date: 24-Nov-2021 Order Date: 19-Nov-2021

Project Description: 100812.001

Order #: 2147532

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	9.71	1	mg/L	ND	97.1	85-115			
Fluoride	1.01	0.1	mg/L	0.17	84.6	79-121			
Nitrate as N	1.08	0.1	mg/L	ND	108	79-120			
Nitrite as N	1.02	0.05	mg/L	ND	102	84-117			
Sulphate	161	1	mg/L	153	85.5	74-126			
General Inorganics									
Ammonia as N	0.308	0.01	mg/L	0.052	102	81-124			
Dissolved Organic Carbon	9.5	0.5	mg/L	ND	94.5	60-133			
Phenolics	0.024	0.001	mg/L	ND	94.3	69-132			
Total Dissolved Solids	90.0	10	mg/L	ND	90.0	75-125			
Sulphide	0.77	0.02	mg/L	0.29	95.8	79-115			
Tannin & Lignin	1.0	0.1	mg/L	0.1	85.5	71-113			
Total Kjeldahl Nitrogen	2.78	0.1	mg/L	0.63	107	81-126			
Metals									
Aluminum	85.9	0.001	mg/L	43.2	85.4	80-120			
Antimony	41.4	0.0005	mg/L	0.353	82.1	80-120			
Arsenic	48.5	0.001	mg/L	0.468	96.1	80-120			
Barium	51.0	0.001	mg/L	8.29	85.5	80-120			
Boron	43.1	0.01	mg/L	ND	86.2	80-120			
Cadmium	40.3	0.0001	mg/L	0.0012	80.7	80-120			
Calcium	8370	0.1	mg/L	312	80.5	80-120			
Chromium	43.8	0.001	mg/L	0.186	87.1	80-120			
Copper	47.2	0.0005	mg/L	6.23	82.0	80-120			
Iron	2310	0.1	mg/L	41.4	90.5	80-120			
Lead	41.7	0.0001	mg/L	0.332	82.7	80-120			
Magnesium	8470	0.2	mg/L	37.0	84.3	80-120			
Manganese	43.4	0.005	mg/L	1.09	84.5	80-120			
Potassium	9220	0.1	mg/L	94.7	91.3	80-120			
Selenium	44.1	0.001	mg/L	0.069	88.1	80-120			
Sodium	8670	0.2	mg/L	ND	86.7	80-120			
Uranium	41.6	0.0001	mg/L	0.0207	83.2	80-120			
Zinc	43.8	0.005	mg/L	3.80	80.1	80-120			



Qualifier Notes:

Sample Qualifiers :

1: A2C - Background counts greater than 200

QC Qualifiers :

BAC14: A2C - Background counts greater than 200

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated

Order #: 2147532

Report Date: 24-Nov-2021 Order Date: 19-Nov-2021 Project Description: 100812.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 15384

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022

Order #: 2206260

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2206260-01 2206260-02 2206260-03

Client ID TW22-02 3hr TW22-02 6hr TW22-02 6 hr (Filtered)

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2206260

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	3-Feb-22	3-Feb-22
Ammonia, as N	EPA 351.2 - Auto Colour	3-Feb-22	3-Feb-22
Anions	EPA 300.1 - IC	2-Feb-22	2-Feb-22
Colour	SM2120 - Spectrophotometric	2-Feb-22	3-Feb-22
Colour, apparent	SM2120 - Spectrophotometric	2-Feb-22	3-Feb-22
Conductivity	EPA 9050A- probe @25 °C	3-Feb-22	3-Feb-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	3-Feb-22	3-Feb-22
E. coli	MOE E3407	2-Feb-22	2-Feb-22
Fecal Coliform	SM 9222D	2-Feb-22	2-Feb-22
Heterotrophic Plate Count	SM 9215C	2-Feb-22	2-Feb-22
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	7-Feb-22	7-Feb-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	3-Feb-22	3-Feb-22
рН	EPA 150.1 - pH probe @25 °C	3-Feb-22	3-Feb-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	3-Feb-22	3-Feb-22
Hardness	Hardness as CaCO3	3-Feb-22	3-Feb-22
Sulphide	SM 4500SE - Colourimetric	3-Feb-22	3-Feb-22
Tannin/Lignin	SM 5550B - Colourimetric	7-Feb-22	7-Feb-22
Total Coliform	MOE E3407	2-Feb-22	2-Feb-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	4-Feb-22	7-Feb-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	3-Feb-22	4-Feb-22
Turbidity	SM 2130B - Turbidity meter	3-Feb-22	3-Feb-22

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL



Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022

	г				1
	Client ID:	TW22-02 3hr	TW22-02 6hr	TW22-02 6 hr (Filtered)	-
	Sample Date:	01-Feb-22 11:30	01-Feb-22 14:30	01-Feb-22 14:30	-
	Sample ID:	2206260-01	2206260-02	2206260-03	-
Microbiological Parametero	MDL/Units	Drinking Water	Drinking Water	Drinking Water	-
Microbiological Parameters	1 CFU/100mL	ND	ND	1	
	1 CFU/100mL	ND	ND	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-
Total Coliforms	10 CFU/mL	ND	ND	-	-
Heterotrophic Plate Count	10 CF0/IIIL	<10	<10	-	-
General Inorganics	5 mg/L	212	0.40		
Alkalinity, total	0.01 mg/L	319	348	-	-
Ammonia as N		0.29	0.30	-	-
Dissolved Organic Carbon	0.5 mg/L	1.3	0.7	-	-
Colour	2 TCU	3	3	-	-
Colour, apparent	2 ACU	24	26	-	-
Conductivity	5 uS/cm	816	855	-	-
Hardness	mg/L	10.7	12.1	-	-
рН	0.1 pH Units	9.0	8.9	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	452	468	-	-
Sulphide	0.02 mg/L	2.78	3.08	-	-
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.4	0.4	-	-
Turbidity	0.1 NTU	4.0	4.2	-	-
Anions					
Chloride	1 mg/L	53	55	-	-
Fluoride	0.1 mg/L	2.7	3.3	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	5	7	-	-
Metals	•••••				
Mercury	0.0001 mg/L	_	<0.0001	<0.0001	_
Aluminum	0.001 mg/L	-	0.194	0.003	-
Antimony	0.0005 mg/L	-	<0.0005	0.0012	-
Arsenic	0.001 mg/L	-	0.002	0.002	-
Barium	0.001 mg/L	-	0.184	0.169	_
Beryllium	0.0005 mg/L	_	<0.0005	<0.0005	_
Boron	0.01 mg/L	-	0.44	0.53	<u> </u>
Cadmium	0.0001 mg/L		<0.0001	<0.0001	<u> </u>
			-0.0001		



Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022

	Client ID:	TW22-02 3hr	TW22-02 6hr	TW22-02 6 hr	<u>-</u>
				(Filtered)	
	Sample Date:	01-Feb-22 11:30	01-Feb-22 14:30	01-Feb-22 14:30	-
	Sample ID:	2206260-01	2206260-02	2206260-03	-
	MDL/Units	Drinking Water	Drinking Water	Drinking Water	-
Calcium	0.1 mg/L	2.7	3.0	2.9	-
Chromium	0.001 mg/L	-	<0.001	<0.001	-
Cobalt	0.0005 mg/L	-	<0.0005	<0.0005	-
Copper	0.0005 mg/L	-	<0.0005	<0.0005	-
Iron	0.1 mg/L	0.2	0.2	<0.1	-
Lead	0.0001 mg/L	-	<0.0001	<0.0001	-
Magnesium	0.2 mg/L	1.0	1.1	0.9	-
Manganese	0.005 mg/L	<0.005	<0.005	<0.005	-
Molybdenum	0.0005 mg/L	-	0.0014	0.0018	-
Nickel	0.001 mg/L	-	<0.001	<0.001	-
Potassium	0.1 mg/L	2.3	2.6	2.2	-
Selenium	0.001 mg/L	-	0.001	<0.001	-
Silver	0.0001 mg/L	-	<0.0001	<0.0001	-
Sodium	0.2 mg/L	163	184	162	-
Strontium	0.01 mg/L	-	0.26	0.28	-
Thallium	0.001 mg/L	-	<0.001	<0.001	-
Tin	0.01 mg/L	-	<0.01	<0.01	-
Titanium	0.005 mg/L	-	0.008	<0.005	-
Tungsten	0.01 mg/L	-	<0.01	<0.01	-
Uranium	0.0001 mg/L	-	0.0003	0.0004	-
Vanadium	0.0005 mg/L	-	<0.0005	<0.0005	-
Zinc	0.005 mg/L	-	<0.005	<0.005	-



Copper

Magnesium

Manganese

Molybdenum

Potassium

Selenium

Iron

Lead

Nickel

Silver

Sodium

Strontium

Thallium

Titanium

Tungsten

Uranium

Vanadium

Microbiological Parameters

Heterotrophic Plate Count

Tin

Zinc

E. coli

Fecal Coliforms

Total Coliforms

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Blank

		Reporting		Source		%REC		RPD
Analyte	Result	Limit	Units	Result	%REC	Limit	RPD	Limit
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics			Ū.					
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NŤU					
Metals								
Mercury	ND	0.0001	mg/L					
Aluminum	ND	0.001	mg/L					
Antimony	ND	0.0005	mg/L					
Arsenic	ND	0.001	mg/L					
Barium	ND	0.001	mg/L					
Beryllium	ND	0.0005	mg/L					
Boron	ND	0.01	mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Cobalt	ND	0.0005	mg/L					
0		0.0005	- //					

ND

0.0005

0.1

0.0001

0.2

0.005

0.0005

0.001

0.1

0.001

0.0001

0.2

0.01

0.001 0.01

0.005

0.01

0.0001

0.0005

0.005

1

1

1

10

mg/L

mg/L mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

CFU/mL

Order #: 2206260

Report Date: 10-Feb-2022

Notes

Order Date: 2-Feb-2022



Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
	rtoour		OTIRS	Result	/iiiii	Liiiit	IN D	Linin	10003
Anions									
Chloride	55.3	1	mg/L	55.2			0.2	10	
Fluoride	3.33	0.1	mg/L	3.30			0.9	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	7.40	1	mg/L	7.40			0.1	10	
General Inorganics		_							
Alkalinity, total	315	5	mg/L	319			1.2	14	
Ammonia as N	0.301	0.01	mg/L	0.315			4.4	17.7	
Dissolved Organic Carbon	0.9	0.5	mg/L	1.3			36.1	37	
Colour	3	2	TCU	3			0.0	12	
Colour, apparent	27	2	ACU	26			3.8	12	
Conductivity	806	5	uS/cm	816			1.1	5	
pH Bhanalian	9.0	0.1	pH Units	9.0			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10 10	
Total Dissolved Solids	648	10 0.02	mg/L	664 ND			2.4 NC	10 10	
Sulphide Tannin & Lignin	ND ND	0.02	mg/L	ND			NC	10	
Total Kjeldahl Nitrogen	0.34	0.1	mg/L	0.37			8.6	16	
Turbidity	4.0	0.1	mg/L NTU	4.0			0.0 0.5	10	
Metals	4.0	0.1	NIO	4.0			0.5	10	
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	0.219	0.001	mg/L	0.291			28.5	20	QR-05
Antimony	0.0007	0.0005	mg/L	ND			NC	20	
Arsenic	0.003	0.001	mg/L	0.002			1.9	20	
Barium	0.159	0.001	mg/L	0.160			0.4	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.44	0.01	mg/L	0.44			2.1	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	2.6 ND	0.1 0.001	mg/L	2.7			2.9 NC	20 20	
Chromium Cobalt	ND	0.0001	mg/L	ND ND			NC	20 20	
	ND	0.0005	mg/L	ND			NC	20	
Copper Iron	0.1	0.0005	mg/L mg/L	0.2			9.0	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	0.9	0.0001	mg/L	1.0			5.9	20	
Magnese	ND	0.005	mg/L	ND			NC	20	
Molybdenum	0.0014	0.0005	mg/L	0.0015			7.7	20	
Nickel	ND	0.000	mg/L	ND			NC	20	
Potassium	2.3	0.1	mg/L	2.3			0.3	20	
Selenium	ND	0.001	mg/L	0.002			NC	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	168	0.2	mg/L	163			3.0	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Tin	ND	0.01	mg/L	ND			NC	20	
Titanium	0.008	0.005	mg/L	0.010			18.3	50	
Tungsten	ND	0.01	mg/L	ND			NC	20	
Uranium	0.0004	0.0001	mg/L	0.0005			1.9	20	
Vanadium	0.0005	0.0005	mg/L	0.0006			19.5	20	
Zinc	ND	0.005	mg/L	ND			NC	20	
Microbiological Parameters			5						
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	ND			NC	30	
·····									

Order #: 2206260

Report Date: 10-Feb-2022

Order Date: 2-Feb-2022

Project Description: 100812.001

OTTAWA - MISSISSAUGA - HAMILTON - KINGSTON - LONDON - NIAGARA - WINDSOR - RICHMOND HILL



Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit Notes
Anions								
Chloride	63.1	1	mg/L	55.2	79.0	77-123		
Fluoride	4.18	0.1	mg/L	3.30	87.5	79-121		
Nitrate as N	0.97	0.1	mg/L	ND	96.9	79-120		
Nitrite as N	0.835	0.05	mg/L	ND	83.5	84-117		QM-07
Sulphate	17.1	1	mg/L	7.40	97.1	74-126		
General Inorganics								
Ammonia as N	0.570	0.01	mg/L	0.315	102	81-124		
Dissolved Organic Carbon	12.4	0.5	mg/L	1.3	111	60-133		
Phenolics	0.027	0.001	mg/L	ND	110	67-133		
Total Dissolved Solids	104	10	mg/L	ND	104	75-125		
Sulphide	0.50	0.02	mg/L	ND	100	79-115		
Tannin & Lignin	1.0	0.1	mg/L	ND	96.8	71-113		
Total Kjeldahl Nitrogen	2.22	0.1	mg/L	0.37	92.3	81-126		
Metals								
Mercury	0.0033	0.0001	mg/L	ND	109	70-130		
Aluminum	44.6	0.001	mg/L	ND	89.2	80-120		
Antimony	48.8	0.0005	mg/L	0.306	97.0	80-120		
Arsenic	50.0	0.001	mg/L	2.46	95.1	80-120		
Barium	192	0.001	mg/L	160	63.8	80-120		QM-07
Beryllium	39.8	0.0005	mg/L	0.0242	79.6	80-120		QM-07
Boron	41.5	0.01	mg/L	ND	83.1	80-120		
Cadmium	44.7	0.0001	mg/L	0.0026	89.4	80-120		
Calcium	12500	0.1	mg/L	2700	97.7	80-120		
Chromium	46.1	0.001	mg/L	0.439	91.4	80-120		
Cobalt	44.8	0.0005	mg/L	0.0399	89.4	80-120		
Copper	39.6	0.0005	mg/L	0.422	78.4	80-120		QM-07
Iron	2440	0.1	mg/L	152	91.6	80-120		
Lead	39.1	0.0001	mg/L	0.0874	78.0	80-120		QM-07
Magnesium	10700	0.2	mg/L	951	97.6	80-120		
Manganese	47.0	0.005	mg/L	2.30	89.4	80-120		
Molybdenum	42.3	0.0005	mg/L	1.50	81.7	80-120		
Nickel	42.2	0.001	mg/L	0.217	84.0	80-120		
Potassium	12400	0.1	mg/L	2330	100	80-120		
Selenium	37.7	0.001	mg/L	1.94	71.6	80-120		QM-07
Silver	37.0	0.0001	mg/L	0.0945	73.7	80-120		QM-07
Sodium	9320	0.2	mg/L	ND	93.2	80-120		
Thallium	41.3	0.001	mg/L	0.016	82.5	80-120		
Tin	42.2	0.01	mg/L	0.22	84.1	80-120		
Titanium	46.8	0.005	mg/L	ND	93.6	70-130		
Tungsten	42.6	0.01	mg/L	0.55	84.1	80-120		
Uranium	42.4	0.0001	mg/L	0.454	83.9	80-120		
Vanadium	48.2	0.0005	mg/L	0.619	95.2	80-120		
Zinc	41.9	0.005	mg/L	1.96	79.8	80-120		QM-07

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Order #: 2206260

Report Date: 10-Feb-2022

Order Date: 2-Feb-2022



Qualifier Notes:

Sample Qualifiers :

QC Qualifiers :

- QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
- QR-05 : Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.
- QS-02: Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated Report Date: 10-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 15387

Report Date: 8-Feb-2022 Order Date: 2-Feb-2022

Order #: 2206338

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2206338-01 2206338-02

Client ID PW-939 PW-1014

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2206338

Report Date: 08-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	3-Feb-22	3-Feb-22
Ammonia, as N	EPA 351.2 - Auto Colour	3-Feb-22	3-Feb-22
Anions	EPA 300.1 - IC	3-Feb-22	3-Feb-22
Colour	SM2120 - Spectrophotometric	4-Feb-22	4-Feb-22
Colour, apparent	SM2120 - Spectrophotometric	4-Feb-22	4-Feb-22
Conductivity	EPA 9050A- probe @25 °C	3-Feb-22	3-Feb-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	3-Feb-22	3-Feb-22
E. coli	MOE E3407	3-Feb-22	3-Feb-22
Fecal Coliform	SM 9222D	3-Feb-22	3-Feb-22
Heterotrophic Plate Count	SM 9215C	3-Feb-22	3-Feb-22
Metals, ICP-MS	EPA 200.8 - ICP - MS	3-Feb-22	3-Feb-22
рН	EPA 150.1 - pH probe @25 °C	3-Feb-22	3-Feb-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	3-Feb-22	3-Feb-22
Hardness	Hardness as CaCO3	3-Feb-22	3-Feb-22
Sulphide	SM 4500SE - Colourimetric	3-Feb-22	3-Feb-22
Tannin/Lignin	SM 5550B - Colourimetric	7-Feb-22	7-Feb-22
Total Coliform	MOE E3407	3-Feb-22	3-Feb-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	4-Feb-22	7-Feb-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	3-Feb-22	4-Feb-22
Turbidity	SM 2130B - Turbidity meter	3-Feb-22	3-Feb-22

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Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 08-Feb-2022 Order Date: 2-Feb-2022

	Client ID:	PW-939	PW-1014	-	-
	Sample Date:	02-Feb-22 12:00	02-Feb-22 12:00	-	-
	Sample ID:	2206338-01 Drinking Water	2206338-02 Drinking Water	-	-
Microbiological Parameters	MDL/Units	Drinking Water	Diffiking Water	_	
E. coli	1 CFU/100mL	ND	ND [1]	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-
Total Coliforms	1 CFU/100mL	ND	ND [1]	-	-
Heterotrophic Plate Count	10 CFU/mL	<10	<10	-	-
General Inorganics	-++		•		••
Alkalinity, total	5 mg/L	172	241	-	-
Ammonia as N	0.01 mg/L	0.53	0.31	-	-
Dissolved Organic Carbon	0.5 mg/L	1.1	<0.5	-	-
Colour	2 TCU	3	5	-	-
Colour, apparent	2 ACU	5	13	-	-
Conductivity	5 uS/cm	384	572	-	-
Hardness	mg/L	39.2	6.33	-	-
рН	0.1 pH Units	8.4	9.0	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	208	324	-	-
Sulphide	0.02 mg/L	1.12	4.61	-	-
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.6	0.3	-	-
Turbidity	0.1 NTU	1.2	2.0	-	-
Anions					
Chloride	1 mg/L	13	39	-	-
Fluoride	0.1 mg/L	0.6	1.1	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	<1	3	-	-
Metals					
Calcium	0.1 mg/L	7.0	1.8	-	-
Iron	0.1 mg/L	<0.1	0.2	-	-
Magnesium	0.2 mg/L	5.3	0.4	-	-
Manganese	0.005 mg/L	<0.005	<0.005	-	-
Potassium	0.1 mg/L	5.2	1.5	-	-
Sodium	0.2 mg/L	64.8	124	-	-



Method Quality Control: Blank

		Project

Order #: 2206338

Report Date: 08-Feb-2022

Order Date: 2-Feb-2022 roject Description: 100812.001

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Colour, apparent	ND	2	ACU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Calcium	ND	0.1	mg/L						
Iron	ND	0.1	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Potassium	ND	0.1	mg/L						
Sodium	ND	0.2	mg/L						
Microbiological Parameters			Ū						
E. coli	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Heterotrophic Plate Count	ND	10	CFU/mL						

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Method Quality Control: Duplicate

		Reporting		Source		%REC		RPD	
Analyte	Result	Limit	Units	Result	%REC	Limit	RPD	Limit	Notes
Anions									
Chloride	38.9	1	mg/L	38.7			0.6	10	
Fluoride	1.16	0.1	mg/L	1.08			7.7	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	3.33	1	mg/L	3.28			1.6	10	
General Inorganics									
Alkalinity, total	315	5	mg/L	319			1.2	14	
Ammonia as N	0.301	0.01	mg/L	0.315			4.4	17.7	
Dissolved Organic Carbon	0.9	0.5	mg/L	1.3			36.1	37	
Colour	3	2	тсu	3			0.0	12	
Colour, apparent	5	2	ACU	5			0.0	12	
Conductivity	806	5	uS/cm	816			1.1	5	
pH	9.0	0.1	pH Units	9.0			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	648	10	mg/L	664			2.4	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.34	0.1	mg/L	0.37			8.6	16	
Turbidity	4.0	0.1	NTU	4.0			0.5	10	
Metals									
Calcium	2.6	0.1	mg/L	2.7			2.9	20	
Iron	0.1	0.1	mg/L	0.2			9.0	20	
Magnesium	0.9	0.2	mg/L	1.0			5.9	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Potassium	2.3	0.1	mg/L	2.3			0.3	20	
Sodium	168	0.2	mg/L	163			3.0	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	ND			NC	30	

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Order #: 2206338

Report Date: 08-Feb-2022 Order Date: 2-Feb-2022



Method Quality Control: Spike

Report Date: 08-Feb-2022

Order Date: 2-Feb-2022

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	47.9	1	mg/L	38.7	91.8	77-123			
Fluoride	1.93	0.1	mg/L	1.08	84.9	79-121			
Nitrate as N	1.09	0.1	mg/L	ND	109	79-120			
Nitrite as N	0.956	0.05	mg/L	ND	95.6	84-117			
Sulphate	13.2	1	mg/L	3.28	98.7	74-126			
General Inorganics									
Ammonia as N	0.570	0.01	mg/L	0.315	102	81-124			
Dissolved Organic Carbon	12.4	0.5	mg/L	1.3	111	60-133			
Phenolics	0.027	0.001	mg/L	ND	110	67-133			
Total Dissolved Solids	104	10	mg/L	ND	104	75-125			
Sulphide	0.50	0.02	mg/L	ND	100	79-115			
Tannin & Lignin	1.0	0.1	mg/L	ND	96.8	71-113			
Total Kjeldahl Nitrogen	2.22	0.1	mg/L	0.37	92.3	81-126			
Metals									
Calcium	12500	0.1	mg/L	2700	97.7	80-120			
Iron	2440	0.1	mg/L	152	91.6	80-120			
Magnesium	10700	0.2	mg/L	951	97.6	80-120			
Manganese	47.0	0.005	mg/L	2.30	89.4	80-120			
Potassium	12400	0.1	mg/L	2330	100	80-120			
Sodium	9320	0.2	mg/L	ND	93.2	80-120			



Certific	Certificate of Analysis							
Client:	GEMTEC Consulting Engineers and Scientists Limited							
Client P	0:							

Qualifier Notes:

Login Qualifiers :

Container(s) - Labeled improperly/insufficient information - No project/sample time on bottles. Applies to samples: PW-939, PW-1014

Sample Qualifiers :

1: A2C - Background counts greater than 200

QC Qualifiers :

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated

Order #: 2206338

Report Date: 08-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 15383

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022

Order #: 2206352

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2206352-01 2206352-02 2206352-03

Client ID TW22-01 3hr TW22-01 6hr TW22-01 6hr (Filtered)

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2206352

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	3-Feb-22	3-Feb-22
Ammonia, as N	EPA 351.2 - Auto Colour	3-Feb-22	3-Feb-22
Anions	EPA 300.1 - IC	3-Feb-22	4-Feb-22
Colour	SM2120 - Spectrophotometric	4-Feb-22	4-Feb-22
Colour, apparent	SM2120 - Spectrophotometric	4-Feb-22	4-Feb-22
Conductivity	EPA 9050A- probe @25 °C	3-Feb-22	3-Feb-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	3-Feb-22	3-Feb-22
E. coli	MOE E3407	3-Feb-22	3-Feb-22
Fecal Coliform	SM 9222D	3-Feb-22	3-Feb-22
Heterotrophic Plate Count	SM 9215C	3-Feb-22	3-Feb-22
Metals, ICP-MS	EPA 200.8 - ICP - MS	3-Feb-22	3-Feb-22
рН	EPA 150.1 - pH probe @25 °C	3-Feb-22	3-Feb-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	3-Feb-22	3-Feb-22
Hardness	Hardness as CaCO3	3-Feb-22	3-Feb-22
Sulphide	SM 4500SE - Colourimetric	3-Feb-22	3-Feb-22
Tannin/Lignin	SM 5550B - Colourimetric	7-Feb-22	7-Feb-22
Total Coliform	MOE E3407	3-Feb-22	3-Feb-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	4-Feb-22	7-Feb-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	7-Feb-22	8-Feb-22
Turbidity	SM 2130B - Turbidity meter	3-Feb-22	3-Feb-22

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Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Order Date: 2-Feb-2022

				,	· ·
	Client ID:	TW22-01 3hr	TW22-01 6hr	TW22-01 6hr	- 1
				(Filtered)	
	Sample Date: Sample ID:	02-Feb-22 11:20 2206352-01	02-Feb-22 14:20 2206352-02	02-Feb-22 14:20 2206352-03	-
	MDL/Units	Drinking Water	Drinking Water	Drinking Water	-
Microbiological Parameters			+	_	••
E. coli	1 CFU/100mL	<10 [1]	<10 [1]	-	-
Fecal Coliforms	1 CFU/100mL	<10 [1]	<10 [1]	-	-
Total Coliforms	1 CFU/100mL	<10 [1]	<10 [1]	-	-
Heterotrophic Plate Count	10 CFU/mL	10	<10	-	-
General Inorganics					
Alkalinity, total	5 mg/L	327	353	-	-
Ammonia as N	0.01 mg/L	0.37	0.38	-	-
Dissolved Organic Carbon	0.5 mg/L	1.5	1 <u>.</u> 5	-	-
Colour	2 TCU	9	14	-	-
Colour, apparent	2 ACU	764	1000	-	-
Conductivity	5 uS/cm	706	828	-	-
Hardness	mg/L	10.8	13.6	-	-
рН	0.1 pH Units	9.2	9.1	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	436	472	-	-
Sulphide	0.02 mg/L	1.77	3.75	-	-
Tannin & Lignin	0.1 mg/L	0.3	0.3	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.5	0.6	-	-
Turbidity	0.1 NTU	140	190	-	-
Anions				•	
Chloride	1 mg/L	28	41	-	-
Fluoride	0.1 mg/L	2.6	3.0	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	<1	1	-	-
Metals				•	• • •
Aluminum	0.001 mg/L	_	1.59	0.282	-
Antimony	0.0005 mg/L	_	<0.0005	0.0006	-
Arsenic	0.001 mg/L	_	<0.001	<0.001	-
Barium	0.001 mg/L	_	0.277	0.142	-
Beryllium	0.0005 mg/L	_	<0.0005	<0.0005	-
Boron	0.01 mg/L	-	0.45	0.53	-
Cadmium	0.0001 mg/L	-	<0.0001	<0.0001	-
Calcium	0.1 mg/L	2.7	3.3	2.0	-
H			•	•	:



Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Feb-2022 Order Date: 2-Feb-2022

	г				r
	Client ID:	TW22-01 3hr	TW22-01 6hr	TW22-01 6hr	-
	Sample Date:	02-Feb-22 11:20	02-Feb-22 14:20	(Filtered) 02-Feb-22 14:20	_
	Sample Date:	2206352-01	2206352-02	2206352-03	-
	MDL/Units	Drinking Water	Drinking Water	Drinking Water	-
Chromium	0.001 mg/L	-	<0.001	<0.001	-
Cobalt	0.0005 mg/L	-	<0.0005	<0.0005	-
Copper	0.0005 mg/L	-	<0.0005	0.0005	-
Iron	0.1 mg/L	1.3	0.9	<0.1	-
Lead	0.0001 mg/L	-	0.0005	<0.0001	-
Magnesium	0.2 mg/L	1.0	1.3	0.6	-
Manganese	0.005 mg/L	0.015	0.017	<0.005	-
Molybdenum	0.0005 mg/L	-	0.0014	0.0019	-
Nickel	0.001 mg/L	-	<0.001	<0.001	-
Potassium	0.1 mg/L	2.8	3.1	1.9	-
Selenium	0.001 mg/L	-	<0.001	<0.001	-
Silver	0.0001 mg/L	-	<0.0001	0.0003	-
Sodium	0.2 mg/L	160	173	146	-
Strontium	0.01 mg/L	-	0.21	0.17	-
Thallium	0.001 mg/L	-	<0.001	<0.001	-
Tin	0.01 mg/L	-	<0.01	<0.01	-
Titanium	0.005 mg/L	-	0.083	<0.005	-
Tungsten	0.01 mg/L	-	<0.01	<0.01	-
Uranium	0.0001 mg/L	-	0.0003	0.0002	-
Vanadium	0.0005 mg/L	-	0.0022	0.0005	-
Zinc	0.005 mg/L	-	0.006	<0.005	-



Lead

Nickel

Silver

Sodium

Strontium

Thallium

Titanium

Tungsten

Uranium

Zinc

E. coli

Fecal Coliforms

Total Coliforms

Vanadium

Microbiological Parameters

Heterotrophic Plate Count

Tin

Magnesium

Manganese

Molybdenum

Potassium

Selenium

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Blank

A	Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit
A	nions								
	Chloride	ND	1	mg/L					
	Fluoride	ND	0.1	mg/L					
	Nitrate as N	ND	0.1	mg/L					
	Nitrite as N	ND	0.05	mg/L					
	Sulphate	ND	1	mg/L					
	eneral Inorganics			5					
	Alkalinity, total	ND	5	mg/L					
	Ammonia as N	ND	0.01	mg/L					
	Dissolved Organic Carbon	ND	0.5	mg/L					
	Colour	ND	2	тČU					
	Colour, apparent	ND	2	ACU					
	Conductivity	ND	5	uS/cm					
	Phenolics	ND	0.001	mg/L					
	Total Dissolved Solids	ND	10	mg/L					
	Sulphide	ND	0.02	mg/L					
	Tannin & Lignin	ND	0.1	mg/L					
	Total Kjeldahl Nitrogen	ND	0.1	mg/L					
	Turbidity	ND	0.1	NŤU					
N	letals								
	Aluminum	ND	0.001	mg/L					
	Antimony	ND	0.0005	mg/L					
	Arsenic	ND	0.001	mg/L					
	Barium	ND	0.001	mg/L					
	Beryllium	ND	0.0005	mg/L					
	Boron	ND	0.01	mg/L					
	Cadmium	ND	0.0001	mg/L					
	Calcium	ND	0.1	mg/L					
	Chromium	ND	0.001	mg/L					
	Cobalt	ND	0.0005	mg/L					
	Copper	ND	0.0005	mg/L					
	Iron	ND	0.1	mg/L					
		NID	0.0004						

ND

0.0001

0.2

0.005

0.0005

0.001

0.1

0.001

0.0001

0.2

0.01

0.001

0.01

0.005

0.01

0.0001

0.0005

0.005

1

1

1

10

mg/L

mg/L mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

CFU/mL

Order #: 2206352

Report Date: 10-Feb-2022

Notes

Order Date: 2-Feb-2022



Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	38.9	1	mg/L	38.7			0.6	10	
Fluoride	1.16	0.1	mg/L	1.08			7.7	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	3.33	1	mg/L	3.28			1.6	10	
General Inorganics	0.00			0.20					
Alkalinity, total	315	5	mg/L	319			1.2	14	
Ammonia as N	0.301	0.01	mg/L	0.315			4.4	17.7	
Dissolved Organic Carbon	0.9	0.5	mg/L	1.3			36.1	37	
Colour	3	2	ΤČU	3			0.0	12	
Colour, apparent	5	2	ACU	5			0.0	12	
Conductivity	806	5	uS/cm	816			1.1	5	
pH	9.0	0.1	pH Units	9.0			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	648	10	mg/L	664			2.4	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
•			-						
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.49	0.1	mg/L	0.55			11.4	16	
Turbidity Metals	4.0	0.1	NTU	4.0			0.5	10	
	0.010	0.001		0.001			00 F	20	QR-05
Aluminum	0.219	0.001	mg/L	0.291			28.5	20	QR-05
Antimony	0.0007	0.0005	mg/L	ND			NC	20	
Arsenic	0.003	0.001	mg/L	0.002			1.9	20	
Barium	0.159	0.001	mg/L	0.160			0.4	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.44	0.01	mg/L	0.44			2.1	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	2.6	0.1	mg/L	2.7			2.9	20	
Chromium	ND	0.001	mg/L	ND			NC	20	
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Copper	ND	0.0005	mg/L	ND			NC	20	
Iron	0.1	0.1	mg/L	0.2			9.0	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	0.9	0.2	mg/L	1.0			5.9	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Molybdenum	0.0014	0.0005	mg/L	0.0015			7.7	20	
Nickel	ND	0.001	mg/L	ND			NC	20	
Potassium	2.3	0.1	mg/L	2.3			0.3	20	
Selenium	ND	0.001	mg/L	0.002			NC	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	168	0.2	mg/L	163			3.0	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Tin	ND	0.01	mg/L	ND			NC	20	
Titanium	0.008	0.005	mg/L	0.010			18.3	50	
								~ ~	
l ungsten	ND 0.0004	0.01 0.0001	mg/L	ND 0.0005			NC 1.9	20 20	
Uranium		0.0001	mg/L						
Vanadium	0.0005		mg/L	0.0006			19.5	20	
Zinc Microbiological Parameters	ND	0.005	mg/L	ND			NC	20	
•		,						~~	
E. coli	ND	1	CFU/100mL	ND			NC	30	B1000
Fecal Coliforms	ND	10	CFU/100mL	ND			NC	30	BAC09
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	10			NC	30	

Order #: 2206352

Report Date: 10-Feb-2022

Order Date: 2-Feb-2022



Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	47.9	1	mg/L	38.7	91.8	77-123			
Fluoride	1.93	0.1	mg/L	1.08	84.9	79-121			
Nitrate as N	1.09	0.1	mg/L	ND	109	79-120			
Nitrite as N	0.956	0.05	mg/L	ND	95.6	84-117			
Sulphate	13.2	1	mg/L	3.28	98.7	74-126			
General Inorganics									
Ammonia as N	0.570	0.01	mg/L	0.315	102	81-124			
Dissolved Organic Carbon	12.4	0.5	mg/L	1.3	111	60-133			
Phenolics	0.027	0.001	mg/L	ND	110	67-133			
Total Dissolved Solids	104	10	mg/L	ND	104	75-125			
Sulphide	0.50	0.02	mg/L	ND	100	79-115			
Tannin & Lignin	1.0	0.1	mg/L	ND	96.8	71-113			
Total Kjeldahl Nitrogen	2.46	0.1	mg/L	0.55	95.7	81-126			
Metals									
Aluminum	44.6	0.001	mg/L	ND	89.2	80-120			
Antimony	48.8	0.0005	mg/L	0.306	97.0	80-120			
Arsenic	50.0	0.001	mg/L	2.46	95.1	80-120			
Barium	192	0.001	mg/L	160	63.8	80-120		G	QM-07
Beryllium	39.8	0.0005	mg/L	0.0242	79.6	80-120		C	QM-07
Boron	41.5	0.01	mg/L	ND	83.1	80-120			
Cadmium	44.7	0.0001	mg/L	0.0026	89.4	80-120			
Calcium	12500	0.1	mg/L	2700	97.7	80-120			
Chromium	46.1	0.001	mg/L	0.439	91.4	80-120			
Cobalt	44.8	0.0005	mg/L	0.0399	89.4	80-120			
Copper	39.6	0.0005	mg/L	0.422	78.4	80-120		G	QM-07
Iron	2440	0.1	mg/L	152	91.6	80-120			
Lead	39.1	0.0001	mg/L	0.0874	78.0	80-120		G	QM-07
Magnesium	10700	0.2	mg/L	951	97.6	80-120			
Manganese	47.0	0.005	mg/L	2.30	89.4	80-120			
Molybdenum	42.3	0.0005	mg/L	1.50	81.7	80-120			
Nickel	42.2	0.001	mg/L	0.217	84.0	80-120			
Potassium	12400	0.1	mg/L	2330	100	80-120			
Selenium	37.7	0.001	mg/L	1.94	71.6	80-120		G	QM-07
Silver	37.0	0.0001	mg/L	0.0945	73.7	80-120		G	QM-07
Sodium	9320	0.2	mg/L	ND	93.2	80-120			
Thallium	41.3	0.001	mg/L	0.016	82.5	80-120			
Tin	42.2	0.01	mg/L	0.22	84.1	80-120			
Titanium	46.8	0.005	mg/L	ND	93.6	70-130			
Tungsten	42.6	0.01	mg/L	0.55	84.1	80-120			
Uranium	42.4	0.0001	mg/L	0.454	83.9	80-120			
Vanadium	48.2	0.0005	mg/L	0.619	95.2	80-120			
Zinc	41.9	0.005	mg/L	1.96	79.8	80-120		G	QM-07

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL

Order #: 2206352

Report Date: 10-Feb-2022

Order Date: 2-Feb-2022



Qualifier Notes:

Login Qualifiers :

Sample - Filtered and preserved by Paracel upon receipt at the laboratory -Applies to samples: TW22-1 6hr (Filtered)

Sample Qualifiers :

1 : Bacteria sample was diluted due to suspended particulate matter.

QC Qualifiers :

- BAC09 : Bacteria sample was diluted due to suspended particulate matter.
- QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
- QR-05 : Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.
- QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

subsampled from the generals bottle

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated Report Date: 10-Feb-2022 Order Date: 2-Feb-2022 Project Description: 100812.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 15388

Report Date: 8-Feb-2022 Order Date: 3-Feb-2022

Order #: 2206385

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2206385-01 2206385-02

Client ID MW21-01 MW21-02

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Order #: 2206385

Report Date: 08-Feb-2022 Order Date: 3-Feb-2022 Project Description: 100812.001

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	4-Feb-22	4-Feb-22

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL



Report Date: 08-Feb-2022

Order Date: 3-Feb-2022

Project Description: 100812.001

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

MW21-02 MW21-01 Client ID: --Sample Date: 03-Feb-22 08:59 03-Feb-22 09:40 --2206385-01 2206385-02 Sample ID: --Drinking Water **Drinking Water** MDL/Units _ -Anions Nitrate as N 0.1 mg/L 0.3 5.8 --0.05 mg/L Nitrite as N < 0.05 <0.05 _ -



Order #: 2206385

Report Date: 08-Feb-2022

Order Date: 3-Feb-2022

Project Description: 100812.001

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N Nitrite as N	ND ND	0.1 0.05	mg/L mg/L						



Order #: 2206385

Report Date: 08-Feb-2022

Order Date: 3-Feb-2022

Project Description: 100812.001

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N Nitrite as N	0.21 ND	0.1 0.05	mg/L mg/L	0.21 ND			1.4 NC	10 10	



OTTAWA - MISSISSAUGA - HAMILTON - KINGSTON - LONDON - NIAGARA - WINDSOR - RICHMOND HILL

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	1.37	0.1	mg/L	0.21	116	79-120			
Nitrite as N	0.876	0.05	mg/L	ND	87.6	84-117			

Order #: 2206385

Report Date: 08-Feb-2022

Order Date: 3-Feb-2022



Order #: 2206385

Report Date: 08-Feb-2022 Order Date: 3-Feb-2022 Project Description: 100812.001

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody:

Report Date: 17-Feb-2022 Order Date: 15-Feb-2022

Order #: 2208183

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID	
2208183-01	TW1	Comment: TW1 in this COC is identified as TW22-1 in the report

Approved By:

Tack Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work



Order #: 2208183

Report Date: 17-Feb-2022 Order Date: 15-Feb-2022 Project Description: 100812.001

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	16-Feb-22	17-Feb-22

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference.



Report Date: 17-Feb-2022 Order Date: 15-Feb-2022 Project Description: 100812.001

Sample Results

Fluoride				Matrix: D	rinking Water
Paracel ID	Client ID	Sample Date	Units	MDL	Result
2208183-01	TW1	14-Feb-22	mg/L	0.1	3.0

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Fluoride	ND	0.1	mg/L						
Matrix Duplicate									
Fluoride	ND	0.1	mg/L	ND			NC	10	
Matrix Spike									
Fluoride	0.97	0.1	mg/L	ND	97.5	83-117			



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100817.001 Custody: 15630

Report Date: 13-Apr-2022 Order Date: 7-Apr-2022

Order #: 2215531

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2215531-01 2215531-02

Client ID Comment: TW21-03 in this COC is identified as TW22-3 in the report TW21-03 PW-903

Approved By:

Dale Robertson, BSc Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2215531

Report Date: 13-Apr-2022 Order Date: 7-Apr-2022 Project Description: 100817.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	8-Apr-22	8-Apr-22
Ammonia, as N	EPA 351.2 - Auto Colour	13-Apr-22	13-Apr-22
Anions	EPA 300.1 - IC	11-Apr-22	11-Apr-22
Colour	SM2120 - Spectrophotometric	8-Apr-22	8-Apr-22
Colour, apparent	SM2120 - Spectrophotometric	8-Apr-22	8-Apr-22
Conductivity	EPA 9050A- probe @25 °C	8-Apr-22	8-Apr-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	8-Apr-22	8-Apr-22
E. coli	MOE E3407	8-Apr-22	8-Apr-22
Fecal Coliform	SM 9222D	8-Apr-22	8-Apr-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	11-Apr-22	11-Apr-22
рН	EPA 150.1 - pH probe @25 °C	8-Apr-22	8-Apr-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	12-Apr-22	12-Apr-22
Hardness	Hardness as CaCO3	11-Apr-22	11-Apr-22
Sulphide	SM 4500SE - Colourimetric	12-Apr-22	13-Apr-22
Tannin/Lignin	SM 5550B - Colourimetric	12-Apr-22	13-Apr-22
Total Coliform	MOE E3407	8-Apr-22	8-Apr-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	8-Apr-22	8-Apr-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	11-Apr-22	12-Apr-22
Turbidity	SM 2130B - Turbidity meter	8-Apr-22	8-Apr-22



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 13-Apr-2022 Order Date: 7-Apr-2022

Project Description: 100817.001

	Client ID: Sample Date: Sample ID:	TW21-03 07-Apr-22 13:00 2215531-01	PW-903 07-Apr-22 12:20 2215531-02	- -	- - -
	MDL/Units	Drinking Water	Drinking Water	-	-
Microbiological Parameters			i		I
E. coli	1 CFU/100mL	ND	ND	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-
Total Coliforms	1 CFU/100mL	ND	1	-	-
General Inorganics					T
Alkalinity, total	5 mg/L	227	224	-	-
Ammonia as N	0.01 mg/L	0.31	0.47	-	-
Dissolved Organic Carbon	0.5 mg/L	1.3	1.6	-	-
Colour	2 TCU	7	6	-	-
Colour, apparent	2 ACU	100	9	-	-
Conductivity	5 uS/cm	516	462	-	-
Hardness	mg/L	11.4	27.7	-	-
рН	0.1 pH Units	9.2	8.6	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	304	250	-	-
Sulphide	0.02 mg/L	1.48	0.90	-	-
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.4	0.5	-	-
Turbidity	0.1 NTU	18.1	0.8	-	-
Anions					•••••••••••••••••••••••••••••••••••••••
Chloride	1 mg/L	35	18	-	-
Fluoride	0.1 mg/L	1.4	0.7	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Sulphate	1 mg/L	2	3	-	-
Metals					
Calcium	0.1 mg/L	3.3	7.5	-	-
Iron	0.1 mg/L	0.3	0.2	-	-
Magnesium	0.2 mg/L	0.8	2.1	-	-
Manganese	0.005 mg/L	0.012	0.017	-	-
Potassium	0.1 mg/L	1.3	3.2	-	-
Sodium	0.2 mg/L	106	86.0	_	-

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL



Dissolved Organic Carbon

Analyte

Anions Chloride Fluoride Nitrate as N Nitrite as N Sulphate General Inorganics Alkalinity, total Ammonia as N

Colour

Colour, apparent

Tannin & Lignin

Total Dissolved Solids

Total Kjeldahl Nitrogen

Microbiological Parameters

Conductivity

Phenolics

Sulphide

Turbidity

Calcium

Magnesium

Manganese

Potassium

Fecal Coliforms

Total Coliforms

Sodium

E. coli

Metals

Iron

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Blank

Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit
ND ND ND ND	1 0.1 0.1 0.05 1	mg/L mg/L mg/L mg/L mg/L					
ND ND	5 0.01	mg/L mg/L					

mg/L

TCU

ACU

uS/cm

mg/L

mg/L

mg/L

mg/L

mg/L

NŤU

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

ND

0.5

2

2

5

0.001

10

0.02

0.1

0.1

0.1

0.1

0.1

0.2

0.005

0.1

0.2

1

1

1

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL

Report Date: 13-Apr-2022

Notes

Order Date: 7-Apr-2022

Project Description: 100817.001

Order #: 2215531



Method Quality Control: Duplicate

		Reporting		Source		%REC		RPD	
Analyte	Result	Limit	Units	Result	%REC	Limit	RPD	Limit	Notes
Anions									
Chloride	34.9	1	mg/L	35.1			0.6	10	
Fluoride	1.30	0.1	mg/L	1.37			4.6	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	1.68	1	mg/L	1.63			3.3	10	
General Inorganics									
Alkalinity, total	224	5	mg/L	227			1.1	14	
Ammonia as N	0.056	0.01	mg/L	0.053			5.3	17.7	
Dissolved Organic Carbon	0.9	0.5	mg/L	1.3			34.9	37	
Colour	7	2	TCU	7			0.0	12	
Colour, apparent	100	2	ACU	100			0.0	12	
Conductivity	524	5	uS/cm	516			1.5	5	
pH	9.2	0.1	pH Units	9.2			0.1	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	254	10	mg/L	250			1.6	10	
Sulphide	0.04	0.02	mg/L	0.04			5.4	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.34	0.1	mg/L	0.36			5.2	16	
Turbidity	0.3	0.1	NTU	0.3			3.3	10	
Metals									
Calcium	10.5	0.1	mg/L	10.5			0.2	20	
Iron	ND	0.1	mg/L	ND			NC	20	
Magnesium	2.6	0.2	mg/L	2.6			1.8	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Potassium	0.9	0.1	mg/L	0.9			4.1	20	
Sodium	20.7	0.2	mg/L	21.1			2.1	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	

Order #: 2215531

Report Date: 13-Apr-2022

Order Date: 7-Apr-2022



Method Quality Control: Spike

Order	# ·	221	5531
Ulder	#.	ZZ I	JJJJ

Report Date: 13-Apr-2022

Order Date: 7-Apr-2022

Project Description: 100817.001

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	45.2	1	mg/L	35.1	101	77-123			
Fluoride	2.29	0.1	mg/L	1.37	92.0	79-121			
Nitrate as N	1.15	0.1	mg/L	ND	115	79-120			
Nitrite as N	1.05	0.05	mg/L	ND	105	84-117			
Sulphate	12.9	1	mg/L	1.63	112	74-126			
General Inorganics									
Ammonia as N	0.305	0.01	mg/L	0.053	101	81-124			
Dissolved Organic Carbon	12.6	0.5	mg/L	1.3	112	60-133			
Phenolics	0.026	0.001	mg/L	ND	103	67-133			
Total Dissolved Solids	92.0	10	mg/L	ND	92.0	75-125			
Sulphide	0.52	0.02	mg/L	0.04	96.6	79-115			
Tannin & Lignin	1.0	0.1	mg/L	ND	96.8	71-113			
Total Kjeldahl Nitrogen	2.12	0.1	mg/L	0.36	88.1	81-126			
Metals									
Calcium	18500	0.1	mg/L	10500	79.9	80-120		Q	M-07
Iron	2160	0.1	mg/L	8.7	86.0	80-120			
Magnesium	11800	0.2	mg/L	2590	92.0	80-120			
Manganese	48.6	0.005	mg/L	3.94	89.3	80-120			
Potassium	10200	0.1	mg/L	872	93.6	80-120			
Sodium	8700	0.2	mg/L	ND	87.0	80-120			

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Qualifier Notes:

Sample Qualifiers :

QC Qualifiers :

QM-07: The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated Report Date: 13-Apr-2022 Order Date: 7-Apr-2022 Project Description: 100817.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Andrius Paznekas

Client PO: Project: 100812.001 Custody: 15431, 16849

Report Date: 5-May-2022 Order Date: 29-Apr-2022

Order #: 2218541

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID
2218541-02
2218541-03
2218541-04

Client ID TW22-01 6hr TW22-01 6hr (Filtered) MW21-01

Comment: TW22-01 in this COC is identified as TW22-03 in report

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2218541

Report Date: 05-May-2022 Order Date: 29-Apr-2022 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	3 - May-22	3-May-22
Ammonia, as N	EPA 351.2 - Auto Colour	29-Apr-22	29-Apr-22
Anions	EPA 300.1 - IC	29-Apr-22	29-Apr-22
Colour	SM2120 - Spectrophotometric	29-Apr-22	29-Apr-22
Colour, apparent	SM2120 - Spectrophotometric	29-Apr-22	29-Apr-22
Conductivity	EPA 9050A- probe @25 °C	3-May-22	3-May-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	29-Apr-22	29-Apr-22
E. coli	MOE E3407	29-Apr-22	29-Apr-22
Fecal Coliform	SM 9222D	29-Apr-22	29-Apr-22
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	29-Apr-22	29-Apr-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	2-May-22	2-May-22
рН	EPA 150.1 - pH probe @25 °C	3-May-22	3-May-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	5-May-22	5-May-22
Hardness	Hardness as CaCO3	2-May-22	2-May-22
Sulphide	SM 4500SE - Colourimetric	29-Apr-22	29-Apr-22
Tannin/Lignin	SM 5550B - Colourimetric	29-Apr-22	29-Apr-22
Total Coliform	MOE E3407	29-Apr-22	29-Apr-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	29-Apr-22	2-May-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	2-May-22	2-May-22
Turbidity	SM 2130B - Turbidity meter	29-Apr-22	29-Apr-22

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Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 05-May-2022 Order Date: 29-Apr-2022

			TW22-01 6hr		
	Client ID:	TW22-01 6hr	(Filtered)	MW21-01	-
	Sample Date:	28-Apr-22 15:15	28-Àpr-22 15:15	28-Apr-22 15:58	-
	Sample ID: MDL/Units	2218541-02 Drinking Water	2218541-03 Drinking Water	2218541-04 Drinking Water	
Microbiological Parameters	MDL/Units	Drinking Water	Drinking Water	Drinking Water	I
E. coli	1 CFU/100mL	ND [1]	_	-	-
Fecal Coliforms	1 CFU/100mL	ND	_	_	-
Total Coliforms	1 CFU/100mL	ND [1]	_	<u> </u>	-
General Inorganics			ł	ł	l
Alkalinity, total	5 mg/L	218	-	-	-
Ammonia as N	0.01 mg/L	0.34	-	-	-
Dissolved Organic Carbon	0.5 mg/L	1.8	-	-	-
Colour	2 TCU	11	-	-	-
Colour, apparent	2 ACU	289	-	-	-
Conductivity	5 uS/cm	544	-	-	-
Hardness	mg/L	15.6	-	-	-
рН	0.1 pH Units	9.2	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-
Total Dissolved Solids	10 mg/L	306	-	-	-
Sulphide	0.02 mg/L	2.31	-	-	-
Tannin & Lignin	0.1 mg/L	1.5	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.4	-	-	-
Turbidity	0.1 NTU	54.6	-	-	-
Anions					
Chloride	1 mg/L	39	-	-	-
Fluoride	0.1 mg/L	1.3	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	6.6	-
Nitrite as N	0.05 mg/L	<0.05	-	<0.05	-
Sulphate	1 mg/L	2	-	-	-
Metals			-		
Mercury	0.0001 mg/L	<0.0001	<0.0001	-	-
Aluminum	0.001 mg/L	0.573	0.007	-	-
Antimony	0.0005 mg/L	<0.0005	<0.0005	-	-
Arsenic	0.001 mg/L	<0.001	<0.001	-	-
Barium	0.001 mg/L	0.044	0.027	-	-
Beryllium	0.0005 mg/L	<0.0005	<0.0005	-	-
Boron	0.01 mg/L	0.33	0.33	-	-
Cadmium	0.0001 mg/L	<0.0001	<0.0001	-	-
Calcium	0.1 mg/L	4.5	1.7	-	-
-					



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 05-May-2022 Order Date: 29-Apr-2022

	Client ID:	TW22-01 6hr	TW22-01 6hr	MW21-01	-
	Sample Date: Sample ID: MDL/Units	28-Apr-22 15:15 2218541-02 Drinking Water	(Filtered) 28-Apr-22 15:15 2218541-03 Drinking Water	28-Apr-22 15:58 2218541-04 Drinking Water	
Chromium	0.001 mg/L	0.001	<0.001	-	_
Cobalt	0.0005 mg/L	<0.0005	< 0.0005	_	_
Copper	0.0005 mg/L	<0.0005	<0.0005	-	-
Iron	0.1 mg/L	0.9	<0.1	_	-
Lead	0.0001 mg/L	0.0001	<0.0001	-	-
Magnesium	0.2 mg/L	1.1	0.5	-	-
Manganese	0.005 mg/L	0.027	<0.005	-	-
Molybdenum	0.0005 mg/L	<0.0005	<0.0005	-	-
Nickel	0.001 mg/L	<0.001	<0.001	-	-
Potassium	0.1 mg/L	1.4	1.2	-	-
Selenium	0.001 mg/L	<0.001	<0.001	-	-
Silver	0.0001 mg/L	<0.0001	<0.0001	-	-
Sodium	0.2 mg/L	98.7	97.0	-	-
Strontium	0.01 mg/L	0.12	0.11	-	-
Thallium	0.001 mg/L	<0.001	<0.001	-	-
Tin	0.01 mg/L	<0.01	<0.01	-	-
Titanium	0.005 mg/L	0.040	<0.005	-	-
Tungsten	0.01 mg/L	<0.01	<0.01	-	-
Uranium	0.0001 mg/L	<0.0001	<0.0001	-	-
Vanadium	0.0005 mg/L	0.0016	<0.0005	-	-
Zinc	0.005 mg/L	<0.005	<0.005	-	_



Uranium

Zinc

E. coli

Fecal Coliforms

Total Coliforms

Vanadium

Microbiological Parameters

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited Client PO:

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics			0					
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	тču					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals		0.1	NTO					
Mercury	ND	0.0001	mg/L					
	ND	0.001	-					
Aluminum	ND	0.0001	mg/L					
Antimony Arsenic	ND	0.0005	mg/L					
			mg/L					
Barium	ND ND	0.001 0.0005	mg/L					
Beryllium Boron	ND ND	0.0005	mg/L					
			mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Cobalt	ND	0.0005	mg/L					
Copper	ND	0.0005	mg/L					
Iron	ND	0.1	mg/L					
	ND	0.0001	mg/L					
Magnesium	ND	0.2	mg/L					
Manganese	ND	0.005	mg/L					
Molybdenum	ND	0.0005	mg/L					
Nickel	ND	0.001	mg/L					
Potassium	ND	0.1	mg/L					
Selenium	ND	0.001	mg/L					
Silver	ND	0.0001	mg/L					
Sodium	ND	0.2	mg/L					
Strontium	ND	0.01	mg/L					
Thallium	ND	0.001	mg/L					
Tin	ND	0.01	mg/L					
Titanium	ND	0.005	mg/L					
Tungsten	ND	0.01	mg/L					
Uranium		0.0004						

ND

ND

ND

ND

ND

ND

0.0001

0.0005

0.005

1

1

1

Order #: 2218541

Report Date: 05-May-2022

Notes

Order Date: 29-Apr-2022

Project Description: 100812.001

OTTAWA - MISSISSAUGA - HAMILTON - KINGSTON - LONDON - NIAGARA - WINDSOR - RICHMOND HILL

mg/L

mg/L

mg/L

CFU/100mL

CFU/100mL

CFU/100mL



Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	38.4	1	mg/L	39.0			1.6	10	
Fluoride	1.26	0.1	mg/L	1.28			1.0	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	1.55	1	mg/L	1.55			0.2	10	
General Inorganics									
Alkalinity, total	214	5	mg/L	218			2.1	14	
Ammonia as N	0.330	0.01	mg/L	0.336			1.9	17.7	
Dissolved Organic Carbon	2.1	0.5	mg/L	1.8			11.5	37	
Colour	10	2	TCU	11			9.5	12	
Colour, apparent	288	2	ACU	289			0.3	12	
Conductivity	537	5	uS/cm	544			1.3	5	
pH	9.2	0.1	pH Units	9.2			0.2	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	602	10	mg/L	608			1.0	10	
Sulphide	2.29	0.20	mg/L	2.31			0.9	10	
Tannin & Lignin	0.7	0.1	mg/L	0.7			3.1	11	
Total Kjeldahl Nitrogen	0.32	0.1	mg/L	0.38			NC	16	
Turbidity	54.4	0.1	NTU	54.6			0.4	10	
Metals	01.1	0.1		01.0			0.1	10	
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	0.050	0.001	mg/L	0.050			1.3	20	
Antimony	0.0008	0.0005	mg/L	0.0009			13.1	20	
Arsenic	0.0000 ND	0.000	mg/L	ND			NC	20	
Barium	0.110	0.001	mg/L	0.113			2.5	20	
	ND	0.0005	-	ND			NC	20	
Beryllium	0.46	0.0005	mg/L	0.47			2.3	20	
Boron Cadmium	0.40 ND	0.0001	mg/L	0.47 ND			NC	20	
Calcium	9.7	0.0001	mg/L				0.5	20	
			mg/L	9.8					
Chromium	ND	0.001	mg/L	ND			NC	20	
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Copper	0.0006	0.0005	mg/L	0.0006			1.4	20	
Iron	0.1	0.1	mg/L	0.1			2.9	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	10.0	0.2	mg/L	10.3			2.2	20	
Manganese	0.010	0.005	mg/L	0.009			11.3	20	
Molybdenum	0.0011	0.0005	mg/L	0.0011			0.2	20	
Nickel	ND	0.001	mg/L	ND			NC	20	
Potassium	11.2	0.1	mg/L	11.2			0.0	20	
Selenium	ND	0.001	mg/L	ND			NC	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	240	0.2	mg/L	235			2.5	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Tin	ND	0.01	mg/L	ND			NC	20	
Titanium	ND	0.005	mg/L	ND			NC	50	
Tungsten	ND	0.01	mg/L	ND			NC	20	
Uranium	0.0002	0.0001	mg/L	0.0002			7.7	20	
Vanadium	ND	0.0005	mg/L	ND			NC	20	
Zinc	0.006	0.005	mg/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Report Date: 05-May-2022

Order Date: 29-Apr-2022



Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	50.0	1	mg/L	39.0	110	77-123			
Fluoride	2.17	0.1	mg/L	1.28	89.4	79-121			
Nitrate as N	1.07	0.1	mg/L	ND	107	79-120			
Nitrite as N	0.968	0.05	mg/L	ND	96.8	84-117			
Sulphate	12.1	1	mg/L	1.55	105	74-126			
General Inorganics									
Ammonia as N	0.592	0.01	mg/L	0.336	102	81-124			
Dissolved Organic Carbon	11.9	0.5	mg/L	1.8	100	60-133			
Phenolics	0.024	0.001	mg/L	ND	97.7	67-133			
Total Dissolved Solids	106	10	mg/L	ND	106	75-125			
Sulphide	0.51	0.02	mg/L	ND	102	79-115			
Tannin & Lignin	2.6	0.1	mg/L	1.5	110	71-113			
Total Kjeldahl Nitrogen	2.20	0.1	mg/L	0.38	91.0	81-126			
Metals									
Mercury	0.0035	0.0001	mg/L	ND	115	70-130			
Aluminum	91.0	0.001	mg/L	50.3	81.2	80-120			
Antimony	35.4	0.0005	mg/L	0.872	69.1	80-120		Q	M-07
Arsenic	46.7	0.001	mg/L	0.181	93.1	80-120			
Barium	144	0.001	mg/L	113	63.1	80-120		Q	M-07
Beryllium	39.8	0.0005	mg/L	0.0271	79.6	80-120		Q	M-07
Boron	62.2	0.01	mg/L	20.2	84.0	80-120			
Cadmium	37.6	0.0001	mg/L	0.0082	75.2	80-120		Q	M-07
Calcium	17700	0.1	mg/L	9790	79.6	80-120		Q	M-07
Chromium	44.9	0.001	mg/L	0.350	89.1	80-120			
Cobalt	42.7	0.0005	mg/L	0.0941	85.1	80-120			
Copper	41.3	0.0005	mg/L	ND	82.7	80-120			
Iron	2280	0.1	mg/L	134	85.7	80-120			
Magnesium	18600	0.2	mg/L	10300	83.8	80-120			
Manganese	54.0	0.005	mg/L	8.90	90.1	80-120			
Molybdenum	42.4	0.0005	mg/L	1.13	82.5	80-120			
Nickel	40.8	0.001	mg/L	0.293	81.0	80-120			
Potassium	19900	0.1	mg/L	11200	86.5	80-120			
Selenium	45.3	0.001	mg/L	0.160	90.2	80-120			
Silver	41.3	0.0001	mg/L	0.0251	82.6	80-120			
Sodium	8560	0.2	mg/L	ND	85.6	80-120			
Thallium	41.6	0.001	mg/L	0.015	83.2	80-120			
Tin	40.3	0.01	mg/L	0.16	80.3	80-120			
Titanium	45.7	0.005	mg/L	ND	91.4	70-130			
Tungsten	42.6	0.01	mg/L	0.38	84.5	80-120			
Uranium	41.6	0.0001	mg/L	0.177	82.8	80-120			
Vanadium	46.1	0.0005	mg/L	0.233	91.7	80-120			
Zinc	42.0	0.005	mg/L	1.88	80.2	80-120			

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL

Order #: 2218541

Report Date: 05-May-2022

Order Date: 29-Apr-2022 Project Description: 100812.001



Qualifier Notes:

Login Qualifiers :

Container(s) - Labeled improperly/insufficient information - Collection time missing from chain of custody, time on bottle reads 15:58.

Applies to samples: MW21-01

Container and COC sample IDs don't match - Sample labelled as TW22-01, chain of custody reads TW22-01 6hr

Applies to samples: TW22-01 6hr, TW22-01 6hr (Filtered)

Sample Qualifiers :

1: A2C - Background counts greater than 200

QC Qualifiers :

QM-07: The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated Report Date: 05-May-2022 Order Date: 29-Apr-2022 Project Description: 100812.001



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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive Kanata, ON K2K 2A9 Attn: Brent Redmond

Client PO: Smith Road Project: 100812.001 Custody: 17037

Report Date: 13-Sep-2022 Order Date: 2-Sep-2022

Order #: 2236417

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID 2236417-02 2236417-03

Client ID TW22-04 6hr TW22-04 6hr (Filtered)

Approved By:

Mark Foto

Mark Foto, M.Sc. Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Analysis Summary Table

Order #: 2236417

Report Date: 13-Sep-2022 Order Date: 2-Sep-2022 Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	6-Sep-22	6-Sep-22
Ammonia, as N	EPA 351.2 - Auto Colour	7-Sep-22	7-Sep-22
Anions	EPA 300.1 - IC	12-Sep-22	12-Sep-22
Colour	SM2120 - Spectrophotometric	2-Sep-22	2-Sep-22
Colour, apparent	SM2120 - Spectrophotometric	2-Sep-22	2-Sep-22
Conductivity	EPA 9050A- probe @25 °C	6-Sep-22	6-Sep-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	2-Sep-22	2-Sep-22
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	6-Sep-22	6-Sep-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	2-Sep-22	6-Sep-22
рН	EPA 150.1 - pH probe @25 °C	6-Sep-22	6-Sep-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	6-Sep-22	6-Sep-22
Hardness	Hardness as CaCO3	2-Sep-22	6-Sep-22
Sulphide	SM 4500SE - Colourimetric	2-Sep-22	2-Sep-22
Tannin/Lignin	SM 5550B - Colourimetric	2-Sep-22	6-Sep-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	2-Sep-22	6-Sep-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	2-Sep-22	6-Sep-22
Turbidity	SM 2130B - Turbidity meter	2-Sep-22	2-Sep-22

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL



Order #: 2236417

Certificate of Analysis Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Report Date: 13-Sep-2022

Project Description: 100812.001

Order Date: 2-Sep-2022

	Client ID:	TW22-04 6hr	TW22-04 6hr (Filtered)	-	-					
	Sample Date:	01-Sep-22 16:00	01-Sep-22 16:00	-	-					
	Sample ID:	2236417-02	2236417-03	-	-					
	MDL/Units	Drinking Water	Drinking Water	-	-					
General Inorganics	5 mg/L		1							
Alkalinity, total		239	-	-	-					
Ammonia as N	0.01 mg/L	0.37	-	-	-					
Dissolved Organic Carbon	0.5 mg/L	1.6	-	-	-					
Colour	2 TCU	29	-	-	-					
Colour, apparent	2 ACU	474	-	-	-					
Conductivity	5 uS/cm	481	-	-	-					
Hardness	mg/L	12.6	-	-	-					
рН	0.1 pH Units	8.9	-	-	-					
Phenolics	0.001 mg/L	<0.001	-	-	-					
Total Dissolved Solids	10 mg/L	308	-	-	-					
Sulphide	0.02 mg/L	0.05	-	-	-					
Tannin & Lignin	0.1 mg/L	0.2	-	-	-					
Total Kjeldahl Nitrogen	0.1 mg/L	0.4	-	-	-					
Turbidity	0.1 NTU	93.9	-	-	-					
Anions	• • • • •				••					
Chloride	1 mg/L	8 [2]	-	-	-					
Fluoride	0.1 mg/L	1.3 [2]	-	-	-					
Nitrate as N	0.1 mg/L	0.2 [2]	-	-	-					
Nitrite as N	0.10 mg/L	<0.10 [2]	-	-	-					
Sulphate	1 mg/L	<1 [2]	-	-	-					
Metals										
Mercury	0.0001 mg/L	<0.0001	<0.0001	-	-					
Aluminum	0.001 mg/L	0.762	0.028	-	-					
Antimony	0.0005 mg/L	<0.0005	<0.0005	-	-					
Arsenic	0.001 mg/L	<0.001	<0.001	-	-					
Barium	0.001 mg/L	0.077	0.053	-	-					
Beryllium	0.0005 mg/L	<0.0005	<0.0005	-	-					
Boron	0.01 mg/L	0.44	0.46	-	-					
Cadmium	0.0001 mg/L	<0.0001	<0.0001	-	-					
Calcium	0.1 mg/L	3.2	1.4	-	-					
Chromium	0.001 mg/L	0.001	<0.001	_	-					
Cobalt	0.0005 mg/L	<0.0005	<0.0005	-	-					
Copper	0.0005 mg/L	0.0009	0.0013	-	-					
Iron	0.1 mg/L	1.1	<0.1	-	-					
L					ا ا					



Order #: 2236417

Certificate of Analysis Client: GEMTEC Consultir

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Report Date: 13-Sep-2022
Order Date: 2-Sep-2022
Project Description: 100812.001

	Client ID:	TW22-04 6hr	TW22-04 6hr	-	-
	Sample Date:	01-Sep-22 16:00	(Filtered) 01-Sep-22 16:00	-	-
	Sample ID:	2236417-02	2236417-03	-	-
	MDL/Units	Drinking Water	Drinking Water	-	-
Lead	0.0001 mg/L	0.0005	<0.0001	-	-
Magnesium	0.2 mg/L	1.1	0.5	-	-
Manganese	0.005 mg/L	0.026	<0.005	-	-
Molybdenum	0.0005 mg/L	<0.0005	<0.0005	-	-
Nickel	0.001 mg/L	0.001	<0.001	-	-
Potassium	0.1 mg/L	1.6	1.4	-	-
Selenium	0.001 mg/L	<0.001	<0.001	-	-
Silver	0.0001 mg/L	<0.0001	<0.0001	-	-
Sodium	0.2 mg/L	93.9	95.8	-	-
Strontium	0.01 mg/L	0.08	0.07	-	-
Thallium	0.001 mg/L	<0.001	<0.001	-	-
Uranium	0.0001 mg/L	0.0001	<0.0001	-	-
Vanadium	0.0005 mg/L	0.0019	<0.0005	-	-
Zinc	0.005 mg/L	<0.005	<0.005	-	-



Client PO: Smith Road

Zinc

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	ΤČU						
Colour, apparent	ND	2	ACU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Mercury	ND	0.0001	mg/L						
Aluminum	ND	0.001	mg/L						
Antimony	ND	0.0005	mg/L						
Arsenic	ND	0.001	mg/L						
Barium	ND	0.001	mg/L						
Beryllium	ND	0.0005	mg/L						
Boron	ND	0.01	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.1	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Copper	ND	0.0005	mg/L						
Iron	ND	0.1	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Molybdenum	ND	0.0005	mg/L						
Nickel	ND	0.001	mg/L						
Potassium	ND	0.1	mg/L						
Selenium	ND	0.001	mg/L						
Silver	ND	0.0001	mg/L						
Sodium	ND	0.2	mg/L						
Strontium	ND	0.01	mg/L						
Thallium	ND	0.001	mg/L						
Uranium	ND	0.0001	mg/L						
Vanadium	ND	0.0005	mg/L						
		0.005							

ND

0.005

mg/L

Report Date: 13-Sep-2022

Order Date: 2-Sep-2022



Client PO: Smith Road

Method Quality Control: Duplicate

Anglista		Reporting		Source		%REC		RPD	
Analyte	Result	Limit	Units	Result	%REC	Limit	RPD	Limit	Notes
General Inorganics									
Ammonia as N	0.023	0.01	mg/L	0.011			NC	17.7	
Dissolved Organic Carbon	2.0	0.5	mg/L	1.8			11.1	37	
Colour	29	2	TCU	29			0.0	12	
Colour, apparent	472	2	ACU	474			0.4	12	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	462	10	mg/L	468			1.3	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.2	0.1	mg/L	0.2			0.0	11	
Total Kjeldahl Nitrogen	ND	0.1	mg/L	ND			NC	16	
Turbidity	ND	0.1	NTU	ND			NC	10	
Metals									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	1.48	0.001	mg/L	0.030			192.0	20	
Antimony	0.0005	0.0005	mg/L	0.0018			109.0	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.062	0.001	mg/L	0.058			7.3	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.41	0.01	mg/L	0.31			27.9	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	94.4	0.1	mg/L	46.4			68.1	20	
Chromium	0.015	0.001	mg/L	ND			NC	20	
Cobalt	0.0013	0.0005	mg/L	ND			NC	20	
Copper	0.0026	0.0005	mg/L	0.0015			52.9	20	
Iron	2.3	0.1	mg/L	ND			NC	20	
Lead	0.0004	0.0001	mg/L	0.0001			NC	20	
Magnesium	13.8	0.2	mg/L	16.3			16.4	20	
Manganese	0.044	0.005	mg/L	0.006			149.0	20	
Molybdenum	ND	0.0005	mg/L	0.0032			NC	20	
Nickel	0.011	0.001	mg/L	ND			NC	20	
Potassium	3.5	0.1	mg/L	7.4			70.0	20	
Selenium	ND	0.001	mg/L	0.001			NC	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	233	0.2	mg/L	103			77.4	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Uranium	0.0001	0.0001	mg/L	0.0009			159.0	20	
Vanadium	0.0045	0.0005	mg/L	0.0008			139.0	20	
Zinc	0.008	0.005	mg/L	ND			NC	20	

OTTAWA . MISSISSAUGA . HAMILTON . KINGSTON . LONDON . NIAGARA . WINDSOR . RICHMOND HILL

Order #: 2236417

Report Date: 13-Sep-2022

Order Date: 2-Sep-2022



Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Ammonia as N	0.279	0.01	mg/L	0.011	108	81-124			
Dissolved Organic Carbon	13.3	0.5	mg/L	1.8	115	60-133			
Phenolics	0.026	0.001	mg/L	ND	104	67-133			
Total Dissolved Solids	104	10	mg/L	ND	104	75-125			
Sulphide	0.48	0.02	mg/L	ND	96.8	79-115			
Tannin & Lignin	0.9	0.1	mg/L	ND	89.9	71-113			
Total Kjeldahl Nitrogen	1.87	0.1	mg/L	ND	93.6	81-126			
Metals									
Mercury	0.0027	0.0001	mg/L	ND	90.3	70-130			
Aluminum	51.2	0.001	mg/L	ND	102	80-120			
Arsenic	48.7	0.001	mg/L	ND	97.4	80-120			
Barium	46.8	0.001	mg/L	ND	93.7	80-120			
Beryllium	52.7	0.0005	mg/L	ND	105	80-120			
Boron	48.6	0.01	mg/L	ND	97.2	80-120			
Cadmium	48.1	0.0001	mg/L	ND	96.3	80-120			
Calcium	9360	0.1	mg/L	ND	93.6	80-120			
Chromium	50.2	0.001	mg/L	ND	100	80-120			
Cobalt	51.8	0.0005	mg/L	ND	104	80-120			
Copper	50.4	0.0005	mg/L	ND	101	80-120			
Iron	2390	0.1	mg/L	ND	95.5	80-120			
Lead	45.5	0.0001	mg/L	ND	91.0	80-120			
Magnesium	10100	0.2	mg/L	ND	101	80-120			
Manganese	49.4	0.005	mg/L	ND	98.8	80-120			
Molybdenum	43.6	0.0005	mg/L	ND	87.1	80-120			
Nickel	50.5	0.001	mg/L	ND	101	80-120			
Potassium	10200	0.1	mg/L	ND	102	80-120			
Selenium	47.0	0.001	mg/L	ND	94.1	80-120			
Silver	50.4	0.0001	mg/L	ND	101	80-120			
Sodium	10200	0.2	mg/L	ND	102	80-120			
Thallium	49.8	0.001	mg/L	ND	99.6	80-120			
Uranium	48.4	0.0001	mg/L	ND	96.8	80-120			
Vanadium	50.5	0.0005	mg/L	ND	101	80-120			
Zinc	49.4	0.005	mg/L	ND	98.8	80-120			

Order #: 2236417

Report Date: 13-Sep-2022

Order Date: 2-Sep-2022



Qualifier Notes:

Sample Qualifiers :

2: Subcontracted analysis - Eurofins Environment Testing

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable ND: Not Detected MDL: Method Detection Limit Source Result: Data used as source for matrix and duplicate samples %REC: Percent recovery. RPD: Relative percent difference. NC: Not Calculated Order #: 2236417

Report Date: 13-Sep-2022 Order Date: 2-Sep-2022 Project Description: 100812.001



959 Smith Road

900 Smith Road

969 Meteor Ave

908 Smith Ave

1-800-749-1947 www.paracellabs.com

Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited	
32 Steacie Drive	
Kanata, ON K2K 2A9	
Attn: Samuel Esenwa	Report Date: 18-Oct-2023
Client PO:	Order Date: 13-Oct-2023
Project: 100812.001	Order #: 2341381
Custody: 19515	
This Certificate of Analysis contains analytical data applicable to the following samples as submitted:	
Paracel ID Client ID	

Approved By:

2341381-01

2341381-02

2341381-03

2341381-04

Sasa

Dale Robertson, BSc

Laboratory Director



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Analysis

Anions

Colour

Turbidity

Colour, apparent

Metals, ICP-MS

Analysis Summary Table

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023

Analysis Date

16-Oct-23

14-Oct-23

13-Oct-23

13-Oct-23

14-Oct-23

Project Description: 100812.001

Extraction Date

16-Oct-23

13-Oct-23

13-Oct-23

13-Oct-23

14-Oct-23

OTTAWA • MISSISSAUGA	HAMILTON	 KINGSTON 	 LONDON 	NIAGARA	 WINDSOR 	RICHMOND HILL
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Method Reference/Description

SM2120 - Spectrophotometric

SM2120 - Spectrophotometric

SM 2130B - Turbidity meter

EPA 300.1 - IC

EPA 200.8 - ICP-MS



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023

	Client ID: Sample Date: Sample ID: Matrix: MDL/Units	959 Smith Road 13-Oct-23 09:30 2341381-01 Drinking Water	900 Smith Road 13-Oct-23 10:20 2341381-02 Drinking Water	969 Meteor Ave 13-Oct-23 11:20 2341381-03 Drinking Water	908 Smith Ave 13-Oct-23 12:20 2341381-04 Drinking Water	-	-
General Inorganics							•
Colour, apparent	2 ACU	7	3	18	8	-	-
Colour	2 TCU	2	<2	3	<2	-	-
Turbidity	0.1 NTU	0.8	0.4	0.9	1.0	-	-
Anions							
Chloride	1 mg/L	40	14	11	22	-	-
Fluoride	0.1 mg/L	0.8	0.5	0.3	0.8	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	<0.1	-	-
Metals							
Iron	0.1 mg/L	0.1	<0.1	0.4	<0.1	-	-



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
General Inorganics								
Colour	ND	2	TCU					
Colour, apparent	ND	2	ACU					
Turbidity	ND	0.1	NTU					
Metals								
Iron	ND	0.1	mg/L					

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	39.5	1	mg/L	39.6			0.3	20	
Fluoride	0.84	0.1	mg/L	0.81			4.5	20	
Nitrate as N	ND	0.1	mg/L	ND			NC	20	
General Inorganics									
Colour	2	2	TCU	2			0.0	12	
Colour, apparent	7	2	ACU	7			0.0	12	
Turbidity	1.0	0.1	NTU	1.0			5.1	10	
Metals									
Iron	ND	0.1	mg/L	ND			NC	20	

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions Chloride	48.1	1	mg/L	39.6	84.7	70-124			
Fluoride	1.51	0.1	mg/L	0.81	70.2	70-130			
Nitrate as N	1.10	0.1	mg/L	ND	110	77-126			
Metals Iron	2470	0.1	mg/L	36.4	97.2	80-120			

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Qualifier Notes:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Report Date: 18-Oct-2023

Order Date: 13-Oct-2023

	ARAC	S LTD.							34138			Paracel C 834						Drinki	ng Wa	ustor ater Si 951	ample	H
Client Name:	GEMTEC	Pro	oject Ref:	1008	12	(00	1	Wa	erworks Na	ime:							Sample	s Take	n By:		
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Address:		PO)#:			,			Add	ress:					Signat	ure:				14		t
After Hours Contact:		E-n	nail:	Samue	21.0	ese	ni	va	Qgen	rkc.	ca						Pa	ge_\	∟ of	1		
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ON REG 170/0	3 ON REG 319/08	169/03							Ground Wa			er ation - Y = Ye	c: N =	No		_		Requ	ired v	Analys	,es	
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Date/Time: OCT	13'23 13	30	Tempera	ature:					°C	Temper	ature:	11.5	1	°C	pH Ver	ified:			/			

Chain of Custody (Drinking Water).xlsx

Revision 5.0



TW22-4

1-800-749-1947 www.paracellabs.com

Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited	
32 Steacie Drive	
Kanata, ON K2K 2A9	
Attn: Andrius Paznekas	Report Date: 27-Dec-2023
Client PO: Smith Road	Order Date: 20-Dec-2023
Project: 100812.001 Custody: 18241	Order #: 2351202
This Certificate of Analysis contains analytical data applicable to the following samples as submitted:	
Paracel ID Client ID	

Approved By:

2351202-01

Losa

Dale Robertson, BSc

Laboratory Director



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Analysis Summary Table

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	20-Dec-23	20-Dec-23
Ammonia, as N	EPA 351.2 - Auto Colour	21-Dec-23	21-Dec-23
Anions	EPA 300.1 - IC	20-Dec-23	20-Dec-23
Colour	SM2120 - Spectrophotometric	20-Dec-23	20-Dec-23
Colour, apparent	SM2120 - Spectrophotometric	20-Dec-23	20-Dec-23
Conductivity	EPA 9050A- probe @25 °C	20-Dec-23	20-Dec-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	22-Dec-23	22-Dec-23
E. coli	MOE E3407	20-Dec-23	20-Dec-23
Fecal Coliform	SM 9222D	20-Dec-23	20-Dec-23
Heterotrophic Plate Count	SM 9215C	20-Dec-23	20-Dec-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	21-Dec-23	21-Dec-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	21-Dec-23	21-Dec-23
рН	EPA 150.1 - pH probe @25 °C	20-Dec-23	20-Dec-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	20-Dec-23	20-Dec-23
Hardness	Hardness as CaCO3	21-Dec-23	21-Dec-23
Sulphide	SM 4500SE - Colourimetric	20-Dec-23	20-Dec-23
Tannin/Lignin	SM 5550B - Colourimetric	22-Dec-23	22-Dec-23
Total Coliform	MOE E3407	20-Dec-23	20-Dec-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	21-Dec-23	22-Dec-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	21-Dec-23	21-Dec-23
Turbidity	SM 2130B - Turbidity meter	20-Dec-23	20-Dec-23

OTTAWA • MISSISSAUGA • HAMILTON • KINGSTON • LONDON • NIAGARA • WINDSOR • RICHMOND HILL



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

	F			i	1		
	Client ID:	TW22-4	-	-	-		
	Sample Date:	19-Dec-23 14:30	-	-	-	-	-
	Sample ID:	2351202-01	-	-	-		
	Matrix:	Drinking Water	-	-	-		
	MDL/Units						
Microbiological Parameters						_	
E. coli	1 CFU/100mL	ND	-	-	-	-	-
Total Coliforms	1 CFU/100mL	ND	-	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-	-	-
Heterotrophic Plate Count	10 CFU/mL	10	-	-	-	-	-
General Inorganics				-			
Alkalinity, total	5 mg/L	252	-	-	-	-	-
Ammonia as N	0.01 mg/L	0.36	-	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	0.8	-	-	-	-	-
Colour, apparent	2 ACU	5	-	-	-	-	-
Colour	2 TCU	2	-	-	-	-	-
Conductivity	5 uS/cm	516	-	-	-	-	-
Hardness	1 mg/L	7	-	-	-	-	-
рН	0.1 pH Units	9.4	-	-	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-	-	-
Total Dissolved Solids	10 mg/L	268	-	-	-	-	-
Sulphide	0.02 mg/L	0.23	-	-	-	-	-
Tannin & Lignin	0.1 mg/L	<0.1	-	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.3	-	-	-	-	-
Turbidity	0.1 NTU	0.5	-	-	-	-	-
Anions						•	
Chloride	1 mg/L	15	-	-	-	-	-
Fluoride	0.1 mg/L	1.1	-	-	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-	-	-
Sulphate	1 mg/L	<1	-	-	-	-	-

OTTAWA • MISSISSAUGA • HAMILTON • KINGSTON • LONDON • NIAGARA • WINDSOR • RICHMOND HILL



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

	Client ID:	TW22-4	-	-	-		
	Sample Date:	19-Dec-23 14:30	-	-	-		-
	Sample ID:	2351202-01	-	-	-		
	Matrix:	Drinking Water	-	-	-		
	MDL/Units						
Metals				•	•		
Mercury	0.0001 mg/L	<0.0001	-	-	-	-	-
Aluminum	0.001 mg/L	0.047	-	-	-	-	-
Antimony	0.0005 mg/L	<0.0005	-	-	-	-	-
Arsenic	0.001 mg/L	<0.001	-	-	-	-	-
Barium	0.001 mg/L	0.052	-	-	-	-	-
Beryllium	0.0005 mg/L	<0.0005	-	-	-	-	-
Boron	0.01 mg/L	0.36	-	-	-	-	-
Cadmium	0.0001 mg/L	<0.0001	-	-	-	-	-
Calcium	0.1 mg/L	1.7	-	-	-	-	-
Chromium	0.001 mg/L	<0.001	-	-	-	-	-
Cobalt	0.0005 mg/L	<0.0005	-	-	-	-	-
Copper	0.0005 mg/L	<0.0005	-	-	-	-	-
Iron	0.1 mg/L	<0.1	-	-	-	-	-
Lead	0.0001 mg/L	0.0002	-	-	-	-	-
Magnesium	0.2 mg/L	0.6	-	-	-	-	-
Manganese	0.005 mg/L	<0.005	-	-	-	-	-
Molybdenum	0.0005 mg/L	<0.0005	-	-	-	-	-
Nickel	0.001 mg/L	<0.001	-	-	-	-	-
Potassium	0.1 mg/L	1.6	-	-	-	-	-
Selenium	0.001 mg/L	<0.001	-	-	-	-	-
Silver	0.0001 mg/L	<0.0001	-	-	-	-	-
Sodium	0.2 mg/L	110	-	-	-	-	-
Strontium	0.01 mg/L	0.09	-	-	-	-	-
Thallium	0.001 mg/L	<0.001	-	-	-	-	-
Uranium	0.0001 mg/L	<0.0001	-	-	-	-	-

OTTAWA - MISSISSAUGA - HAMILTON - KINGSTON - LONDON - NIAGARA - WINDSOR - RICHMOND HILL



Client: GEMTEC Consulting Engineers and Scientists Limited

0.005 mg/L

< 0.005

-

Client PO: Smith Road

Metals Vanadium

Zinc

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

-

Project Description: 100812.001

Client ID:	TW22-4	-	-	-		
Sample Date:	19-Dec-23 14:30	-	-	-	-	-
Sample ID:	2351202-01	-	-	-		
Matrix:	Drinking Water	-	-	-		
MDL/Units						
0.0005 mg/L	<0.0005	-	-	-	-	-

-

_

-



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals								
Mercury	ND	0.0001	mg/L					
Aluminum	ND	0.001	mg/L					
Arsenic	ND	0.001	mg/L					
Barium	ND	0.001	mg/L					
Beryllium	ND	0.0005	mg/L					
Boron	ND	0.01	mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Cobalt	ND	0.0005	mg/L					
Copper	ND	0.0005	mg/L					
Iron	ND	0.1	mg/L					
Lead	ND	0.0001	mg/L					
			-					

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Magnesium	ND	0.2	mg/L					
Manganese	ND	0.005	mg/L					
Molybdenum	ND	0.0005	mg/L					
Nickel	ND	0.001	mg/L					
Potassium	ND	0.1	mg/L					
Selenium	ND	0.001	mg/L					
Silver	ND	0.0001	mg/L					
Sodium	ND	0.2	mg/L					
Strontium	ND	0.01	mg/L					
Thallium	ND	0.001	mg/L					
Uranium	ND	0.0001	mg/L					
Vanadium	ND	0.0005	mg/L					
Zinc	ND	0.005	mg/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Method Quality Control: Duplicate

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	6.10	1	mg/L	5.97			2.3	20	
Fluoride	0.59	0.1	mg/L	0.59			0.4	20	
Nitrate as N	0.18	0.1	mg/L	0.19			1.9	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	27.3	1	mg/L	27.0			0.8	20	
General Inorganics									
Alkalinity, total	281	5	mg/L	282			0.4	14	
Ammonia as N	0.354	0.01	mg/L	0.362			2.1	17.7	
Dissolved Organic Carbon	0.9	0.5	mg/L	1.6			51.4	37	QR-07
Colour	2	2	TCU	2			0.0	12	
Colour, apparent	5	2	ACU	5			0.0	12	
Conductivity	657	5	uS/cm	668			1.7	5	
рН	7.8	0.1	pH Units	7.8			0.5	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	52.0	10	mg/L	56.0			7.4	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.24	0.1	mg/L	0.27			10.3	16	
Turbidity	0.5	0.1	NTU	0.5			0.0	10	
Metals									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	0.146	0.001	mg/L	0.145			0.7	20	
Antimony	ND	0.0005	mg/L	ND			NC	20	
Arsenic	0.009	0.001	mg/L	0.009			0.8	20	
Barium	0.082	0.001	mg/L	0.084			2.7	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.02	0.01	mg/L	0.03			1.9	20	
Cadmium	0.0015	0.0001	mg/L	0.0014			2.5	20	
Calcium	194	0.1	mg/L	195			0.2	20	
Chromium	0.004	0.001	mg/L	0.004			1.7	20	



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Analyte

Cobalt

Copper

Iron

Lead

Nickel

Silver

Sodium

Thallium

Uranium

Zinc

E. coli

Total Coliforms

Fecal Coliforms

Vanadium

Microbiological Parameters

Heterotrophic Plate Count

Magnesium

Manganese

Molybdenum

Potassium

Selenium

Method Quality Control: Duplicate

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

Notes

OTTAWA •	MISSISSAUGA	 HAMILTON 	 KINGSTON 	 LONDON 	 NIAGARA 	 WINDSOR 	 RICHMOND H 	HILL
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Source

Result

ND

0.0692

9.1

0.141

87.3

0.194

0.0011

0.001

6.7

ND

ND

94.9

ND

0.0015

ND

0.746

ND

ND

ND

10

Units

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

CFU/mL

Reporting

Limit

0.0005

0.0005

0.1

0.0001

0.2

0.005

0.0005

0.001

0.1

0.001

0.0001

0.2

0.001

0.0001

0.0005

0.005

1

1

1

10

Result

ND

0.0685

9.0

0.142

86.0

0.191

0.0011

0.001

6.3

ND

ND

92.9

ND

0.0015

ND

0.727

ND

ND

ND

ND

%REC

Limit

%REC

RPD

Limit

20

20

20

20

20

20

20

20

20

20

20

20

20

20

20

20

30

30

30

30

RPD

NC

1.1

1.6

0.5

1.4

1.5

0.6

1.6

5.8

NC

NC

2.1

NC

1.3

NC

2.6

NC

NC

NC

NC



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Method Quality Control: Spike

Order	#:	2351	202

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

Project Description: 100812.001

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	16.3	1	mg/L	5.97	103	70-124			
Fluoride	1.54	0.1	mg/L	0.59	94.7	70-130			
Nitrate as N	1.28	0.1	mg/L	0.19	109	77-126			
Nitrite as N	0.922	0.05	mg/L	ND	92.2	82-115			
Sulphate	36.9	1	mg/L	27.0	98.3	70-130			
General Inorganics									
Ammonia as N	1.34	0.01	mg/L	0.362	97.5	81-124			
Dissolved Organic Carbon	10.2	0.5	mg/L	0.9	93.3	60-133			
Phenolics	0.026	0.001	mg/L	ND	106	67-133			
Total Dissolved Solids	80.0	10	mg/L	ND	80.0	75-125			
Sulphide	0.45	0.02	mg/L	ND	89.2	79-115			
Tannin & Lignin	1.0	0.1	mg/L	ND	101	71-113			
Total Kjeldahl Nitrogen	1.18	0.1	mg/L	0.27	90.9	81-126			
Metals									
Mercury	0.0026	0.0001	mg/L	ND	86.1	70-130			
Aluminum	180	0.001	mg/L	145	71.0	80-120			QM-07
Arsenic	56.2	0.001	mg/L	9.13	94.1	80-120			
Barium	120	0.001	mg/L	84.3	71.8	80-120			QM-07
Beryllium	50.9	0.0005	mg/L	0.0216	102	80-120			
Boron	61.7	0.01	mg/L	25.2	73.0	80-120			QM-07
Cadmium	42.5	0.0001	mg/L	1.43	82.1	80-120			
Calcium	9130	0.1	mg/L	ND	91.3	80-120			
Chromium	54.5	0.001	mg/L	3.56	102	80-120			
Cobalt	50.2	0.0005	mg/L	0.0279	100	80-120			
Copper	111	0.0005	mg/L	69.2	82.6	80-120			
Iron	10700	0.1	mg/L	9100	65.5	80-120			QM-07
Lead	38.5	0.0001	mg/L	ND	77.0	80-120			QS-02
Magnesium	8930	0.2	mg/L	ND	89.3	80-120			
Manganese	230	0.005	mg/L	194	72.7	80-120			QM-07
Molybdenum	47.3	0.0005	mg/L	1.07	92.4	80-120			



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Nickel	50.8	0.001	mg/L	1.01	99.7	80-120			
Potassium	16400	0.1	mg/L	6710	96.5	80-120			
Selenium	45.7	0.001	mg/L	0.522	90.4	80-120			
Silver	48.9	0.0001	mg/L	0.0128	97.8	80-120			
Sodium	8960	0.2	mg/L	ND	89.6	80-120			
Thallium	47.5	0.001	mg/L	0.018	95.0	80-120			
Uranium	43.4	0.0001	mg/L	1.52	83.8	80-120			
Vanadium	53.4	0.0005	mg/L	0.200	106	80-120			
Zinc	42.7	0.005	mg/L	ND	85.4	80-120			

Order #: 2351202

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO: Smith Road

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers:

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
- QR-07 Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials. Remainder of QA/QC is acceptable.
- QS-02 Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions:

None

Work Order Revisions / Comments:

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Report Date: 27-Dec-2023

Order Date: 20-Dec-2023

GP	ARAC		Paracel	1D: (235	512(02		nt E IG 4 Ilab		Paracel C				Onta		in O Prinkir		ter S	Sampl	les
Client Name:	C-m tro	Project	Ref: 100	0812	.01	01/	51	nita		me:						ş	Sample	s Taken	By:		
Contact Name:	Andrivs Pazi		#:					Wa	terworks Nu	mber:				Name:		Se	m	41	SS	en	us
Address:		PO #:						Add	ress:					Signat	ure:		£	Ú,	n	a	Ð
After Hours Contact:		E-mail:	Pr.	driv	ς.	Pe	121	e has 6	<i>*</i>		14			_			round			_	
Telephone:		Fax:						Pub	lic Health U	nit:					010	day □	2 day	/ 🗆 3	day	G 4 d	Jay
	Jnder: (Indicate ONLY one			1				taw ; T = Tr Ground Wa			ution; P = Plur	mbing					Requ	ired A	inaly	ses	
 ON REG 170/03 ON REG 243/07 		Private Well	103								ater alation - Y = Ye	es; N =	No		-			Т	R	Τ	
Are these samples fo	n submitted to MOE/MOH or human consumption?: 1 in must be completed be	ILTC?: □Yes □No I □Yes □No	∃-N/A	s: R/T/D/P	pe: G / S	le: Y / N	nple		SAMPLE C	OLLEC	red	tainers	ed Chlorine Il mg/L	Flushed: EG 243)	iform/E. Coli	HPC	Lead		KUMUM	idite	CLEIN
	ION NAME	SAMP		Sample Type:	Source Type: G / S	Reportable: Y / N	Resample	DA	TE		TIME	# of Containers	Free/Combined Chlor Residual mg/L	Standing / Flushed: S / F (REG 243)	Total Coliform/E.			4 111	North	Jurbid	Bac
1		1W22-4	(R	4	N	1	19-1	2-23	14	1:30	11						. 4.	×.	\checkmark	
2																					
3																		_		_	
4																			_	-	
5																					_
6																				$ \rightarrow$	
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8															_				\downarrow	$ \rightarrow$	
9																		_	_	\rightarrow	
10																					
Comments:	or in Hay	STOU	i tree	CP ACX		145	mith L	ed San meta	15-5		no(d			Meth		Deliver	Ø	ł	C	he	pB
Relinquished By (Sign); Relinquished By (Print);	ma .		Received By Driver/Depot:	X	To	2		, 8.2 m Q	Receive Lab:		0			Date/	Time:	Sc	1.40				
Date/Time: /G	11 Senu	9 19:00	Temperature:	P	e f	d (Dk	<u>BM</u>	-		20,202	5 11	15cm		D	ei d	Byic	202	3	11.0	Zocim

Chain of Custody (Drinking Water).xlsx

Revision 5.0



TW24-4 (Filtered)

Certificate of Analysis

Paracel ID Client ID	
This Certificate of Analysis contains analytical data applicable to the following samples as submitted:	
Custody: 19566	
Project: 100812.001	Order #: 2404291
Client PO:	Order Date: 24-Jan-2024
	Report Date: 30-Jan-2024
Attn: Andrius Paznekas	
Kanata, ON K2K 2A9	
32 Steacie Drive	
GEMTEC Consulting Engineers and Scientists Limited	

TW24-4 Identified as TW24-5 and TW24-5 (Filtered) in the summary table

Approved By:

2404291-01

2404291-02

Mark Foto

Mark Foto, M.Sc.



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Analysis Summary Table

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	25-Jan-24	25-Jan-24
Ammonia, as N	EPA 351.2 - Auto Colour	29-Jan-24	29-Jan-24
Anions	EPA 300.1 - IC	25-Jan-24	25-Jan-24
Colour	SM2120 - Spectrophotometric	25-Jan-24	25-Jan-24
Colour, apparent	SM2120 - Spectrophotometric	25-Jan-24	25-Jan-24
Conductivity	EPA 9050A- probe @25 °C	25-Jan-24	25-Jan-24
Dissolved Organic Carbon	MOE 3247B - Combustion IR	30-Jan-24	30-Jan-24
E. coli	MOE E3407	25-Jan-24	25-Jan-24
Fecal Coliform	SM 9222D	25-Jan-24	25-Jan-24
Heterotrophic Plate Count	SM 9215C	25-Jan-24	25-Jan-24
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	26-Jan-24	26-Jan-24
Metals, ICP-MS	EPA 200.8 - ICP-MS	26-Jan-24	26-Jan-24
рН	EPA 150.1 - pH probe @25 °C	25-Jan-24	25-Jan-24
Phenolics	EPA 420.2 - Auto Colour, 4AAP	29-Jan-24	29-Jan-24
Hardness	Hardness as CaCO3	26-Jan-24	26-Jan-24
Sulphide	SM 4500SE - Colourimetric	25-Jan-24	25-Jan-24
Tannin/Lignin	SM 5550B - Colourimetric	25-Jan-24	25-Jan-24
Total Coliform	MOE E3407	25-Jan-24	25-Jan-24
Total Dissolved Solids	SM 2540C - gravimetric, filtration	25-Jan-24	26-Jan-24
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	25-Jan-24	25-Jan-24
Turbidity	SM 2130B - Turbidity meter	25-Jan-24	25-Jan-24



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

	г		i				
	Client ID:	TW24-4	TW24-4 (Filtered)	-	-		
	Sample Date:	24-Jan-24 14:25	24-Jan-24 14:25	-	-	-	-
	Sample ID:	2404291-01	2404291-02	-	-		
	Matrix:	Drinking Water	Drinking Water	-	-		
	MDL/Units						
Microbiological Parameters					-		
E. coli	1 CFU/100mL	ND	-	-	-	-	-
Total Coliforms	1 CFU/100mL	1	-	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-	-	-
Heterotrophic Plate Count	10 CFU/mL	<10	-	-	-	-	-
General Inorganics							
Alkalinity, total	5 mg/L	189	-	-	-	-	-
Ammonia as N	0.01 mg/L	0.45	-	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	1.7	-	-	-	-	-
Colour, apparent	2 ACU	12	-	-	-	-	-
Colour	2 TCU	2	-	-	-	-	-
Conductivity	5 uS/cm	480	-	-	-	-	-
Hardness	1 mg/L	31.7	-	-	-	-	-
рН	0.1 pH Units	8.8	-	-	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-	-	-
Total Dissolved Solids	10 mg/L	248	-	-	-	-	-
Sulphide	0.02 mg/L	2.34	-	-	-	-	-
Tannin & Lignin	0.1 mg/L	0.4	-	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.4	-	-	-	-	-
Turbidity	0.1 NTU	1.4	-	-	-	-	-
Anions					-		
Chloride	1 mg/L	29	-	-	-	-	-
Fluoride	0.1 mg/L	0.8	-	-	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-	-	-
Sulphate	1 mg/L	8	-	-	-	-	-



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

	-						
	Client ID:	TW24-4	TW24-4 (Filtered)	-	-		
	Sample Date:	24-Jan-24 14:25	24-Jan-24 14:25	-	-	-	-
	Sample ID:	2404291-01	2404291-02	-	-		
	Matrix:	Drinking Water	Drinking Water	-	-		
	MDL/Units						
Metals							-
Mercury	0.0001 mg/L	<0.0001	<0.0001	-	-	-	-
Aluminum	0.001 mg/L	0.050	0.023	-	-	-	-
Antimony	0.0005 mg/L	<0.0005	<0.0005	-	-	-	-
Arsenic	0.001 mg/L	<0.001	<0.001	-	-	-	-
Barium	0.001 mg/L	0.151	0.137	-	-	-	-
Beryllium	0.0005 mg/L	<0.0005	<0.0005	-	-	-	-
Boron	0.01 mg/L	0.27	0.24	-	-	-	-
Cadmium	0.0001 mg/L	<0.0001	<0.0001	-	-	-	-
Calcium	0.1 mg/L	8.2	7.4	-	-	-	-
Chromium	0.001 mg/L	<0.001	<0.001	-	-	-	-
Cobalt	0.0005 mg/L	<0.0005	<0.0005	-	-	-	-
Copper	0.0005 mg/L	<0.0005	<0.0005	-	-	-	-
Iron	0.1 mg/L	<0.1	<0.1	-	-	-	-
Lead	0.0001 mg/L	<0.0001	<0.0001	-	-	-	-
Magnesium	0.2 mg/L	2.8	2.7	-	-	-	-
Manganese	0.005 mg/L	<0.005	<0.005	-	-	-	-
Molybdenum	0.0005 mg/L	0.0005	<0.0005	-	-	-	-
Nickel	0.001 mg/L	<0.001	<0.001	-	-	-	-
Potassium	0.1 mg/L	3.3	3.3	-	-	-	-
Selenium	0.001 mg/L	<0.001	<0.001	-	-	-	-
Silver	0.0001 mg/L	<0.0001	<0.0001	-	-	-	-
Sodium	0.2 mg/L	85.5	85.4	-	-	-	-
Strontium	0.01 mg/L	0.45	0.41	-	-	-	-
Thallium	0.001 mg/L	<0.001	<0.001	-	-	-	-
Uranium	0.0001 mg/L	<0.0001	<0.0001	-	-	-	-



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Metals Vanadium Zinc Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Clie	ent ID:	TW24-4	TW24-4 (Filtered)	-	-		
Sample	Date:	24-Jan-24 14:25	24-Jan-24 14:25	-	-	-	-
Sam	ple ID:	2404291-01	2404291-02	-	-		
	Matrix:	Drinking Water	Drinking Water	-	-		
MDL/Ur	its						
0.0005 n	ng/L	<0.0005	<0.0005	-	-	-	-
0.005 m	g/L	<0.005	<0.005	-	-	-	-



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Blank

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals								
Mercury	ND	0.0001	mg/L					
Aluminum	ND	0.001	mg/L					
Antimony	ND	0.0005	mg/L					
Arsenic	ND	0.001	mg/L					
Barium	ND	0.001	mg/L					
Beryllium	ND	0.0005	mg/L					
Boron	ND	0.01	mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Cobalt	ND	0.0005	mg/L					
Copper	ND	0.0005	mg/L					
Iron	ND	0.1	mg/L					



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Blank

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Lead	ND	0.0001	mg/L					
Magnesium	ND	0.2	mg/L					
Manganese	ND	0.005	mg/L					
Molybdenum	ND	0.0005	mg/L					
Nickel	ND	0.001	mg/L					
Potassium	ND	0.1	mg/L					
Selenium	ND	0.001	mg/L					
Silver	ND	0.0001	mg/L					
Sodium	ND	0.2	mg/L					
Strontium	ND	0.01	mg/L					
Thallium	ND	0.001	mg/L					
Uranium	ND	0.0001	mg/L					
Vanadium	ND	0.0005	mg/L					
Zinc	ND	0.005	mg/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Duplicate

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	5.73	1	mg/L	5.81			1.4	20	
Fluoride	0.72	0.1	mg/L	0.73			1.7	20	
Nitrate as N	0.21	0.1	mg/L	0.21			0.2	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	28.9	1	mg/L	28.8			0.4	20	
General Inorganics Alkalinity, total	322	5	mg/L	326			1.1	14	
Ammonia as N	0.234	0.01	mg/L	0.232			1.0	17.7	
Dissolved Organic Carbon	1.3	0.5	mg/L	1.3			1.2	37	
Colour	2	2	TCU	2			0.0	12	
Colour, apparent	42	2	ACU	41			2.4	12	
Conductivity	1220	5	uS/cm	1200			2.0	5	
pH	7.7	0.1	pH Units	7.7			0.1	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	64.0	10	mg/L	66.0			3.1	10	
Sulphide	0.31	0.02	mg/L	0.32			3.1	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.15	0.1	mg/L	0.14			7.6	16	
Turbidity	7.0	0.1	NTU	7.2			1.7	10	
Metals									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	0.001	0.001	mg/L	0.001			0.9	20	
Antimony	ND	0.0005	mg/L	ND			NC	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.124	0.001	mg/L	0.118			5.1	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.02	0.01	mg/L	0.02			0.4	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	106	0.1	mg/L	106			0.1	20	
Chromium	ND	0.001	mg/L	ND			NC	20	



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Analyte

Cobalt

Copper

Iron

Lead

Nickel

Silver

Sodium

Thallium

Uranium

Zinc

E. coli

Total Coliforms

Fecal Coliforms

Vanadium

Microbiological Parameters

Heterotrophic Plate Count

Magnesium

Manganese

Molybdenum

Potassium

Selenium

Method Quality Control: Duplicate

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001

Notes

BAC-NDOGTi

BAC-NDOGTi

BAC04

OTTAWA - MISSISSAUGA - HAMILTON - KINGSTON - LONDON - NIAGARA - WINDSOR - RICHMOND HIL	A • HAMILTON • KINGSTON • LONDON • NIAGARA • WIND	OR • RICHMOND HILI
--	---	--------------------

Source

Result

ND

0.0547

0.6

0.0003

25.9

0.159

0.0008

0.002

2.7

ND

ND

103

ND

0.0002

ND

0.020

ND

ND

ND

70

Units

mg/L

CFU/100mL

CFU/100mL

CFU/100mL

CFU/mL

Reporting

Limit

0.0005

0.0005

0.1

0.0001

0.2

0.005

0.0005

0.001

0.1

0.001

0.0001

0.2

0.001

0.0001

0.0005

0.005

1

1

1

10

Result

ND

0.0538

0.6

0.0003

25.0

0.160

0.0008

0.002

2.6

ND

ND

98.7

ND

0.0002

ND

0.020

NDOGT

NDOGT

ND

30

%REC

Limit

%REC

RPD

Limit

20

20

20

20

20

20

20

20

20

20

20

20

20

20

20

20

30

30

30

30

RPD

NC

1.6

1.2

17.8

3.7

0.0

5.2

0.6

1.6

NC

NC

4.4

NC

5.2

NC

0.4

NC

NC

NC

80.0



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	16.2	1	mg/L	5.81	104	70-124			
Fluoride	1.74	0.1	mg/L	0.73	101	70-130			
Nitrate as N	1.28	0.1	mg/L	0.21	107	77-126			
Nitrite as N	0.922	0.05	mg/L	ND	92.2	82-115			
Sulphate	37.8	1	mg/L	28.8	90.5	70-130			
General Inorganics Ammonia as N	1.26	0.01	mg/L	0.232	103	81-124			
Dissolved Organic Carbon	11.0	0.5	mg/L	1.4	95.9	60-133			
Phenolics	0.026	0.001	mg/L	ND	106	67-133			
Total Dissolved Solids	104	10	mg/L	ND	100	75-125			
Sulphide	0.75	0.02	mg/L	0.32	85.8	79-115			
Tannin & Lignin	1.0	0.02	mg/L	ND	101	71-113			
Total Kjeldahl Nitrogen	1.12	0.1	mg/L	0.14	98.3	81-126			
Metals	1.12	0.1	ing/L	0.14	00.0	01 120			
Mercury	0.0028	0.0001	mg/L	ND	92.8	70-130			
Aluminum	46.5	0.001	mg/L	1.09	90.7	80-120			
Arsenic	53.7	0.001	mg/L	0.177	107	80-120			
Barium	174	0.001	mg/L	118	111	80-120			
Beryllium	45.5	0.0005	mg/L	0.0117	90.9	80-120			
Boron	56.5	0.01	mg/L	15.6	81.7	80-120			
Cadmium	48.0	0.0001	mg/L	0.0046	96.0	80-120			
Calcium	9330	0.1	mg/L	ND	93.3	80-120			
Chromium	49.6	0.001	mg/L	0.047	99.2	80-120			
Cobalt	47.1	0.0005	mg/L	0.0720	94.1	80-120			
Copper	94.8	0.0005	mg/L	54.7	80.2	80-120			
Iron	2850	0.1	mg/L	580	90.9	80-120			
Lead	42.9	0.0001	mg/L	0.284	85.3	80-120			
Magnesium	39300	0.2	mg/L	28800	105	80-120			
Manganese	203	0.005	mg/L	159	87.4	80-120			
Molybdenum	43.4	0.0005	mg/L	0.764	85.2	80-120			

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024

Project Description: 100812.001



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Nickel	45.9	0.001	mg/L	1.63	88.5	80-120			
Potassium	12000	0.1	mg/L	2680	92.9	80-120			
Selenium	47.2	0.001	mg/L	0.080	94.2	80-120			
Silver	43.9	0.0001	mg/L	0.0191	87.7	80-120			
Sodium	71800	0.2	mg/L	61100	107	80-120			
Thallium	45.3	0.001	mg/L	0.015	90.6	80-120			
Uranium	47.2	0.0001	mg/L	0.150	94.0	80-120			
Vanadium	51.6	0.0005	mg/L	0.0874	103	80-120			
Zinc	44.0	0.005	mg/L	0.899	86.3	80-120			

Report Date: 30-Jan-2024

Order Date: 24-Jan-2024



Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Qualifier Notes:

Login Qualifiers :

Container(s) - Labeled improperly/insufficient information - Collection time on the bottles is PM; chain of custody reads as PM; report collection time as 14:25 as confirmed by the client. Applies to Samples: TW24-4, TW24-4 (Filtered)

Sample Qualifiers :

QC Qualifiers:

BAC04	Duplicate QC data falls within method prescribed 95% confidence limits.
BAC-NDOGTi	NO DATA: Overgrown with Target.

Sample Data Revisions:

None

Work Order Revisions / Comments:

Missing times on all of the bottles

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

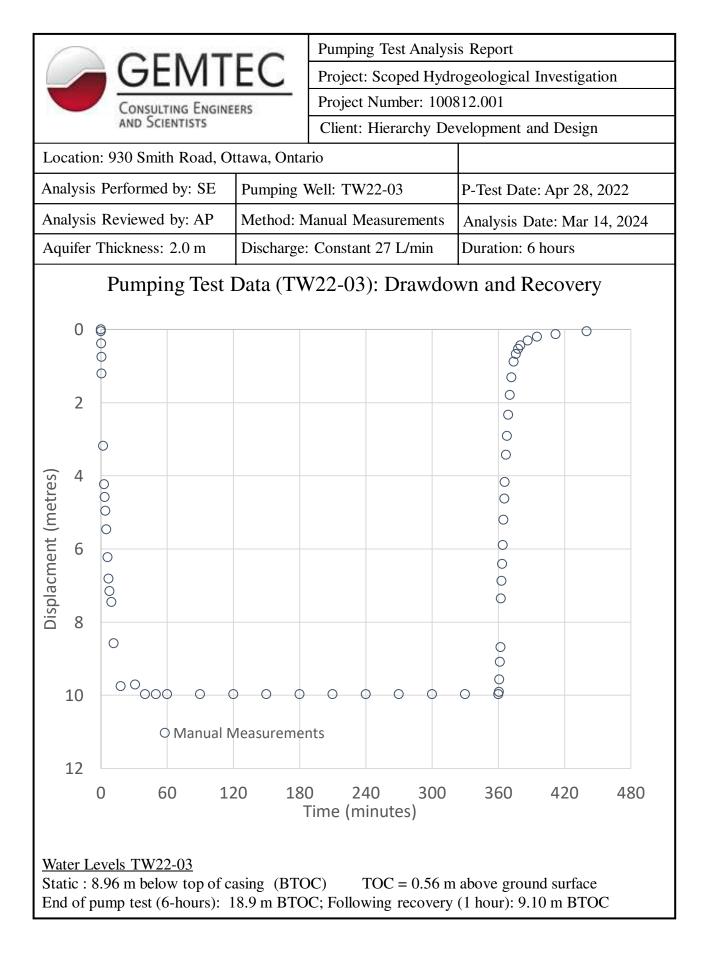
Report Date: 30-Jan-2024

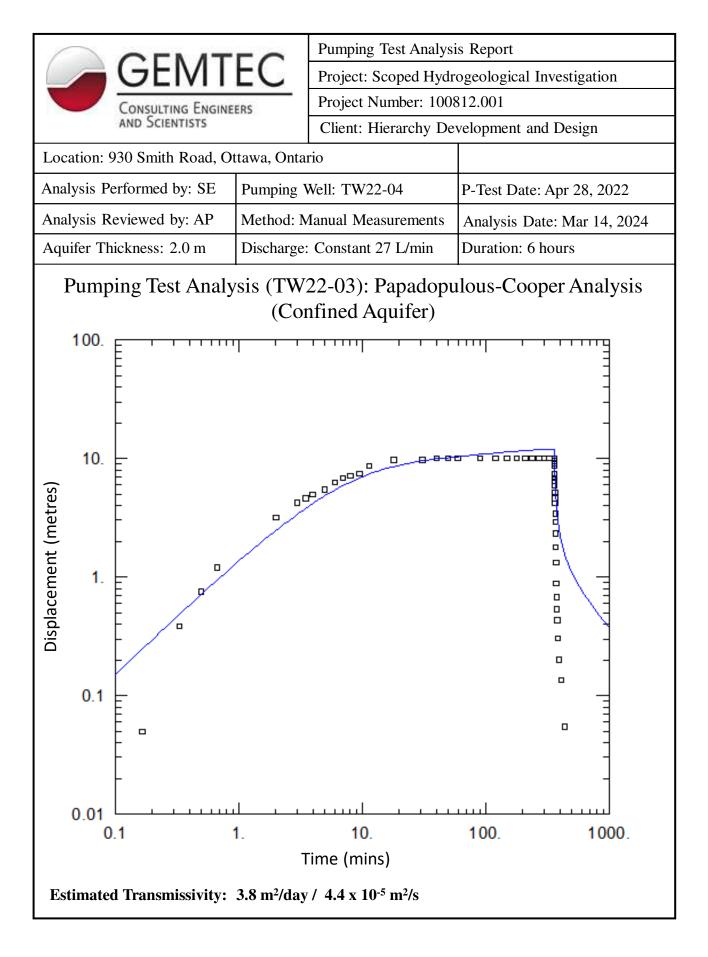
Order Date: 24-Jan-2024

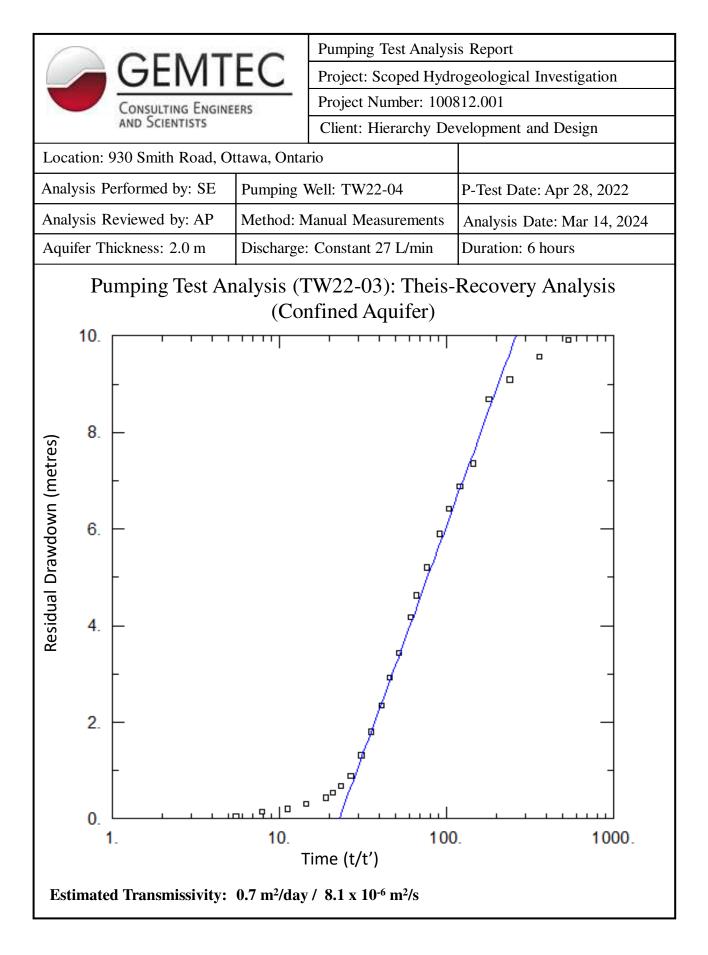
GP	ARAC	C E S	Pa	racel I	D: 2	240	429			rent Bil K1G 4J 7 iellabs. com	/d. 18	Paracel (2404		Number	and the second se			rinki	ing W	usto /ater 95	Sample	25
Client Name:	GENTEC	P	roject Ref:	100,	912	2 .	06	(Water	works Nar	ne:						5	ample	es Take	en By:		
Contact Name:	Andrius Pa	znekas o	Quote #:						Water	works Nur	nber:				Name		1	uc	a j	Fic.	rinc	d i
Address:		p	0#:						Addre	\$5:					Signat	ure:		Se	4	Z		
After Hours Contact:		E	-mail:	andr	ius,	. pa	a 2 n	<u>e</u> Ka	5								Pa		of		_	
elephone:	613-295-	8425 H	ax:	©9	emt	Ł	, C	9	Public	Health Uni	t:				1					e Requ 3 day	uired:	ay
Samples Submitted	Under: (Indicate ONLY on	e)			Sam	ple T	ype: F	R = Ra	w;T = Treat	ted; D =	Distribution	n; P = Plur	mbing		1				_	Analy	+,	
 ON REG 170/0 ON REG 243/0 	3 🛛 ON REG 319/08 7 💐 Othero , 7 29	Derivate Well	2		1				round Wate AWQI repor				ar N -	No				requ	med	Analy	yses	<u> </u>
Have LSN forms bee Are these samples for	n submitted to MOE/MOH or human consumption?: n must be completed b	ILTC?: □ Yes □ □ Yes ☑ No	No 🗹 N/A								OLLECTED	pn - r = re		ine	Flushed: 6 243)	form/E. Coli	НРС	Lead	THM	Waller P	refats	
LOCAT	ION NAME	SA	MPLE ID		Sample Type: R/T/D/P	Source Type: G / S	Reportable: Y / N	Resample	DATE		ТІМ	IE ,	# of Containers	Free/Combined Chlor Residual mg/L	Standing / Flushed: S / F (REG 243)	Total Coliform/E.		-	F	544 21 4 2 1 4 A	Trace 1	
1		TW24	1-4		R	G	N,		2024	01-24	Pe	м,									Х	
2																						
3																				ų		
1																						
5																						
7																			-			-
8								_								-		_		_		_
9								_												_		_
0 mments:																						
Plac	192 include	ectoin	r in	ACI	U	K	70	U							Metho	10	0	K	i	3		
inquished By (Sign): inquished By (Print):	A		Receive Driver/I Date/Ti	Depot:						Received	Bac	or t	1	-	Verifie	d By:	so					
	Juca 7,	orndi	Date/1	me:						Date/Tim	m. a	4.3	24	350	Date/1	ime:	Sa.	24	20	724	4	2.p.
te/Time: 202	4-01-24;	KX.	Temper	ature:				°C		Temperat	ure: 2	5.3		°C	pH Ver	ified:	Ø	By:S	50			

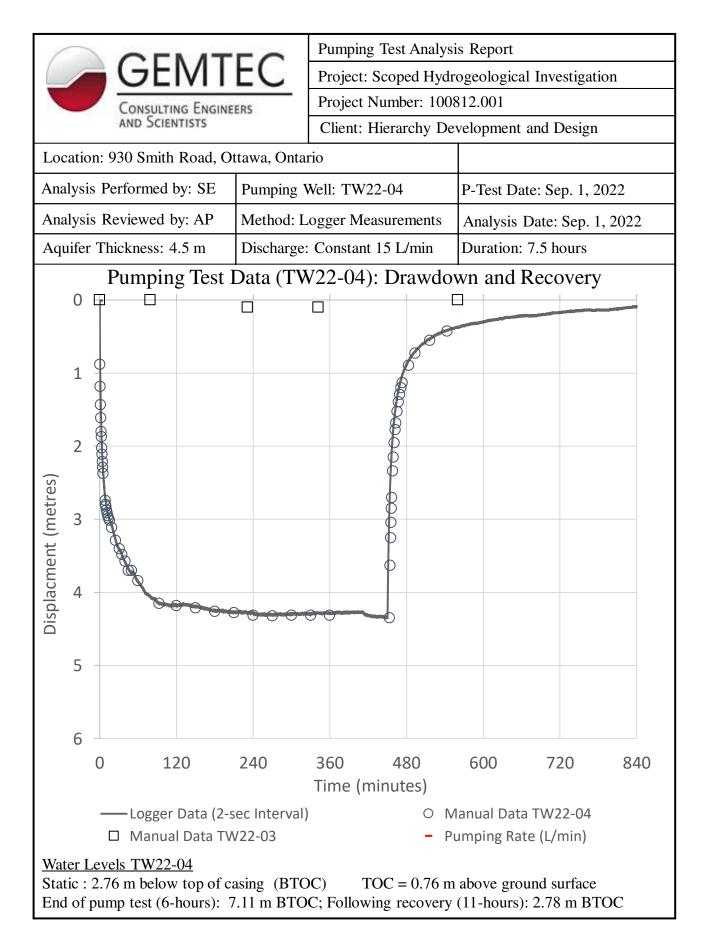
APPENDIX G

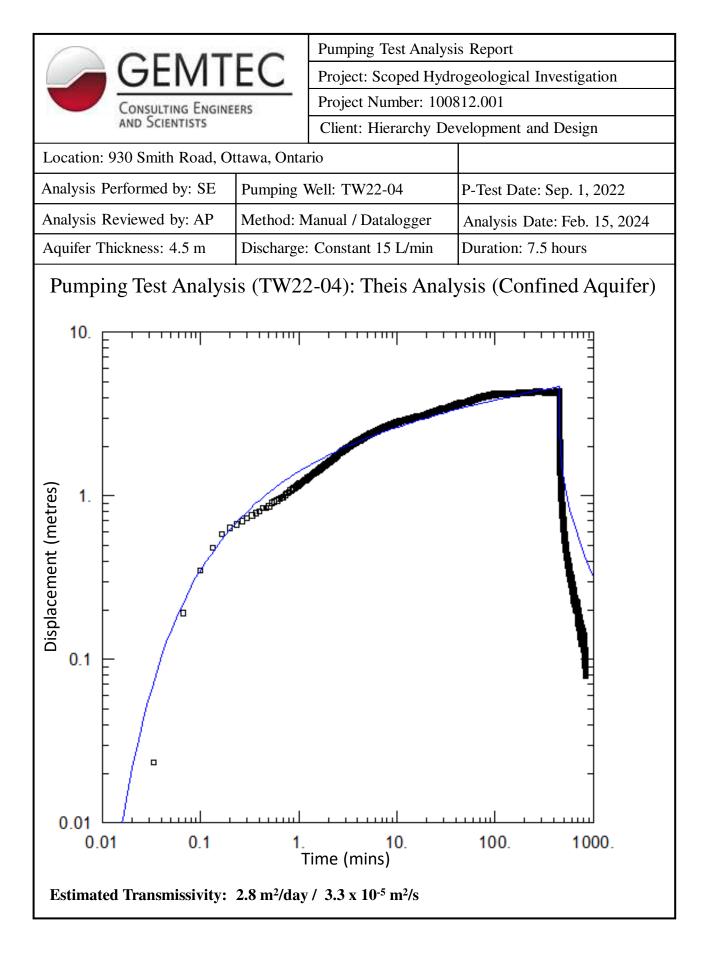
Pumping Tests Analysis

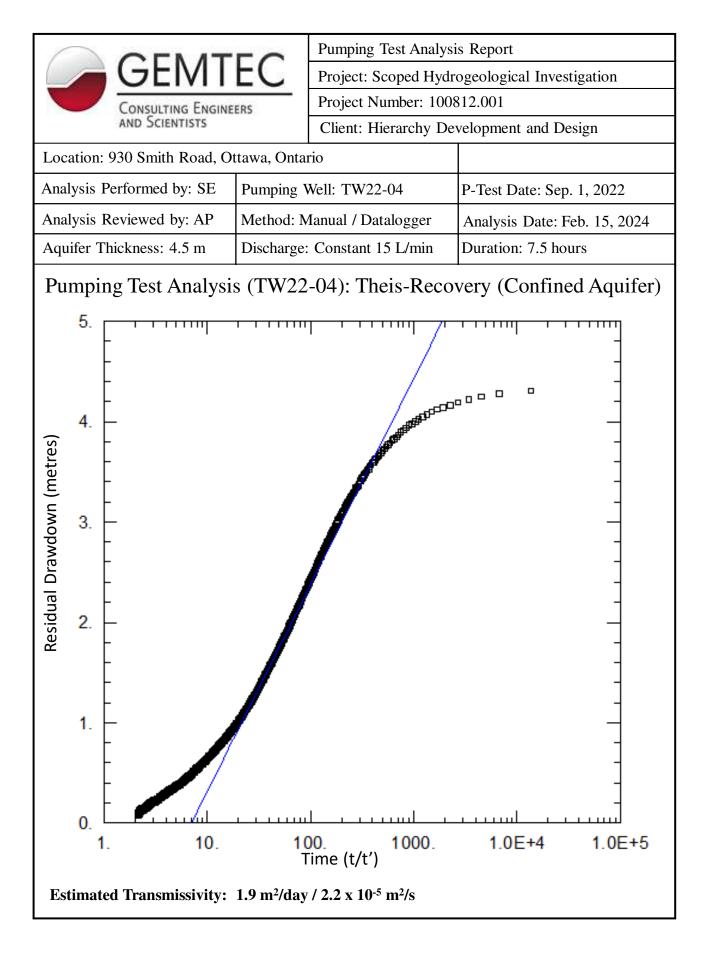


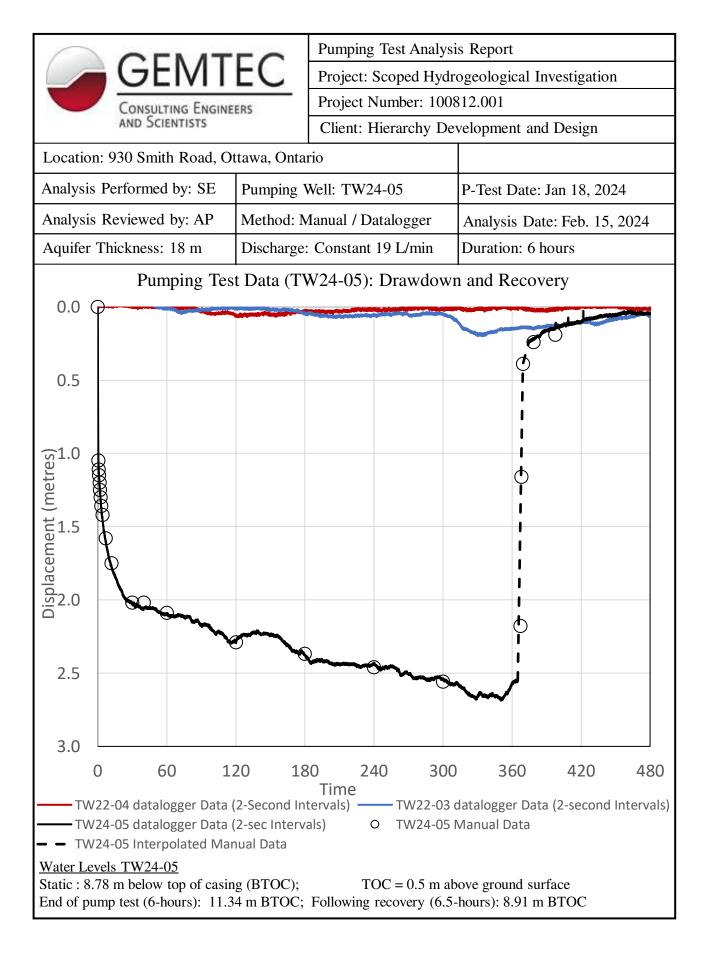


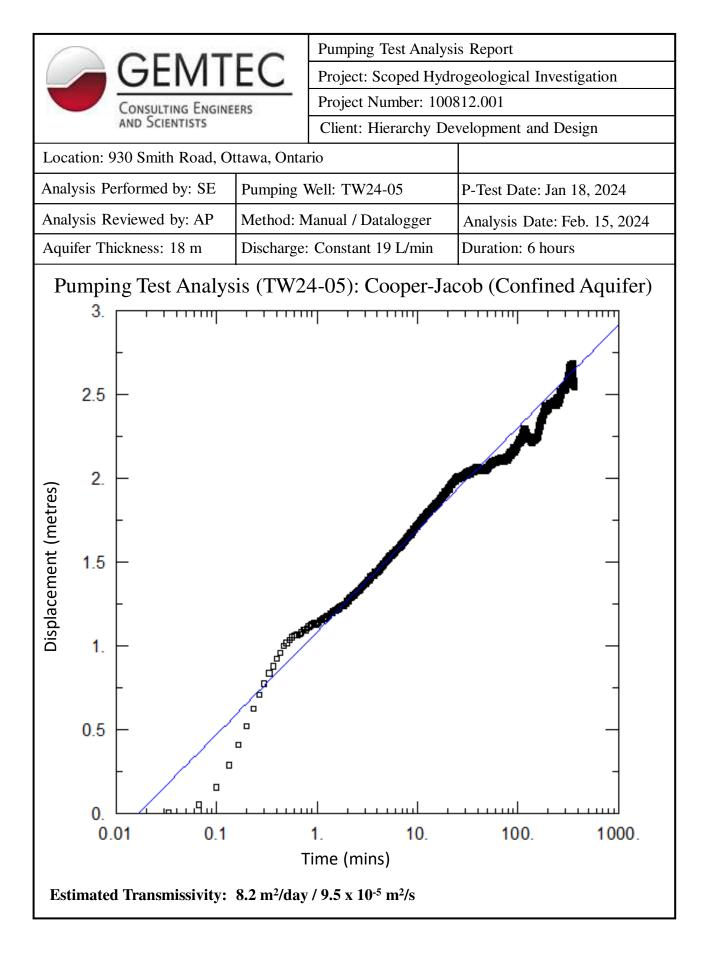


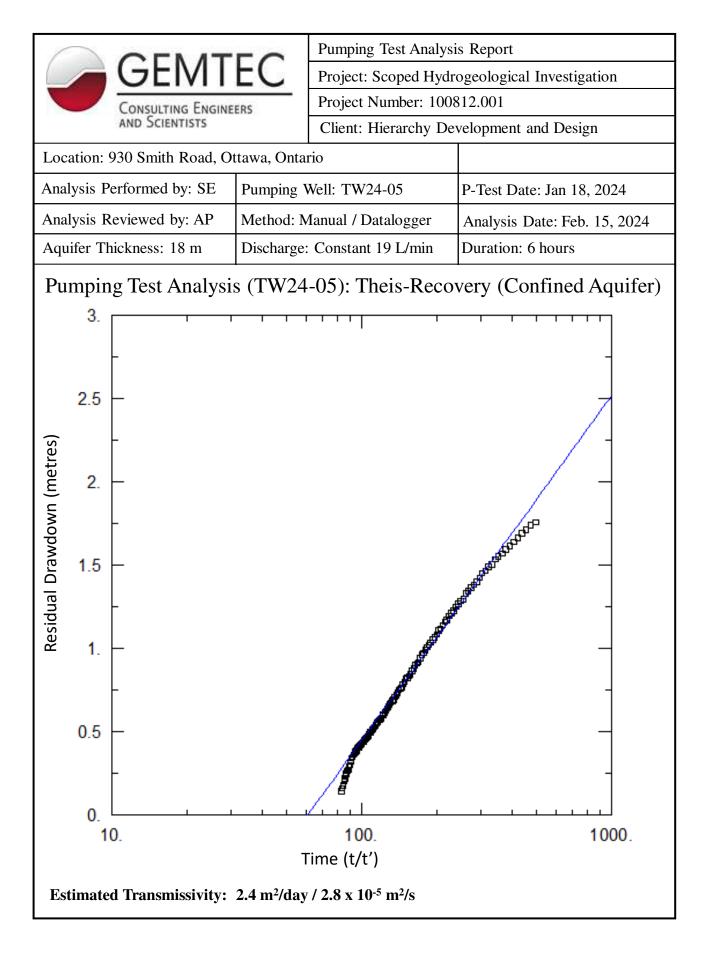












APPENDIX H

Nitrate Dilution Calculations

Nitrate Dilution Calculation Worksheet Entire Parcel with 7 lots - 13.49 acres

Nitrate Loading

Residential Septic Systems (assumes 1,000 L/day/lot) Number of lots with untreated septic systems = Nitrate loading from untreated septic system = Total annual nitrate loading from untreated systems =	7 lots 40 grams/lot/day 102200 grams/year
Total Annual Nitrate Loading from all Systems =	102200 grams/year
Dilution Volumes	
Infiltration Factors Topography factor = Soil factor = Cover factor = Combined infiltration factor = Precipitation Infiltration Annual water surplus = Annual infiltration (Water Surplus x Infiltration Factor) = Infiltration Area and Infiltration Volumes Area available for infiltration (Site Area) = Area available for infiltration (Site Area - Hard Surface Area) = assumes 10%	0.17 0.15 0.1 0.42 0.380 metres/year 0.1596 metres/year 54591.67 square metres 49132.5 square metres
Total Annual Volume of Infiltration (Infiltration x Area) = Annual Flow from Residential Lots (assuming 1000 L/day/lot) =	7842 cubic metres/year 2555 cubic metres/year
Total Annual Volume Available for Dilution =	10397 cubic metres/year
Dilution Calculation	
$C_{Nitrate} = rac{Mass}{Volume} = rac{Annual Nitrate Loading(grams/year)}{Annual Dilution Volume(cubic metres/year)}$	$=rac{grams}{cubic\ metre}=rac{mg}{L}$

C =	102200 grams/year	=	9.83	mg/L
C _{Nitrate} =	10397 cubic metres/year	-	5.05	ing/∟





civil geotechnical environmental field services materials testing civil géotechnique environnementale surveillance de chantier service de laboratoire des matériaux

