



Hydrogeological Assessment Report – Matheson and Rosedale Subdivision, Part Lot 20 Concession 3, Montague, Ontario

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Smart Homes Ottawa Inc. (the Client) to undertake a hydrogeological assessment for a proposed subdivision development located on Part Lot 20 Concession 3, Montague, at the southeast corner of Matheson Drive and Rosedale Road South in the Township of Montague, Ontario (the Site). The regional location of the Site is outlined on Figure 1 and a Site plan is outlined on Figure 2.

The total area of the Site is approximately 23.53 ha (58.15 acres) and is currently comprised of undeveloped agricultural land. It is proposed that the Site will be developed into 41 new residential lots with minimum areas of 0.4 ha (1 acre). A conceptual site plan of the proposed development is included in Appendix A. There are no municipal water or wastewater services available near the property and therefore, the Site has to be privately serviced.

As such, a hydrogeological assessment was undertaken for the required on-site wastewater services and water supply, in accordance with the Ministry of the Environment Guidelines D-5-4 and D-5-5 (Ministry of the Environment, 1996a; 1996b).

The suitability of the development area for on-site disposal of wastewater was determined by identifying and characterizing the native soils and bedrock, the location of the shallow water table, and surficial slopes across the Site. Additionally, a predictive assessment of the attenuation capacity of Site for the potential nitrate contamination from on-site wastewater systems was conducted.

The water supply assessment included the installation and hydraulic testing of test wells and water quality testing of the aquifer to determine the sustainability of on-site groundwater resources. As per D-5-5 guidelines, for a property with a developable area of more than 15 ha and up to 25 ha, a total of four test wells are required to characterize the water supply aquifer at the Site.

Cambium used the results of the wastewater and water supply assessments to calculate the maximum number of residential lots for the Site considering its specific conditions (i.e., soil type, bedrock depth, terrain, and groundwater characteristics).



2.0 Environmental Features

To assess environmental features, databases maintained by the MECP, Rideau Valley Conservation Authority (RVCA), and Ministry of Natural Resources and Forestry (MNR) were reviewed.

Based on this information, the Site is situated within the Rideau River tertiary watershed within the Rideau Valley Source Protection Area, under the jurisdiction of the RVCA (Ministry of the Environment, Conservation and Parks, 2023a).

According to the Regulation Map published by the RVCA (2023), the Site does not contain a regulated area per O.Reg. 41/24 (Prohibited Activities, Exemptions and Permits).

The Site is also not located within any Areas of Environmental Significance or Areas of Natural and Scientific Interests identified by the Natural Heritage System database published by the MNR (2023a). A woodland area is identified in the northeastern portion of the Site (Appendix A).

As per the Source Water Protection Information Atlas published by the MECP (2023a), the Site is situated within a Well Head Protection Area D (WHPA-D) with a vulnerability score of 2, and a Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6 (Appendix A).

Wellhead protection areas are the areas of land surrounding a municipal well which are categorized based on the time it takes for groundwater to travel to the well. Within WHPA-D, contaminated groundwater would take between 5 years and 25 years to reach the protected well (SGBLS, 2015). A vulnerability score of 2 (the second lowest risk category) and the types of land use associated with a residential subdivision indicates the proposed development does not pose a significant risk of source water contamination.

HVAs are aquifers that are more sensitive to contamination. In general, a HVA consists of granular materials (e.g., sand and/or gravel) or fractured rock that has a high permeability and is near the surface of the ground. By default, all HVA's have a vulnerability score of 6. Based on test pit results (Section 4.1), soil thickness is less than 1 m across most of the Site, which



indicates that the default vulnerability score is appropriate for the property and the Site is considered to be hydrogeologically sensitive for the purpose of this assessment.



3.0 Physical Setting

3.1 Topography and Drainage

Topography at the Site gently slopes from the eastern corner to the western corner of the property (Appendix A). Elevations range from 127 meters above sea level (masl) to 118 masl. Rosedale Creek is located approximately 200 m west of the Site.

Surface runoff at the Site is assumed to follow Site topography and flow west and northwest, into Rosedale Creek, ultimately discharging into the Rideau River approximately 4 km from Site.

3.2 Physiography

The Site is located in the physiographic region known as the Smiths Falls Limestone Plain. The Plain is described as the largest and most continuous tract of shallow soil over limestone in Southern Ontario and covers an area of approximately 3,626 km². Notable features of the region include old marine beach deposits in areas of higher relief, low drumlins and scattered till, and deep clay deposits (Chapman & Putnam, 1984).

3.3 Overburden Geology

According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (2010), a portion of the western border of the Site consists of silt and clay, minor sand and gravel, and fine-textured glaciomarine deposits. The remainder of the Site consists of a minimal surficial veneer comprised of topsoil overlaying Paleozoic bedrock.

Soil mapping accessed via the AgMaps website maintained by the Ministry of Agriculture, Food, and Agribusiness (2025) indicates the region, including the entirety of the Site, is characterized by Hydrologic Soil Group B soils of the morainal Farmington and Grenville group orthic melanic brunisols. The soils are characterized by the National Soils Database as well drained, indicating that water is removed from the soil readily, but not rapidly.



3.4 Bedrock Geology

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (2007), the Site is underlain by bedrock of the March Formation, part of the Beekmantown Group. The bedrock of the March Formation is described as sandstone, dolomitic sandstone and dolostone.

Groundwater Resources Study GRS005, published by the Ontario Geological Survey (Brunton & Dodge, 2008) indicates that the Site is not located in an area of known, potential, or inferred karst.



4.0 Test Pit Investigation

Cambium staff completed a test pit investigation at the Site on January 4th, 2024, to assess subsurface conditions at the Site. A total of 18 test pits, designated as TP01-24 and TP18-24, were advanced on the Site to a predetermined depth of 2 meters below ground surface (mbgs) or when refusal was encountered (Embedded Table 1). Test pit locations are shown in Figure 3 and test pit logs are included in Appendix B.

Embedded Table 1 Test Pit Termination Depths

Test Pit	Termination Depth (mbgs)	Termination Material
TP01-24	0.42	Bedrock
TP02-24	2.00	Clay
TP03-24	0.93	Bedrock
TP04-24	0.32	Bedrock
TP05-24	0.14	Bedrock
TP06-24	0.48	Bedrock
TP07-24	0.22	Bedrock
TP08-24	0.34	Bedrock
TP09-24	0.84	Bedrock
TP10-24	0.48	Bedrock
TP11-24	0.64	Bedrock
TP12-24	0.18	Bedrock
TP13-24	1.74	Bedrock
TP14-24	1.08	Bedrock
TP15-24	0.20	Bedrock
TP16-24	0.30	Bedrock
TP17-24	0.27	Bedrock
TP18-24	0.41	Bedrock

4.1 Test Pit Logs

Eight test pits consisted of topsoil underlain by bedrock, nine test pits encountered subsurface soils prior to terminating on bedrock, and one test pit was terminated at the predetermined depth of 2 mbgs.

A summary of general lithological details obtained from the investigation is presented below.



Topsoil

Topsoil material was encountered in all test pits, ranging in thickness of 0.12 to 0.48 m, with an average of 0.23 m. The material was described as a dark brown, silty sand with frequent rootlets.

Subsurface Soils

In ten test pits, subsurface soils were encountered below the topsoil which consisted of brown, moist, sand and silt to silty sand with some clay and gravel and trace boulders, ranging in thickness of 0.02 to 0.81 m with an average thickness of 0.24 m. In TP02-24, TP09-24, TP11-24, TP13-24, and TP14-24, the previous subsurface soil was underlain by grey, wet, silty sand with some clay and trace gravel and boulders, ranging in thickness of 0.10 to 1.24 m with an average thickness of 0.28 m. In the remaining eight test pits, subsurface soils were absent beneath the topsoil.

Bedrock

Bedrock was encountered in all test pits except TP02-24 that was ended at the predetermined termination depth. The bedrock at TP10-24 was fractured and large slabs were removed during excavation before refusal at 0.48 mbgs.

Groundwater

The groundwater conditions at the Site generally consisted of dry to moist soils throughout the entire depth, except for TP02-24, TP06-24, and TP14-24, where wet soils were encountered at depths ranging from 0.45 mbgs to 1.90 mbgs. Water seeping into the pits and pooling at the base was observed during the investigation at TP06-24, TP13-24, and TP14-24.

Cambium notes that groundwater levels at the Site may fluctuate seasonally and in response to climatic events. Like surface drainage, shallow groundwater flow is inferred to follow topography, flowing to the west or northwest.



4.2 Physical Laboratory Testing

Physical laboratory testing, including grain size distribution analysis, was completed on three soil samples to confirm textural classification identified during field logging and obtain percolation rate estimates. Analysis results are based on the Unified Soil Classification System scale. A summary of results is provided in Embedded Table 2. Complete laboratory analysis reports are provided in Appendix C.

Embedded Table 2 Grain Size Distribution Analysis Results

Test Pit	Depth (mbgs)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	T-time (min/cm)
TP02-24 GS1	0.25 – 1.0	Silt and Sand some Clay trace Gravel	2	38	46	14	35
TP09-24 GS 1	0.22 – 0.65	Sand and Silt some Clay trace Gravel	3	43	39	15	35
TP13-24 GS2	0.5 – 1.74	Silty Sand some Clay some Gravel	13	44	32	11	30

Laboratory results are consistent field observations and with the National Soils Database characterization of the soils as allowing water to drain readily, but not rapidly.



5.0 On-Site Sewage Assessment – Subdivision

5.1 Water Balance Assessment

A water balance assessment was completed to determine the potential change in groundwater recharge that could occur due to the proposed development. Generally, any property can be categorized into three broad types of areas: paved, roof, and landscape/vegetated. In the post-development scenario, the amount of paved and roof areas at the Site will increase and the amount of landscape/vegetated area will decrease. This has the potential to impact the amount of water that infiltrates into the ground and is available to replenish natural ground- and surface-water systems, which must be considered as part of the development process.

To compare the difference in infiltration that may result from the proposed development, a water balance calculation was completed to determine the amount of surplus water that is currently generated at the Site. Site characteristics such as surficial soil type, topography, and the amount of pervious and impervious areas were then used to estimate the volume of water infiltrating at the Site. Calculations were completed for both pre-and post-development scenarios, so that a comparison could be made to identify potential changes in infiltration as well as mitigation measures which could be employed to reduce development impacts.

5.1.1 Water Budget and Total Water Surplus

Based on the Thornthwaite and Mather methodology (1957), the water balance is an accounting of water in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can run off towards lakes and streams (R), infiltrate to the groundwater table (I), or evaporate from the ground or be used for transpiration by vegetation (ET). When long-term average values of P, R, I, and ET are used, there is minimal or no net change to groundwater storage (ΔS).

The annual water budget can be expressed as:

$$P = R + I + ET + \Delta S$$

Where:

P = Precipitation (mm/yr)



R = Run-off (mm/yr)

I = Infiltration (mm/yr)

ET = Evapotranspiration (mm/yr)

ΔS = Change in soil water storage (mm/yr)

Total water surplus is defined as the difference between precipitation and evapotranspiration. It is the amount of water per unit area that can either infiltrate into on-site soils or be directed off-site as runoff. An assumption for the calculation of water surplus is that changes in soil water storage are negligible over the course of a year. It is also assumed that the catchment area for the water balance described above is completely contained within Site boundaries (i.e. the model does not account for catchment areas that extend off-site).

To calculate the water surplus the thirty-year climate normal data collected between 1981 and 2010 at the Drummond Center weather station was used. The data was accessed through the Environment Canada website (Environment Canada, 2023). The total yearly precipitation, on average, was 876 mm.

The Thornthwaite method was used to determine the amount of evapotranspiration that will occur at the Site (Dingman, 2008). The calculated depth of evapotranspiration was 520 mm/yr. The water balance calculations are attached in Appendix D. Given these calculations, the water surplus for the Site was determined to be 356 mm/yr.

To determine the fraction of surplus water that infiltrates into the soils on-site, the volume of surplus water is multiplied by an infiltration factor. The infiltration factor varies between 0 and 1 and is estimated based on topography, soils and cover (as per the Stormwater Management Planning and Design Manual (Ministry of the Environment, 2006)). Site specific values are summarized in Embedded Table 3.



Embedded Table 3 Infiltration Factor

Infiltration Factor	
Topography	Hilly to rolling land = 0.15
Soil	Silty Sand = 0.3
Cover	Cultivated land = 0.1
Infiltration Factor (I)	0.55

The annual volume of water that infiltrates at the site is calculated as follows:

$$I (m^3/yr) = Water\ Surplus (m/yr) * Total\ landscape\ area(m^2/yr) * Infiltration\ Factor$$

The annual infiltration at the Site is expected to vary based on a number of factors (i.e. actual precipitation, variation in soil composition, soil compaction, etc.).

The annual runoff that occurs at the Site varies between permeable and impermeable surfaces. On permeable landscape surfaces, the runoff is calculated as the difference between total precipitation and annual infiltration. On impermeable surfaces where there is no infiltration, the runoff is calculated as 90% of precipitation, with the remaining 10% of precipitation lost directly to evaporation.

Annual infiltration and runoff volumes were calculated for the Site for both pre- and post-development scenarios. Details of the calculations are provided in Appendix D. A discussion of the water balance used to calculate the infiltration and runoff volumes for each scenario is provided in Section 5.1.2 and Section 5.1.3.

5.1.2 Pre-Development Water Balance

The water balance for existing conditions at the Site is summarized in Embedded Table 4. The pre-development infiltration and runoff rates were calculated to be 46,848 and 38,330 m³/yr, respectively.



Embedded Table 4 Pre-Development Water Balance

Land Use		Area (m ²)	Precipitation (m ³)	Evapo-transpiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Impervious Areas	Paved Area	-	-	-	-	-
	Roof Area	-	-	-	-	-
Pervious Areas	Landscape Area	235,300	206,123	120,944	46,848	38,330
Total		235,300	206,123	120,944	46,848	38,330

5.1.3 Post-Development Water Balance

The developable area of the Site, as per the draft site plan provided in Appendix A, was considered to determine the post-development water balance. The developable area was calculated as per the assumptions in the preliminary stormwater management report prepared for the Site (Monument Group, 2024). Monument Group calculated the imperviousness of the site following redevelopment with increased hardened surface coverage (i.e. roofs, roads and driveways).

The total Site area (23.53 ha) will be subdivided into 41 residential lots with associated roads and a stormwater management (SWM) pond. Based on the concept plan, the average house size is 240 m² including the garage. An impervious area buffer was also added to consider larger house footprints and outbuildings such as additional residential units, detached garages, or sheds that may be considered at full build out. This impervious buffer was calculated by adding an additional 95 m² to each residential lot.

The total impervious area associated with the dwellings is 1.37 ha. Based on preliminary plans for the stormwater management system, the footprint of the SWM pond was estimated to be 0.9 ha. The impervious area associated with the internal street network is 1.03 ha and corresponds to approximately 1.5 km of 7 m wide paved surfaces. Overall, the total post-development imperviousness calculated in the SWM report was 14% for the total development (3.30 ha).



The water balance for post-development conditions at the Site is summarized in Embedded Table 5. The pre-development infiltration and runoff rates were calculated to be 40,231 and 52,023 m³/yr, respectively.

Embedded Table 5 Post-Development Water Balance

Land Use		Area (m ²)	Precipitation (m ³)	Evapo-transpiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Impervious Areas	Paved Area	10,500	9,198	920	-	8,278
	Roof Area	9,840	8,620	862	-	7,758
	Residential Buffer	3,895	3,412	341	-	3,071
	SWM Pond	9,000	7,884	788	-	-
Pervious Areas	Landscape Area	202,065	177,009	103,861	40,231	32,916
Total		235,300	206,123	106,773	40,231	52,023

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

5.1.4 Water Balance Comparison

A comparison of water balances for the pre-development and post-development scenarios is summarized in Embedded Table 6. Prior to on-site infiltration of additional run-off, there is a net infiltration deficit of approximately 6,617 m³/yr, compared to the pre-development infiltration. The run-off rate upon development of the Site is projected to increase by 13,693 m³/yr.

Embedded Table 6 Water Balance Comparison

	Precipitation (m ³)	Evapotranspiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Pre-Development	206,123	120,944	46,848	38,330
Post-Development	206,123	106,773	40,231	52,023
Change in Volume	-	-14,171	-6,617	13,693
Change in %	-	-12	-14	36

Detailed water balance calculations are given in Appendix D.



5.2 Septic System Impact Assessment

Guideline D-5-4 (Ministry of the Environment, 1996b) outlines a three-step process for assessing potential groundwater impact from individual on-site sewage systems. The first two steps involve lot size and system isolation considerations. If risk is identified through either of these two steps, the assessment must progress to the third step, which is detailed consideration of nitrate loading and contaminant attenuation.

5.2.1 Step One: Lot Size Consideration

As the average lot size is less than 1 ha, it does not satisfy the lot size consideration, and the assessment automatically progresses to Step Two.

5.2.2 Step Two: System Isolation Considerations

Water supply at the Site and surrounding area is predominately sourced from a bedrock aquifer which is overlain by a significant layer of overburden material. Given this information, it is expected that the water supply aquifer will be hydraulically isolated from the proposed septic system at the Site.

However, given the thin soil cover at the Site and limited availability regarding bedrock aquifer hydraulic connectivity with the surface, the Site is considered to be hydrologically sensitive for the purpose of this assessment. Notwithstanding the potential isolation, based on the proposed density of the development, nitrate loading is a consideration for the Site. As such, the assessment progresses to Step Three.

5.2.3 Predictive Assessment

Based on Procedure D-5-4, a proposed lot is anticipated to generate an average discharge of 1,000 L/day of sewage effluent. Total nitrogen (all species) ultimately converts to nitrate through the wastewater treatment process. Nitrate is considered to be the critical contaminant in sewage effluent. A nitrate loading of 40 grams/lot/day is required to be used to determine the effluent loading from conventional septic systems on the receiving groundwater system.



To determine if the lot size is adequate for the Site, a mass balance calculation is used to determine the sewage loading for nitrate on the property boundary. The mass balance calculations employed is:

$$Q_t C_t = Q_e C_e + Q_i C_i$$

Where:

Q_t	=	Total volume ($Q_e + Q_i$)
C_t	=	Total concentration of nitrate at the property boundary
Q_e	=	Volume of septic effluent
C_e	=	Concentration of nitrate in effluent (40 mg/L)
Q_i	=	Volume of available dilution water
C_i	=	Concentration of nitrate in infiltration water (0.1 mg/L)

To determine the concentration of nitrate at the property boundary (C_t), the above mass balance equation is rearranged as:

$$C_t = \frac{Q_e C_e + Q_i C_i}{Q_t}$$

This equation was used to calculate the predicted nitrate concentration at the lot boundary. Calculation results are detailed in Appendix D and summarized in .

Surplus water which infiltrates into the soils on-site will also provide groundwater recharge. Although nitrate is not present in atmospheric precipitation, a value of 0.4 mg/L was used in the calculation for the concentration of nitrate in the infiltration water. This value simulates the long-term contributions of residual agricultural nitrate from historical activities on the Site, and was based on the average groundwater nitrate concentrations measured in the test wells on the undeveloped portions of the Site (Q_i , Section 6.4).



5.3 Available Dilution

Water used for nitrate attenuation at the Site consisted of infiltration through the post-development pervious areas, as well as a portion of the run-off from the residential lots and paved roadways and driveways. Infiltration via post-development pervious areas was determined to be 40,231 m³/yr and no infiltration was assumed within the footprint of the SWM pond as noted in Section 5.1.3.

As the proposed development is a rural subdivision, all run-off from the roof area and residential buffer was assumed to discharge to ground surface via roof downspout disconnection. Simple downspout disconnection involves directing flow from roof downspouts to a pervious area that drains away from the building that prevents stormwater from directly entering the storm sewer system or flowing across a “connected” impervious surface, such as a driveway, that drains to a storm sewer. Simple downspout disconnection requires a minimum flow path length across the pervious area of 5 m. It is also recommended that the area should be tilled to a depth of 300 mm and amended with compost to achieve an organic content in the range of 8 to 15% by weight or 30 to 40% by volume.

As noted in the Low Impact Development Stormwater Management Planning and Design Guide published by Credit Valley Conservation and Toronto and Region Conservation Authorities (2010), a conservative runoff reduction rate estimate for roof downspout disconnection is 25% for hydrologic soil group C and D soils and 50% for HSG A and B soils (assuming disconnections meet the physical suitability and constraints criteria).

The combined run-off from residential roofs and buffer zones is 10,829 m³/yr (Section 5.1.3). As soils at the Site are hydrologic group B soils (Section 3.3), a 50% infiltration rate was applied and post-development infiltration via downspout disconnection was estimated to be 5,414 m³/yr.

As runoff from the roadways and connected driveways at the Site will drain to the unlined ditch network, some of the run-off will infiltrate. Assuming a 50% infiltration rate based on the hydrologic group B soils, post-development infiltration via the drainage ditches would be approximately 3,879 m³/yr. Assuming a more conservative 25% infiltration rate for the ditches



to account for reduced infiltration due to sedimentation or other factors, post-development infiltration via the drainage ditches would be approximately 1,939.5 m³/yr.

Post-development infiltration volumes are summarized in Embedded Table 7. As is often the case with residential redevelopment on formerly agricultural and pastoral lands typified by hydrologic group A and B soils, there is a net increase in post-development infiltration (47,584 vs 46,848 m³/yr). This is due to the reduction in transpiration following vegetation removal combined with an increase in surplus water being directed to the remaining pervious areas. The post-development water balance could be maintained with ditch infiltration efficiency as low as 15%.

Embedded Table 7 Available Dilution Calculations (Post Development)

Post-Development Infiltration	
Pervious Land	40,231 m ³ /yr (110,222 L/day)
Downspout Disconnect (50%)	5,414 m ³ /yr (14,833 L/day)
Roadside Ditches (25%)	1,939.5 m ³ /yr (5,314 L/day)
Volume of Available Dilution Water Per Day	47,584 m³/yr (130,369 L/day)

Details of the predictive assessment considering a range of conditions on the Site are presented in Appendix D and summarized in Embedded Table 8. Based on the predictive assessment, assuming conventional septic beds and infiltration via pervious lands alone, the post-development nitrate concentration would be 11.11 mg/L.

Taking into account additional infiltration via downspout disconnection for all dwellings and 25% infiltration of run-off via unlined ditches, the proposed 41 lots would result in a nitrate concentration of 9.87 mg/L, which is less than the nitrate concentration limit of 10 mg/L at the property boundary, as required by the ODWQA. The proposed development is therefore expected to maintain acceptable nitrate concentrations at property boundaries.



Embedded Table 8 Predictive Assessment of Nitrate Concentration – All Lots

Variable	Value
Number of Lots	41
Q_e (L/day)	41000
C_e (mg/L)	40
Q_i (L/day) (includes downspout disconnection and 25% infiltration via ditches)	130,732
C_i (mg/L)	0.4
Q_t (L/day)	171,732
C_t (mg/L)	9.85

5.4 Conceptual Wastewater System Design

Section 8 of the *Ontario Building Code* (OBC) details the design, construction, operation, and maintenance of sewage systems. No proposed lot specific development information is available at this time. As such, the following assumptions were used in the conceptual on-site sewage system design:

- Four-bedroom dwelling.
- Percolation rate of >50 min/cm (accounts for worst-case soils)
- Minimum lot area of 4,048 m²

According to Table 8.2.1.3.A of the OBC, a four-bedroom dwelling has a daily sewage design flow volume of 2,000 L/day. Based on the design flow for residential occupancy, the proposed septic tank capacity was calculated as follows in accordance with section 8.2.2.3. of the OBC:

$$\text{Volume (V): } V = 2 * Q$$

$$V = 2 * 2,000 \text{ L}$$

$$V = 4,000 \text{ L}$$

A single two compartment septic tank with capacity of 4,500 L would be suitable to achieve the minimal capacity requirements.



The estimated percolation times from the soil samples for the proposed lots across the Site were between 30 and 35. However, bedrock was observed in 17 of 18 test pits, several directly under the topsoil layer, ranging from depths of 0.14 to 1.74 mbgs. As such, a percolation rate of 50 min/cm was considered as a worst case. A conventional leaching bed will require a minimum vertical separation of 0.9 m between the bedrock contact as per the OBC; as such, the proposed leaching beds may be required to be either partly or fully raised.

Considering worst-case conditions ($T > 50$ min/cm, bedrock at the surface, and the smallest proposed lot of 4,048 m²), a conceptual sewage system design using a raised filter bed was explored. The total required footprint is determined by the allowable sewage loading rate based on Table 8.7.4.1. of the OBC. Using a soil percolation time of 50 min/cm, the maximum loading rate is 4 L/m²/day, the following calculations described the required footprint of the conceptual filter bed components:

Effective Filter Area:	$A = Q / 75$
	$A = (2,000 \text{ L/d}) / 75$
	$A = 26.7 \text{ m}^2$
Loading Area:	$A = Q / LR$
	$A = (2,000 \text{ L/d}) / (4)$
	$A = 500 \text{ m}^2$

Based on a daily sewage design flow of 2,000 L/day, the loading area (total footprint) of the proposed raised leaching bed needs to be a minimum of 500 m². Considering worst-case percolation rates for soils and the lot with the smallest area, 3,548 m² would remain for the development of a residential dwelling.

The large area of the Site will provide adequate space for the installation of on-site wastewater treatment systems and should be able to meet the required setback distances (i.e., structures, property lines, wells etc.) outlined in OBC Tables 8.2.1.6.A and 8.2.1.6.B. However, each lot should be considered and evaluated independently for each Site-specific sewage system design. The Site conditions appear feasible to install on-site wastewater systems. Given the



assumed hydrogeological sensitivity of the Site, best management practices should be applied for the design and construction of on-site sewage systems.



6.0 Water Supply Assessment

The results obtained for the water supply assessment are discussed in the following subsections.

6.1 Well Inventory Survey

6.1.1 MECP Well Records Assessment

Cambium accessed the MECP Water Well Information System to review water well records within 500 m of the Site (Ministry of the Environment, Conservation and Parks, 2023b). A total of 58 records were identified, all of which describe drilled wells installed into bedrock. The records identified one abandoned water supply well, one recharge well, and the remaining wells were all water supply wells.

The bedrock lithology for all records were described as limestone or sandstone overlain by clay or sand. Information on well construction varies with well age and driller, but wells generally consist of a stainless steel casing installed at least 6 m into bedrock, with the remaining depth being left as open hole to completion depth in bedrock.

The locations of wells records identified within 500 m of the Site are illustrated in Figure 4. A summary of water well information, including total depth, static water level, and recommended pumping rate, is presented in Embedded Table 9. Further details are provided Appendix E.

Embedded Table 9 MECP Water Well Information Summary

		Depth (mbgs)	Depth Water Found (mbgs)	Static Water Level (mbgs)	Recommended Pumping Rate (L/min)
Bedrock Wells Count = 58	Minimum	12.8	7.6	1.0	12.0
	Maximum	29.9	29.0	14.0	482.0*
	Average	21.7	18.6	6.3	58.7**

* MECP database appears to contain several erroneous pumping rates

** Average rate excludes MECP database results great than 50 imperial gallons per minute



6.1.2 Door-to-Door Well Survey

A door-to-door survey of all accessible properties within 500 m of the property was conducted by Cambium staff on February 9th, 2024, to confirm details in the public record and to identify any wells not included in the MECP records assessment. Thirty properties were visited, and in-person interviews were conducted with available homeowners regarding the condition and details of their water supply well(s), including the method of construction, water level, pump intake, well, and water level depths, water use, and general water quality and well yield.

If a homeowner was unavailable, a letter was left either with an additional resident of the home, or in the mailbox with a pre-paid return envelope. The letter explained the nature of the proposed project and the survey and provided direct contact information for Cambium's project manager.

Details and responses from the well use survey are provided in Appendix E. Generally, survey results indicate that the water supply for the surrounding residences is of good quality, except for hardness. No water quantity issues were noted. No homeowners expressed willingness to have their wells monitored during the pumping test for the proposed development. One residential well completed on a lot previously severed from the Site was included in the water supply investigation, however, which is detailed in the following section.

6.2 Water Supply Well Installation

Three test wells, denoted as TW1, TW2, and TW3, were installed at the Site by AirRock Drilling in January 2024. Pumping tests were completed at all three wells, as well as a residential well (RW1) which was installed at the residential property severed from the northwestern edge of the Site (987 Matheson Drive), to characterize the aquifer as per Guideline D-5-5.

Well records for the test wells and residential well indicate sandstone bedrock was encountered during drilling, with little to no overburden noted. This is consistent with available geological mapping (Section 3.4), as well as the shallow depth to bedrock encountered during



the subsurface investigation at the Site (Section 4.1). Well construction details for the four wells are summarized in Embedded Table 10 and well records are included in Appendix E.

Embedded Table 10 Test Well Construction Details

Well ID	Well Tag Number	Well Diameter (m)	Depth (mbgs)	Casing Stick-up (mags*)	Water Level (mbgs)
TW1	A395660	0.152	24.58	0.52	8.82
TW2	A395658	0.152	25.17	0.60	9.70
TW3	A395659	0.152	31.80	0.55	11.93
RW1	A378942	0.152	22.47	0.68	7.14

**mags = meters above ground surface*

6.3 Hydraulic Pumping Tests

Hydraulic pumping tests were completed by Cambium staff at the four identified wells between February 26th and March 8th, 2024. Prior to the first test, Solinst Leveloggers (loggers) were installed in all wells for the duration of the pumping tests to monitor water levels before, during, and after all tests. Manual measurements were also recorded during the pumping tests to mitigate the possibility of equipment failure.

The test wells were chlorinated on February 9th, 2023, to ensure adequate disinfection within each well. A disinfected submersible pump was then installed in each well prior to testing. Following pump installation, the water level in the test well was allowed to recover to static conditions before pumping began. The pumping rate for each test was controlled by a valve connected to a digital flow meter and water was discharged in a downslope direction approximately 15 m from each test well.

The pumping test at RW1 was completed with the pump previously existing in the well. Pumping was achieved by opening an outside garden tap, with water discharging through a garden hose directed away from the well head area.

Specific details pertaining to each pumping test are described in the following subsections and field parameters measured during the pumping tests are presented in Table 1.



6.3.1 TW1 Pumping Test

The pumping test for TW1 was completed by Cambium staff on February 28th, 2024. Well water levels measured during TW1 pumping test activities are provided in Appendix F.

The static water level in TW1 was 7.95 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 19.5 mbgs. The available drawdown in the well was therefore approximately 11.6 m (height of static water level above pump).

Hydraulic testing began at 9:21 am and ran for a duration of six hours. A pumping rate of 14 L/min was maintained for the majority of the test. The total volume of water discharged from TW1 during the pumping test was approximately 5,000 L.

Water levels in TW1 initially decreased 9 cm during the first 11 minutes of the test, however after this time water levels rose, and were 6 cm higher than static water level at 3:31 pm, the time of pumping cessation. Similar trends of increasing water levels were measured in the other wells monitored during the test (TW2, TW3, RW1), which indicates the presence of background water levels trends that are of greater influence than potential effects from TW1 pumping.

The approximate 5,000 L that was discharged from TW1 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW1 pumping in the other wells monitored during testing activities, indicate that TW1 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

6.3.2 TW2 Pumping Test

The pumping test for TW2 was completed by Cambium staff on February 27th, 2024. Well water levels measured during TW2 pumping test activities are provided in Appendix F.



The static water level in TW2 was 9.26 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 19.5 mbgs. The available drawdown in the well was therefore approximately 10.2 m (height of static water level above pump).

Hydraulic testing began at 9:20 am, at a pumping rate of 14 L/min. At 56 minutes into the test, a rupture in the discharge line occurred down the well and pumping activities ceased. The issue was resolved, and testing resumed at 11:40 am. Pumping continued for 5 hours at a continuous rate of 14 L/m, and then ceased at 4:40 pm. The total volume of water discharged from TW2 during the pumping test was approximately 5,000 L.

Water levels in TW2 initially decreased to a maximum drawdown of 3 cm at 1:07 pm, however after this time water levels rose, achieving pre-test water level conditions by the time of pumping cessation. Similar trends of increasing water levels were measured in the other wells monitored during the test (TW1, TW3, RW1), which indicates the presence of background water levels trends that are of greater influence than potential effects from TW2 pumping.

The approximate 5,000 L that was discharged from TW2 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW2 pumping in the other wells monitored during testing activities, indicate that TW2 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

6.3.3 TW3 Pumping Test

The pumping test for TW3 was completed by Cambium staff on February 26th, 2024. Well water levels measured during TW3 pumping test activities are provided in Appendix F.

The static water level in TW3 was 11.46 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 24.5 mbgs. The available drawdown in the well was therefore approximately 13.0 m (height of static water level above pump).



Hydraulic testing began at 1:52 pm and ran for a duration of six hours at a continuous pumping rate of 14 L/min. Pumping ceased at 8 pm. The total volume of water discharged from TW3 during the pumping test was approximately 5,000 L.

Water levels in TW3 decreased to a maximum drawdown of 2 cm at the time of pumping cessation. A similar trend of 2 cm drawdown was measured in the other wells monitored during the test (TW1, TW2, RW1). Following pumping cessation, water levels rose to 1 cm above pre-test water levels conditions within 8 minutes. No water level changes were noted in the monitoring wells. These results, in combination with the background trends noted during the TW1 and TW2 pumping tests, indicate the presence of background water levels trends that are of greater influence than potential effects from TW3 pumping.

The approximate 5,000 L that was discharged from TW3 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW3 pumping in the other wells monitored during testing activities, indicate that TW3 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

6.3.4 RW1 Pumping Test

The pumping test for RW1 was completed by Cambium staff on March 8th, 2024. Well water levels measured during RW1 pumping test activities are provided in Appendix F.

The static water level in RW1 was 5.81 mbgs prior to commencing the pumping test. The depth of the pump previously installed in the well is unknown but presumed to be approximately 19.5 mbgs. Given this depth, the available drawdown in the well would be approximately 13.7 m (height of static water level above pump).

Hydraulic testing began at 10:14 pm and ran for a duration of six hours. Pumping rates during the test were variable, ranging from approximately 10 to 14 L/min for the first hour, and 18 to



20 L/min for the remaining 5 hours. The total volume of water discharged from RW1 during the pumping test was approximately 6,000 L.

Water levels in RW1 decreased to a maximum drawdown of 10 cm at the time of pumping cessation (4:14 pm), which represents approximately less than 1% of the total drawdown available in the well. Following pumping cessation, water levels in RW1 recovered to pre-test conditions within 23 minutes. A maximum drawdown of 4 cm was also measured in TW1 which was monitored during the test. TW1 water levels regained pre-test conditions within 1 hour following pumping cessation.

The approximate 6,000 L that was discharged from RW1 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the dominant pumping rate of 18 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to RW1 pumping in the other wells monitored during testing activities, indicate that RW1 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

6.4 Groundwater Quality Analysis

Unfiltered groundwater samples were collected from TW1, TW2, TW3, and RW1 during the last 30 minutes of the pumping test conducted on each well. Residual chlorine concentrations in the wells were measured to be less than 0.01 mg/L prior to sampling. All samples were submitted for analysis of general organic and inorganic chemistry to Bureau Veritas in Mississauga, Ontario, which is accredited by the Canadian Association for Laboratory Accreditation Inc. Samples were stored at a temperature between 0 and 10 °C prior to and during transport.

Water quality results were compared against the ODWQS criteria for parameters outlined in Guideline D-5-5 Tables 1, 2, and 3 (Ministry of the Environment, 1996b). A complete summary of water quality results and certificates of lab analyses are provided in Appendix G.



Parameters reported at concentrations exceeding ODWQS criteria are outlined in Embedded Table 11.

Embedded Table 11 Summary of ODWQS Exceedances

Parameter	Units	ODWQS Criteria	TW1	TW1R	TW2	TW3	RW1
Hardness (as CaCO ₃)	mg/L	80-100 (aesthetic/operation guideline)	190	323	210	300	260
Total Coliforms	CFU/100 ml	0	27		0	0	0

Hardness was the only parameter with measured concentrations exceeding ODWQS criteria in all wells. Hardness is an aesthetic/operational parameter which is typically elevated in limestone bedrock aquifers and is readily amenable with a conventional water softening unit.

Nitrate concentrations in groundwater samples from test wells on the undeveloped portions of the Site were 0.26 mg/L (TW1), 0.30 mg/L (TW2), and 0.64 mg/L (TW3). The nitrate concentration in the groundwater sample from the well at 987 Matheson Drive was 1.79 mg/L. This is consistent with nitrate results obtained for other lots on the perimeter of the Site reported by Macintosh Perry (2022), which reported a nitrate concentration of <0.1 mg/L in the water supply well at 999 Matheson Drive, and 1.9 mg/L at 862 Rosedale Road.

All wells are completed at similar depths within the local bedrock aquifer. Detectable nitrate in most wells suggests that there is incomplete hydraulic separation between the surface and the water supply aquifer.

Low nitrate concentrations observed in the on-site test wells are inferred to be the result of historical agricultural land use at the Site. Change in land use at the Site will remove this agricultural nitrate source and groundwater concentrations are anticipated to decline to the rainwater/snow melt nitrate concentration of <0.1 mg/L. To simulate the long-term mobilization of residual agricultural nitrate by water infiltrating through the unsaturated zone, a background concentration equal to the average nitrate concentration of the on-site test wells (0.4 mg/L) was used in the nitrate attenuation predictive assessment (Section 5.2).



Elevated concentrations in the groundwater samples from water supply wells tested at the existing residential properties along the perimeter of the Site suggest that nitrate will increase in the water supply aquifer following installation of septic systems. Results suggest the long-term concentration under lots with on-site septic beds is <2 mg/L.

Hardness was the only parameter with measured concentrations exceeding ODWQS criteria in TW1. A maximum treatable value is not available, however, water with a hardness value of more than 300 mg/l is generally considered "very hard". The Ontario Drinking Water Objectives states that "waters with hardness in excess of 500 mg/l are unacceptable for most domestic purposes". Where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.

Langelier Saturation Index (LSI) results for the test well water samples indicate the local groundwater is generally supersaturated with respect to calcium carbonate (CaCO_3) and scale forming may occur. LSI results are generally between 0 and 0.7, indicating water is slightly to somewhat scale forming and non to slightly corrosive. This is supported by calculated Ryznar Stability Index results between 6 and 8, which indicate water has a low to moderate potential for scaling and corrosion. Although total dissolved solid concentrations are low to moderate and pH is within the ODWQS range, drinking water systems installed on the Site should be designed by a qualified professional to control pH, scaling, and corrosion.

6.4.1 Total Coliforms

As noted in Embedded Table 11, total coliforms were detected in the water sample collected from TW1. Cambium staff returned to Site on June 12, 2025, to shock chlorinate and resample the well. Field parameters measured during the pumping are summarized in Table 2.

A disinfected pump was installed in TW1, then approximately 600 ml of chlorine bleach was mixed with 25 L of water and poured into the test well. Water was recirculated within TW1 for 60 minutes, then water was purged to ground surface for 5 hours and 20 minutes at a rate of approximately 20 L/minute until the residual chlorine was less than the field meter's detection limit (<0.05 mg/L). A water sample was collected at the end of the purging and analysed for the "subdivision suite" of drinking water quality parameters, including total coliforms. All



parameters in TW1 met the ODWQS criteria except hardness. Laboratory results are presented in Appendix G, and summarized in Embedded Table 12.

Embedded Table 12 Summary of ODWQS Exceedances – TW1 Resampling

Parameter	Units	ODWQS Criteria	TW1
Hardness (as CaCO ₃)	mg/L	80-100 (aesthetic/operation guideline)	323
Total Coliforms	CFU/100 ml	0	0

6.5 Hydrogeological Sensitivity

The test pits and terrain analysis (Section 4.0) indicate that surficial soil thickness varies across the Site, and areas of exposed bedrock are present in the southeast corner of the development. This is consistent with the Site's designation as being with an HVA, and the Site is considered potentially hydrogeologically sensitive due to the thin layer of soil cover over bedrock in some areas, which reduces the potential filtration of contaminants. In order to protect and minimize adverse impacts to the environment and water supply aquifer, Cambium recommends that future water supply wells are installed in accordance with the requirements and best practices for water supply wells set out by the MECP (2015).

6.5.1 Well Construction

All wells to be installed in the proposed subdivision must be installed by a licensed well contractor in accordance with O.Reg. 903. Water supply wells must be constructed up gradient of the septic system location(s), with a minimum 30 m separation between water supply wells and septic systems to minimize potential risk. Cambium notes the RVCA recommend a minimum 50 m separation. No watercourses were identified on the Site, but Cambium notes the RVCA also recommends a 30 m separation distance between wells and any water course. Given the general slope of the Site from southeast to northwest (Appendix A), and the lots are generally oriented perpendicular to the slope, Cambium recommends that septic beds are



located on the downgradient side (W/NW corner) and water supply wells in the upgradient side (E/SE corner) of each lot

Due to the shallow depth to bedrock at the Site, Cambium recommends that stainless steel well casing be installed and grouted into place at least 4 m into competent bedrock or to a minimum depth of 12 m, whichever depth is greatest. The annular space between the well casing and the borehole should be sealed with a suitable strength cement grout to prevent preferential flow through the well annular space. Cambium notes that O.Reg. 903 requires installation of a suitable sealant around the base of the well casing where it intersects the bedrock. Once the grout has set, drilling can continue.

All wells must be completed with a vented and vermin proof well cap and the well casing must extend at least 0.4 m above ground surface, and the ground surface must be graded away from the well.

Once completed wells should be pumped to develop the aquifer, then a chlorine-based disinfectant should be introduced such that the free chlorine concentration in the entire water column in the well is at least 50 mg/L.

A licensed (Class 4) well contractor should complete the well with a submersible pump and pitless adaptor, then the well should be disinfected a second time as described above.



7.0 Conclusions and Recommendations

Cambium was retained by the Client to complete a hydrogeological assessment for a proposed rural subdivision in the Township of Montague, Ontario, to demonstrate whether water and wastewater services for the facility can be provided in accordance with the D-5-4 and D-5-5 Guidelines without adversely impacting existing development in the surrounding area.

7.1 Wastewater Assessment

A soils investigation completed at the Site indicates the subsurface consists of a thin layer of sand and silt to silty sand which is underlain by shallow bedrock. Soil sample analysis indicates the sand and silt/silty sand has estimated percolation times (T times) ranging from 30 to 35 min/cm, which reflects moderate capacity for water to infiltrate into the shallow subsurface environment.

A nitrate impact assessment given an average daily septic flow of 1,000 L/day for each lot predicts that the post-development nitrate concentration for 41 lots within the 23.53 ha developable area (assuming conventional septic beds and infiltration via pervious lands alone), would be 11.11 mg/L.

Taking into account additional infiltration via downspout disconnection for all dwellings and 25% infiltration of run-off via unlined ditches, the proposed 41 lots would result in a nitrate concentration of 9.87 mg/L, which is less than the nitrate concentration limit of 10 mg/L at the property boundary, as required by the ODWQA. The proposed development is therefore expected to maintain acceptable nitrate concentrations at property boundaries.

The conceptual wastewater design indicates that shallow soils at the Site may require raised filter beds as part of the private wastewater systems. The required footprint for a raised filter bed was calculated to be 500 m², leaving at minimum 3,548 m² of available area for development (estimated using the smallest proposed lot). Each lot should be considered and evaluated independently for each site-specific sewage system design. The Site conditions appear feasible to install on-site wastewater systems. Given the hydrogeological sensitivity of the Site, best management practices should be applied for the design and construction of on-



site sewage systems. Given the general slope of the Site from southeast to northwest (Appendix A), and the lots are generally oriented perpendicular to the slope, Cambium recommends that septic beds are located on the downgradient side (W/NW corner) and water supply wells in the upgradient side (E/SE corner) of each lot.

7.2 Water Supply Assessment

Hydraulic testing of the three on-site wells (TW1, TW2, and TW3) and one residential well (RW1) located on the adjacent severed parcel was completed between February 26th and March 8th, 2024. A minimum discharge rate of approximately 14 L/min was maintained for 6 hours, during all tests, which resulted in a minimum of approximately 5,000 L being pumped from each well. Water level drawdown was negligible (i.e. < 0.1 m) in all test and observation wells.

Water quality samples collected from all four wells indicate water from the supply aquifer is of good quality, with only hardness exceeding ODWQS guidelines in all wells. This parameter is readily amendable with standard water treatment systems.

Total Coliforms were measured to be elevated above ODWQS guidelines in TW1. Cambium staff returned to Site to shock chlorinate and resample the well for the “subdivision suite” of drinking water quality parameters, including total coliforms. All parameters in TW1 met the ODWQS criteria except hardness.

Based on the pumping test and water quality results, it is anticipated that all test wells can sustainably provide a sufficient quantity of potable water to meet the daily demand for a residential dwelling without detrimental effect to surrounding water users.

Given the hydrogeological sensitivity of the Site, best management practices should be applied for the design and construction of water supply wells to minimize the potential impacts of Site development on the water supply aquifer.



8.0 Closing

We trust that the information in this submission meets your current requirements. If you have any questions regarding the contents of this report, please contact the undersigned.

Respectfully submitted,

Cambium Inc.

DocuSigned by:

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2025-06-27

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10.0 Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

Reliance on Materials and Information

The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

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When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

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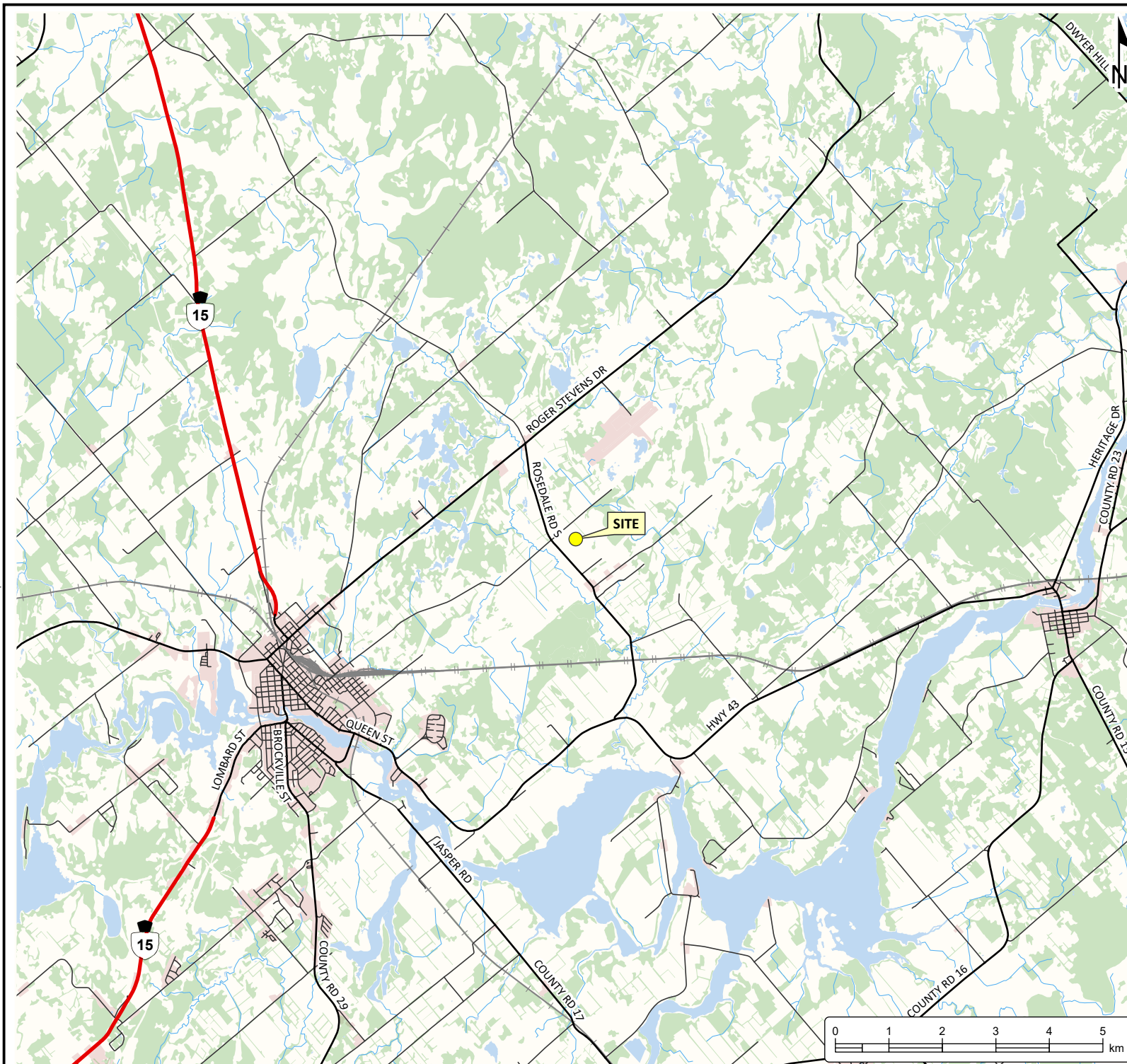
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Appended Figures



LEGEND

-  Highway
-  Major Road
-  Minor Road
-  Railway
-  Watercourse
-  Water Area
-  First Nations Reserve
-  Provincial Park
-  Wooded Area
-  Built Up Area

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SITE LOCATION PLAN

Project No.: 19387-001		Date: July 2024 Rev.:
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 18N
Created by: DBB	Checked by: KH	Figure: 1



**HYDROGEOLOGICAL
ASSESSMENT REPORT**
SMART HOMES OTTAWA INC.
Part Lot 20 Concession 3
Montague, Ontario

LEGEND

Site (approximate)

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SITE PLAN

Project No.: 19387-001	Date: December 2024
Scale: 1:4,250	Rev.: NAD 1983 UTM Zone 18N
Created by: DBB	Checked by: KH
Figure: 2	



**HYDROGEOLOGICAL
ASSESSMENT REPORT**
SMART HOMES OTTAWA INC.
Part Lot 20 Concession 3
Montague, Ontario

LEGEND

- Test Well
- Residential Well
- Test Pit
- Site (approximate)

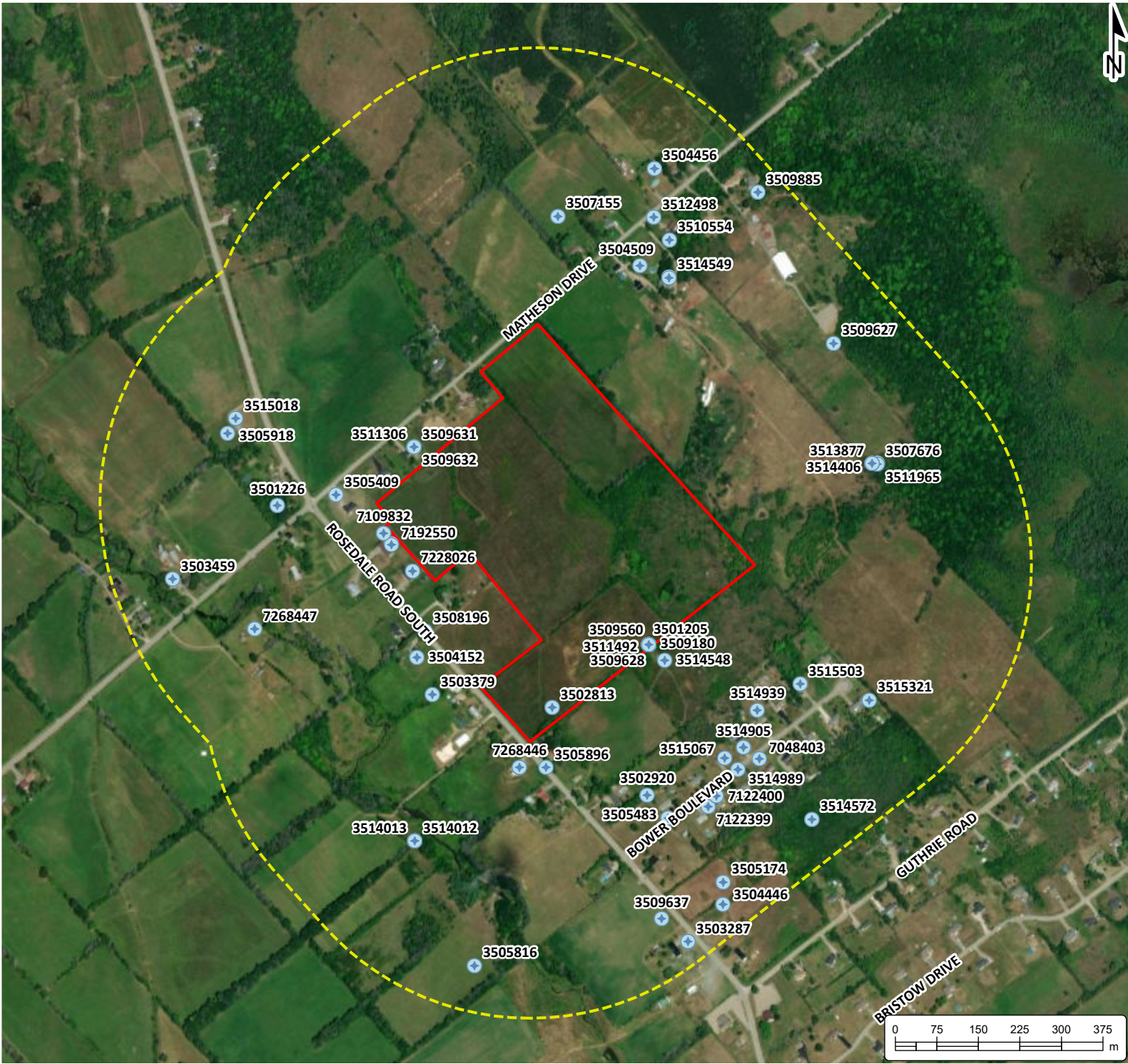
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**TEST PIT AND
TEST WELL LOCATION PLAN**

Project No.: 19387-001	Date: December 2024
Scale: 1:4,250	Rev.: NAD 1983 UTM Zone 18N
Created by: DBB	Checked by: KH
Figure: 3	



**HYDROGEOLOGICAL
ASSESSMENT REPORT**
SMART HOMES OTTAWA INC.
Part Lot 20 Concession 3
Montague, Ontario

LEGEND

- Water Well Record
- Study Area (500m)
- Site (approximate)

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**MECP WELL RECORDS
WITHIN 500m**

Project No.: 19387-001	Date: July 2024
Scale: 1:9,750	Rev.: Rev.
Created by: DBB	Checked by: KH
Figure: 4	



Appended Tables



Table 1 Pumping Test Field Parameter Field Measurements

Parameter	Units	Time				
		Hour 1	Hour 2	Hour 3	Hour 4	Hour 5
		TW1 - 28 Febuary 2024				
pH		6.67	7.01	6.92	7.28	7.17
Electrical Conductivity	µS/cm	405	411	414	421	418
Temperature	°C	10.3	11.3	11.1	12.1	11.7
Chlorine	mg/L	0.12	0.06	0.05	0.05	<0.05
Turbidity	NTU	0.69	0.62	0.65	0.32	0.41
		TW2 - 27 Febuary 2024				
pH		-	6.71	7.05	7.21	7.27
Electrical Conductivity	µS/cm	-	578	518	460	546
Temperature	°C	-	14.2	13.4	13.2	12.8
Chlorine	mg/L	-	0.06	0.08	<0.05	<0.05
Turbidity	NTU	-	1.58	0.95	1.05	1.07
		TW3 - 26 Febuary 2024				
pH		6.87	7.09	-	7.13	7.2
Electrical Conductivity	µS/cm	884	985	-	908	800
Temperature	°C	11.5	11	-	8.5	7
Chlorine	mg/L	0.09	<0.05	-	<0.05	<0.05
Turbidity	NTU	2.29	0.87	-	0.85	0.83
		RW1 - 8 March 2024				
pH			7.32	7.14	7.13	7.11
Electrical Conductivity	µS/cm	1480	752	808	752	797
Temperature	°C	12.8	9.1	10.3	10.9	10.2
Chlorine	mg/L	1.77	0.16	<0.05	<0.05	<0.05
Turbidity	NTU	0.98	0.71	0.81	0.48	0.84



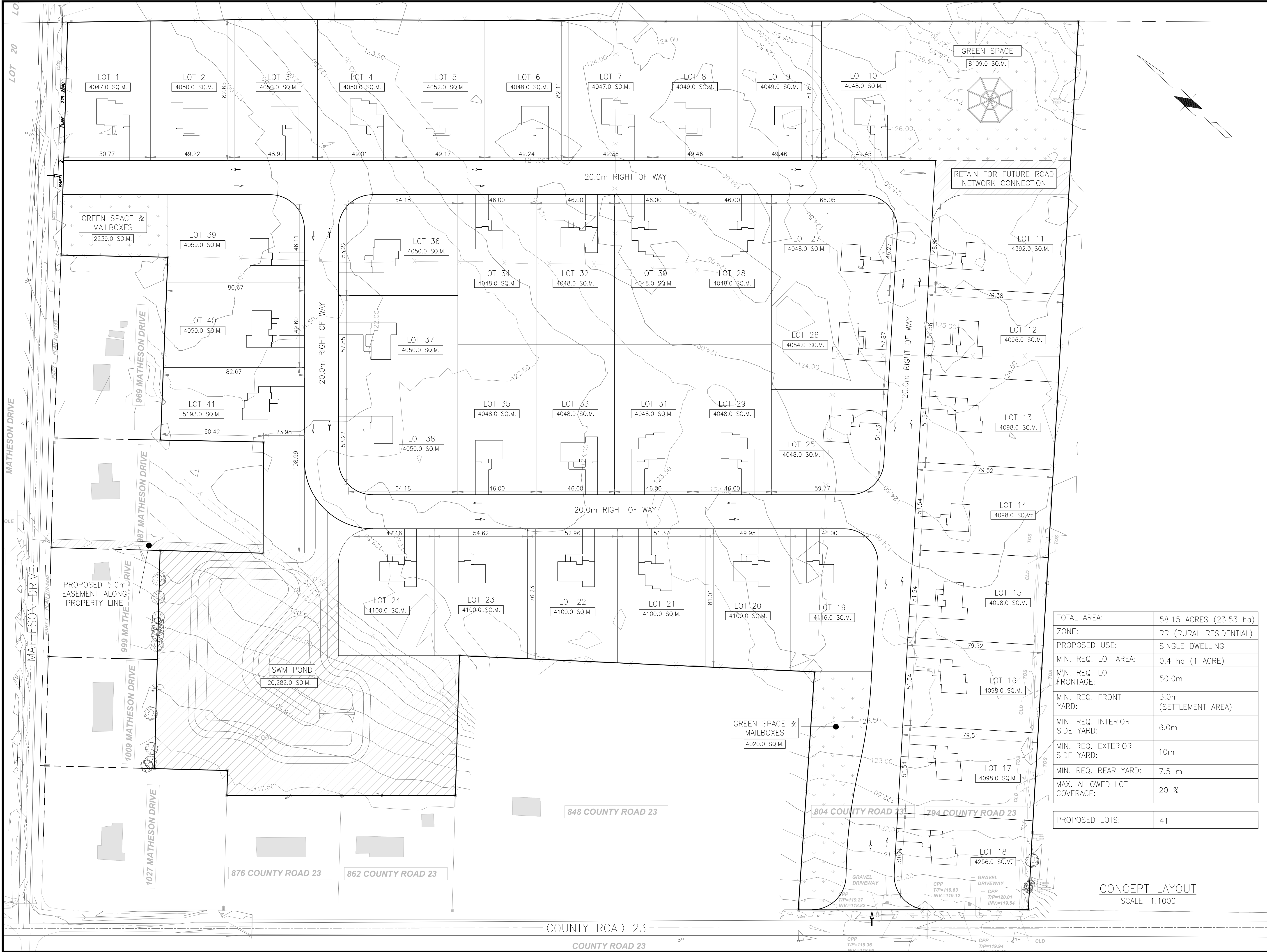
Table 2 TW1 Re-Test Field Parameter Field Measurements

Parameter	Units	Time										
		11:07	11:37	11:52	12:07	12:37	13:07	15:20	15:40	15:50	16:07	16:27
		TW1 -12 June 2025										
pH		7.02	6.98	7.22	7.46	7.23	7.31	7.12	7.18	7.21	7.16	7.18
Electrical Conductivity	µS/cm	707	553	561	560	556	552	534	551	552	558	556
Temperature	°C	16.5	15.5	15.3	15.6	15.5	15.4	15.9	15.8	15.7	15.1	15.1
Chlorine	mg/L	>2.5	0.28	0.26	0.24	0.21	0.18	<0.05	<0.05	<0.05	<0.05	<0.05
Turbidity	NTU	19.5	24.3	14.2	10.8	5.56	4.31	3.37	3.28	3.27	4.22	4.34



Appendix A

Property and Land Information



TOTAL AREA:	58.15 ACRES (23.53 ha)
ZONE:	RR (RURAL RESIDENTIAL)
PROPOSED USE:	SINGLE DWELLING
MIN. REQ. LOT AREA:	0.4 ha (1 ACRE)
MIN. REQ. LOT FRONTAGE:	50.0m
MIN. REQ. FRONT YARD:	3.0m (SETTLEMENT AREA)
MIN. REQ. INTERIOR SIDE YARD:	6.0m
MIN. REQ. EXTERIOR SIDE YARD:	10m
MIN. REQ. REAR YARD:	7.5 m
MAX. ALLOWED LOT COVERAGE:	20 %
PROPOSED LOTS:	41

CONCEPT LAYOUT
SCALE: 1:1000

USE AND INTERPRETATION OF DRAWINGS:
DRAWINGS ARE NOT TO BE SCALED.
BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER REPRESENTS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR REPRESENTS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
THIS DRAWING ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THIS DRAWING EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK.
UNAUTHORIZED CHANGES:
IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY EFI WITHOUT OBTAINING EFI'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST EFI AND TO RELEASE EFI FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH CHANGES.
IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS EFI FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.
IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO EFI'S CONSTRUCTION DOCUMENTS WITHOUT PRIOR WRITTEN APPROVAL OF EFI AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH EFI AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

REFERENCES			
NO. REF.	NO. DWG.	TITLE	BY
1			
2024-11-18	G	ISSUED FOR DRAFT PLAN	KT
2024-09-27	F	REDUCED LOTS	KT RS
2024-08-30	E	MISC. REVISION	KT RS
2024-06-10	D	REVISED LAYOUT	KT RS
2024-05-23	C	REVISED W/ 20m ROW	KT RS
2024-02-05	B	REVISED FOR REVIEW	KT RS
2023-12-15	A	ISSUED FOR REVIEW	KT RS
DATE	REV.	REVISIONS	BY APP'D

DRAWING ISSUED FOR:
DATE: 2024 NOVEMBER 18
☐ CLIENT REVIEW ☐ BID/TENDER ☐ CONSTRUCTION
☐ INFORMATION ☒ PERMIT ☐ OTHER

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www.efiengineering.com

ARCHITECT:

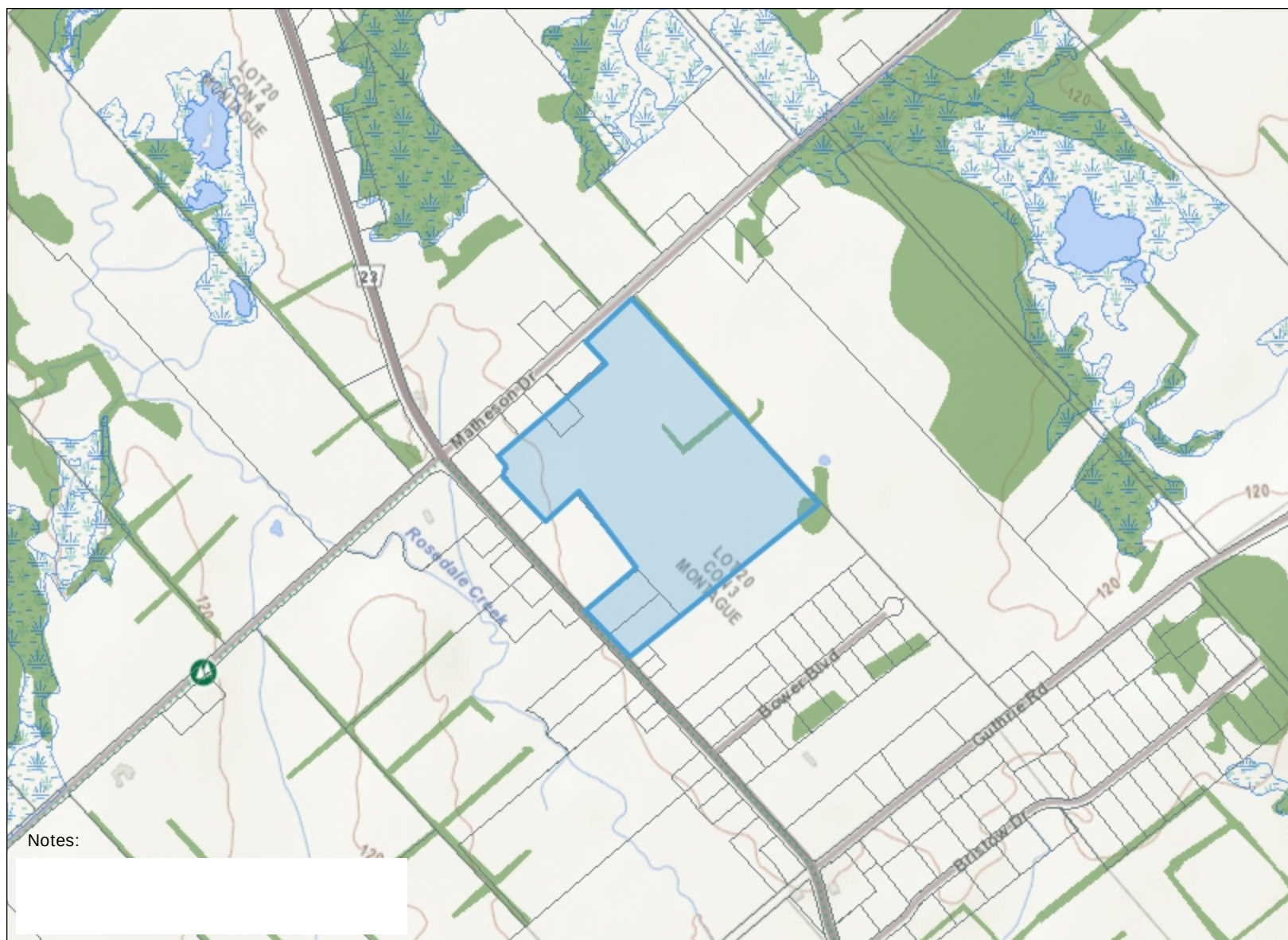
CLIENT: SMART HOMES OTTAWA
6610 FOURTH LINE RD,
NORTH GOWER, ON
K0A 0B5

SITE: ROSEDALE DR SOUTH/ MATHESON DR

TITLE: SUBDIVISION CONCEPT LAYOUT PLAN			
SCALE: AS SHOWN	DATE: 2023/12/08	DRAWN: KT	CHECKED: RS
PROJECT NO: 23-7213	DRAWING NO: 1	REVISION: G	

Natural Heritage Areas Map

Map created:1/11/2024



Notes:

0.6 0 0.32 0.6 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

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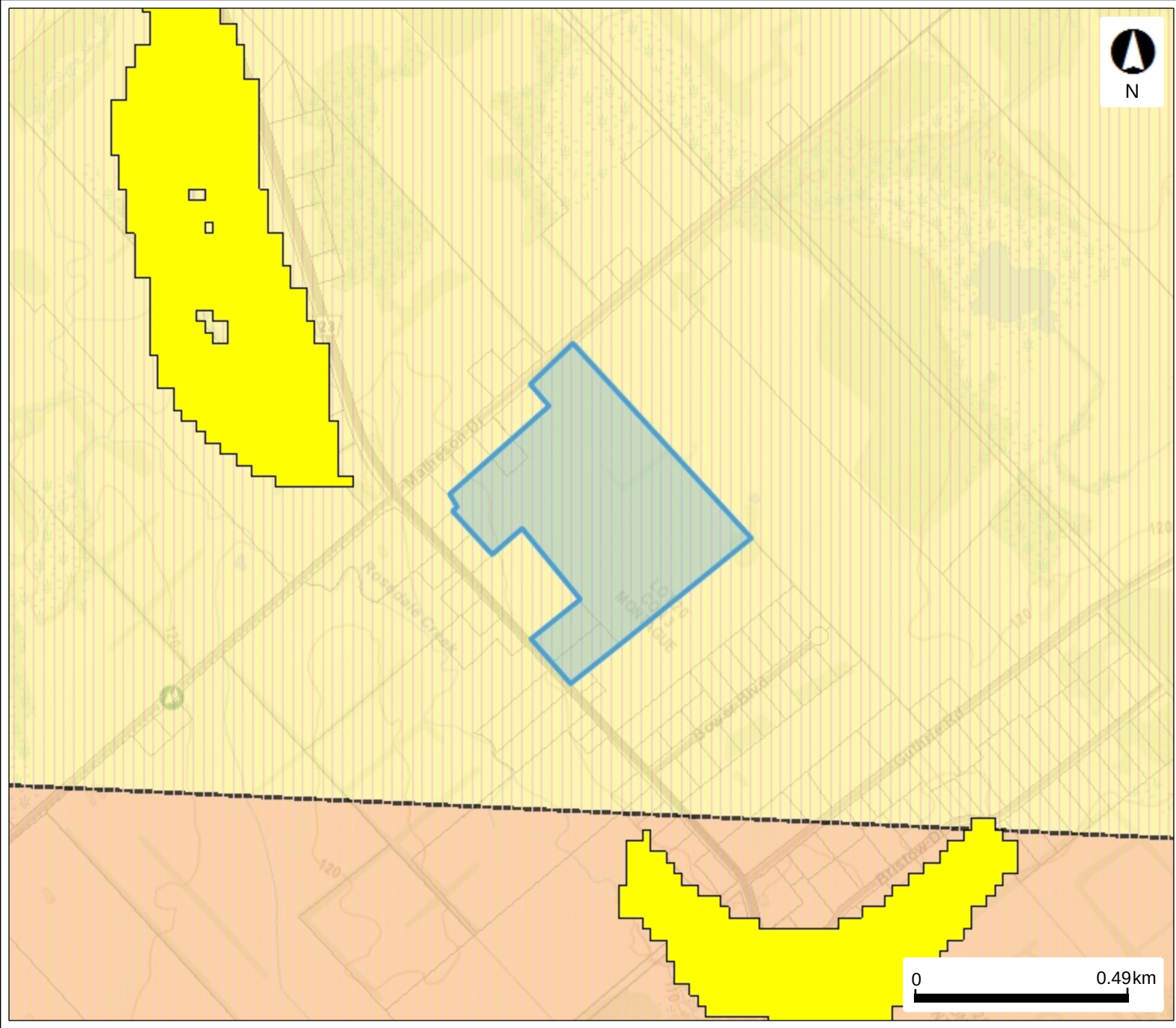
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Legend

-  Assessment Parcel
-  Earth Science Provincially Significant/sciences de la terre d'importance provinciale
-  Earth Science Regionally Significant/sciences de la terre d'importance régionale
-  Life Science Provincially Significant/sciences de la vie d'importance provinciale
-  Life Science Regionally Significant/sciences de la vie d'importance régionale
-  Evaluated Wetland
-  Provincially Significant/considérée d'importance provinciale
-  Non-Provincially Significant/non considérée d'importance provinciale
-  Unevaluated Wetland
-  Woodland
-  Natural Heritage System



Source Protection Information Atlas Map



- Legend**
- Significant Groundwater Recharge Area**
- N/A
 - 0
 - 2
 - 4
 - 6
- Highly Vulnerable Aquifers**
- Wellhead Protection Area**
- A
 - B
 - C
 - C1
 - D
 - F
- Assessment Parcel**

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AgErosion Watershed Map - Matheson Subdivision Hydrologic Soil Groups



Map Layers

Watershed Area
Hectares

Watershed Length
Meters



0 1.0 km



Map Created : 5/14/2025
Map Center: 44.93017 N, -75.95694 W

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Appendix B

Test Pit Logs



Cambium Reference # 19387-001

Date: Jan. 04. 2024

Weather: Sunny, windy, -10 °C

Logged by: MC

Test Pit ID	Depth (mbgs ¹)	Material	Sample
TP01-24	0.00-0.15	Topsoil	
	0.15-0.42	Brown silty sand, some gravel, trace boulders, moist, rootlets, loose	GS1
18T			
424661		Ended on bedrock at 0.42mbgs	
4975427			
TP02-24	0.00-0.25	Topsoil	
	0.25-1.00	Brown silt and sand, some clay, trace gravel, moist, rootlets, loose	GS1
18T	1.00-1.90	Brown silty sand mixed with grey clay, moist, compact	
424569	1.90-2.00	Grey silty sand, some clay, trace gravel, trace boulders, compact, wet	GS2
4975343			
		Ended at target depth of 2mbgs	
TP03-24	0.00-0.12	Topsoil	
	0.12-0.93	Brown silty sand, medium to coarse sand, some gravel, trace boulders, rootlets, dry, loose	GS1
18T			
424626		Ended on bedrock at 0.93mbgs	
4975211			
TP04-24	0.00-0.32	Topsoil	
		Ended on bedrock at 0.32mbgs	
18T			
424771			
4975122			
TP05-24	0.00-0.14	Topsoil	
		Ended on bedrock at 0.14mbgs	
18T			
424511			
4975116			
TP06-24	0.00-0.26	Topsoil	
	0.26-0.45	Brown sand and silt, trace gravel, wet, dense	GS1
18T			
424950		Water trickling in around bottom of TP, pooling in bottom of TP	
4975029			
		Ended on bedrock at 0.45mbgs	
TP07-24	0.00-0.22	Topsoil	
		Ended on bedrock at 0.22	
18T			
425049			
4975108			
TP08-24	0.00-0.32	Topsoil	
	0.32-0.34	Brown silty sand, moist, loose	*
18T			
425121		Ended on bedrock at 0.34mbgs	
4975246			
		* Did not sample due to hard to isolate	
Notes:			

¹meters below ground surface



Cambium Reference # 19287-001

Date: Jan. 04. 2024

Weather: Sunny, windy, -10 °C

Logged by: MC

Test Pit ID	Depth (mbgs ¹)	Material	Sample
TP09-24	0.00-0.22	Topsoil	
	0.22-0.65	Brown sand and silt, some clay, trace gravel, moist, dense	GS1
18T	0.65-0.84	Grey clay, trace gravel, moist, dense	GS2
424924			
4975187		Ended on bedrock at 0.84mbgs	
TP10-24	0.00-0.48	Topsoil	
18T	0.23-0.48	Large slabs of fractured bedrock	
424810			
4975329		Ended on bedrock at 0.48mbgs	
TP11-24	0.00-0.22	Topsoil	
	0.22-0.53	Brown silts and sand, moist, loose	GS1
18T	0.53-0.64	Grey silty sand, some clay, moist, dense	GS2
424857			
4975378		Ended on bedrock at 0.64mbgs	
TP12-24	0.00-0.18	Topsoil	
18T		Ended on bedrock at 0.18mbgs	
424999			
4975411			
TP13-24	0.00-0.25	Topsoil	
	0.28-0.50	Brown silt and sand, trace gravel, moist, dense	GS1
18T	0.50-1.74	Grey silty sand, some clay, some gravel, trace boulder, moist, dense	GS2
424915			
4975489		Water trickling in at approximately 0.05m above bottom	
		Ended on bedrock at 1.74mbgs	
TP14-24	0.00-0.30	Topsoil	
	0.30-0.46	Orangy brown silty sand, dense, wet, slumping into hole	GS1
18T	0.46-1.08	Grey silty sand, some clay, trace gravel, wet, slumping into hole	GS2
424803			
4975628	0.5	Water trickling in and pooling around in the bottom	
		Ended on bedrock at 1.08mbgs	
TP15-24	0.00-0.20	Topsoil	
18T		Ended on bedrock at 0.2mbgs	
424778			
4975460			
TP16-24	0.00-0.30	Topsoil	
18T		Ended on bedrock at 0.3mbgs	
424702			
4975292			
Notes:			

¹meters below ground surface

Date: Jan. 04. 2024

Weather: Sunny, windy, -10 °C

Logged by: MC

¹meters below ground surface



Appendix C

Grainsize Analysis Results



Grain Size Distribution Chart

Project Number: 19387-001

Client: EFI Engineering

Project Name: Matheson and Rosedale Subdivision

Sampled By: Maren Catt - Cambium Inc.

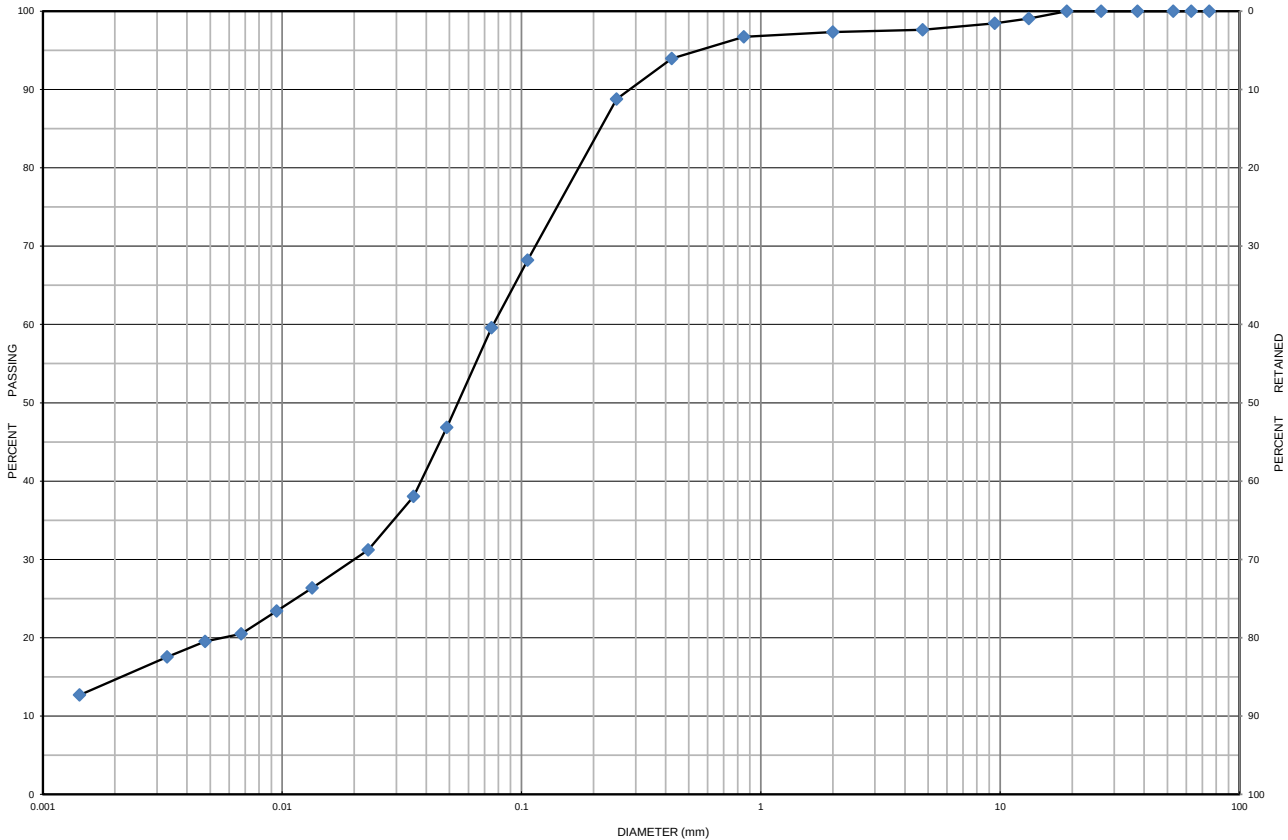
Sample Date: January 4, 2024

Depth: 0.25 m to 1.0 m

Lab Sample No: S-24-0118

Location: TP 02-24 GS 1

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 02-24	GS 1	0.25 m to 1.0 m	2	38	46	14	19.4
Description		Classification	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
Silt and Sand some Clay trace Gravel		ML	0.077	0.020	-	-	-

Additional information available upon request

Issued By: 
(Senior Project Manager)

Date Issued: January 24, 2024



Grain Size Distribution Chart

Project Number: 19387-001

Client: EFI Engineering

Project Name: Matheson and Rosedale Subdivision

Sampled By: Maren Catt - Cambium Inc.

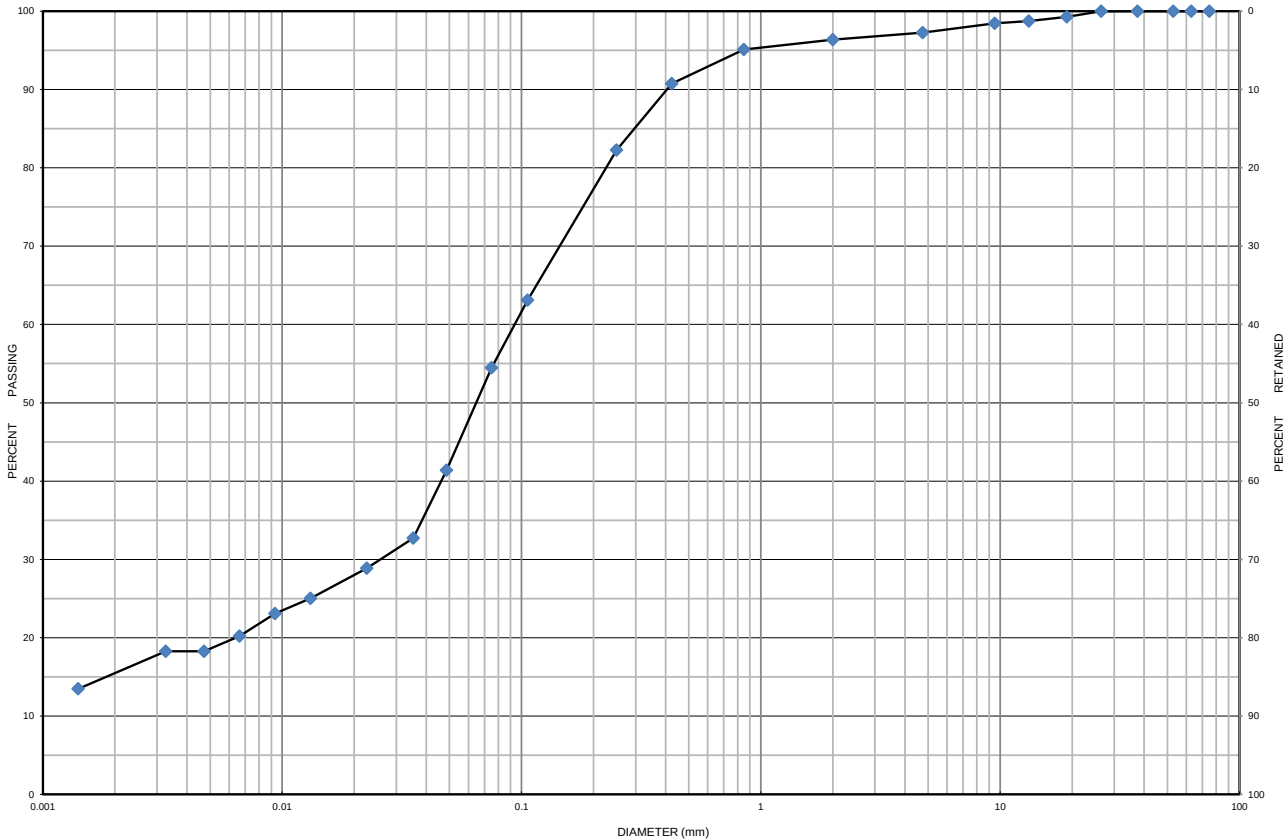
Sample Date: January 4, 2024

Depth: 0.22 m to 0.65 m

Lab Sample No: S-24-0119

Location: TP 09-24 GS 1

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 09-24	GS 1	0.22 m to 0.65 m	3	43	39	15	17.1
Description		Classification	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
Sand and Silt some Clay trace Gravel		ML	0.093	0.026	-	-	-

Additional information available upon request

Issued By: 
(Senior Project Manager)

Date Issued: January 24, 2024



Grain Size Distribution Chart

Project Number: 19387-001

Client: EFI Engineering

Project Name: Matheson and Rosedale Subdivision

Sampled By: Maren Catt - Cambium Inc.

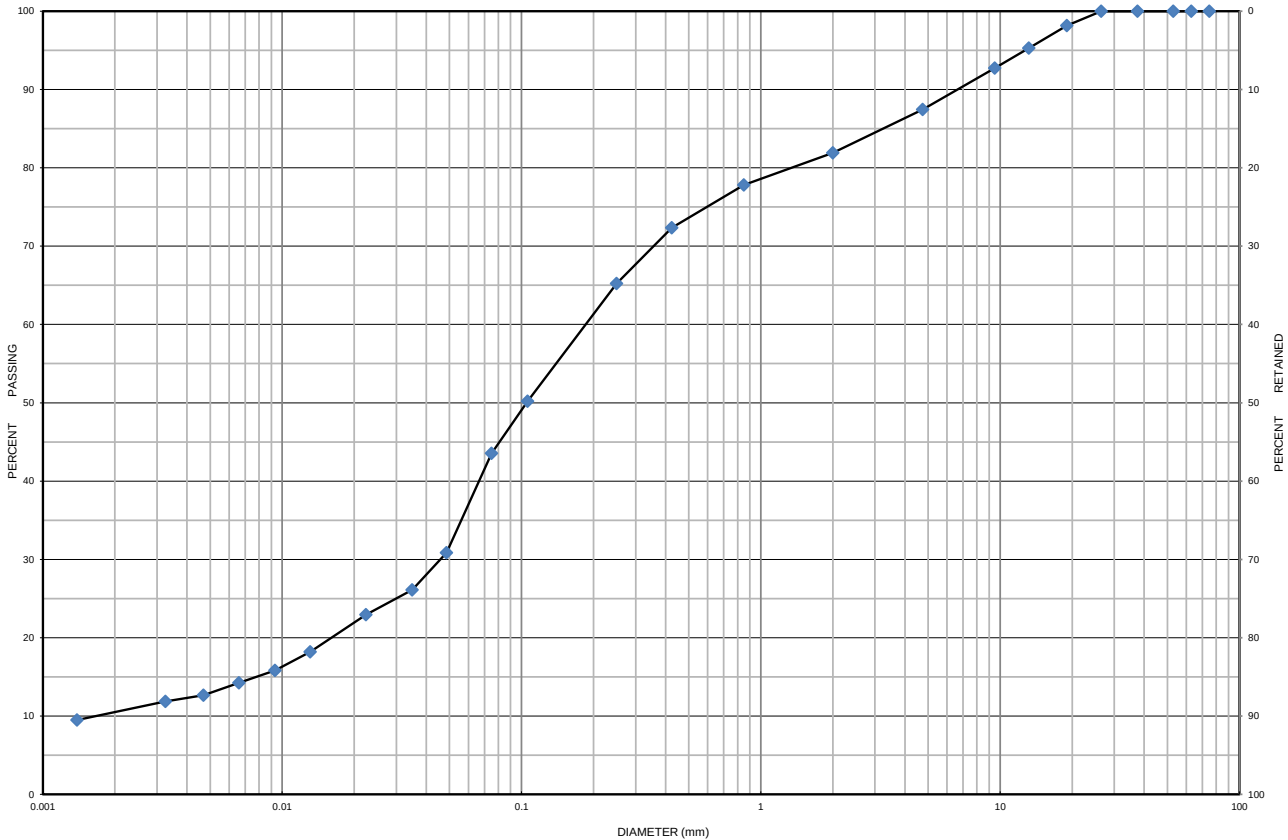
Sample Date: January 4, 2024

Depth: 0.5 m to 1.74 m

Lab Sample No: S-24-0120

Location: TP 13-24 GS 2

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 13-24	GS 2	0.5 m to 1.74 m	13	44	32	11	9.4
Description		Classification	D ₆₀	D ₃₀	D ₁₀	C _u	C _c
Silty Sand some Gravel some Clay		SM	0.1800	0.0400	0.0017	105.88	5.23

Additional information available upon request

Issued By: 
(Senior Project Manager)

Date Issued: January 24, 2024



Appendix D

Water Balance Calculations

THORNTHWAITE-TYPE MONTHLY WATER-BALANCE MODEL													
modified from Dingman 2015: Box 6-8 (pg 299) using ET model of Hamon (1963)													
		Input Data				Computed Values							
										Surplus 362 mm/yr			
Weather Station Location:	Drummond, ON					Latitude:	45.0 degree						
Solar Declination (degree)	-20.6	-12.6	-1.5	10.0	19.0	23.1	21.0	13.4	2.6	-9.0	-18.5	-23.0	
DayLength (hr)*	9.1	10.3	11.8	13.4	14.7	15.4	15.0	13.8	12.3	10.8	9.4	8.7	
Available Water Storage Capacity		0.14 m/m			Root Depth		460 mm		SOILmax		64.4 mm		
MONTHLY WATER BALANCE DATA													
Temperatures in C, water-balance terms in mm.													
Month:	J	F	M	A	M	J	J	A	S	O	N	D	Year
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
TEMPERATURE (T)	-9.8	-8.5	-2.0	6.0	12.7	17.8	20.3	19.1	14.4	7.8	1.6	-5.8	876 702 174 174 876 538 362
PRECIPITATION (P)	67.7	51.3	55.1	64.2	77.0	82.4	83.5	75.3	91.8	78.5	83.6	65.9	
RAIN	24.1	15.9	28.6	53.0	76.9	82.4	83.5	75.3	91.8	76.3	67.8	26.7	
SNOW	44	35	27	11	0	0	0	0	0	2	16	39	
MELT FACTOR (F)	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.27	0.00	
PACK	94	130	156	0	0	0	0	0	0	0	12	51	
MELT	0	0	0	167	0	0	0	0	0	2	4	0	
INPUT (W)	24	16	29	220	77	82	84	75	92	79	72	27	
POTENTIAL ET (PET)	0	0	0	40	70	96	113	97	63	38	21	0	
NET INPUT (ΔW)	24	16	29	180	7	-14	-29	-22	29	41	51	27	
SOIL MOISTURE (SOIL)	64	64	64	64	64	52	33	23	52	64	64	64	
ΔSOIL	0	0	0	0	0	-13	-19	-9	29	12	0	0	0
ET	0	0	0	40	70	95	102	85	63	38	21	0	514
SURPLUS=W-ET-DSOIL	24	16	29	180	7	0	0	0	0	29	51	27	362
Notes:													
Precipitation, Rain, Temperature, and Latitude are inputted parameters													
SOILmax = available water storage capacity * root depth													
m = month													
D = Day length (hrs) =2*cos ⁻¹ (-tan(Latitude)*tan(Declination))/0.2618 [calculation is in radians]													
SNOW _m = P _m -RAIN _m													
F _m = 0 if T _m <= 0°C; F _m = 0.167*T _m if 0°C<T _m <6°C; F _m = 1 if T _m >=6°C													
PACK _m = (1-F _m)*(SNOW _m +PACK _{m-1})													
MELT = F _m *(SNOW _m +PACK _{m-1})													
W _m = RAIN _m +MELT _m													
PET = 0 if T _m <0; otherwise PET = 2.98*0.611*exp(17.3*T _m /(T _m +237.2))/(T _m +237.2)*Number of days in month [Hamon ET model (1963)]													
ΔW _m = W _m -PET _m													
SOIL = min{[ΔW _m +SOIL _{m-1}], SOILmax}, if ΔW _m >0; otherwise SOIL = SOIL _{m-1} * exp(ΔW/SOILmax)													
ΔSOIL = SOIL _{m-1} -SOIL _m													
ET = PET if W _m > PET; otherwise, ET=W _m -ΔSOIL													



Pre- and Post-Development Water Balance Calculations

630 Sunnidale Road South, Wasaga Beach, ON

1 Climate Information

Precipitation	876 mm/yr
Actual Evapotranspiration	514 mm/yr
Water Surplus	362 mm/yr

2 Infiltration Rates

Table 2 Approach - Infiltration factors

Topography: Flat to Gently Sloping Land	0.15
Soil Type: medium combinations of clay and loam	0.3
Cover: Cultivated land/Woodland	0.1
Total Infiltration Factor	0.55

Infiltration (Water Surplus * Infiltration Factor)	199 mm/yr
Run-off (Water Surplus - Infiltration)	163 mm/yr

Table 3 Approach - Typical Recharge Rates

Coarse Sand and Gravel	>250	mm/yr
Fine to medium sand	200-250	mm/yr
Silty sand to sandy silt	150-200	mm/yr
Silt	125-150	mm/yr
Clayey Silt	100- 125	mm/yr
Clay	<100	mm/yr

Site development area is underlain predominantly by sand and silty sand with gravel and trace clay.

Based on the above, the recharge rate is typically 200-250 mm/yr

3 Pre-Development Property Statistics

	ha	m ²
Total Paved Area	0.00	0
Total Roof Area	0.00	0
Total Landscape Area	23.53	235,300
Total	23.53	235,300

4 Post-Development Property Statistics

	ha	m ²
Total Paved Area	1.05	10,500
Total Roof Area	0.98	9,840
Total Residential Buffer	0.39	3,895
SWM Pond Surface Area	0.90	9,000
Total Landscape Area	20.21	202,065
Total	23.53	235,300



Pre- and Post-Development Water Balance Calculations

630 Sunnidale Road South, Wasaga Beach, ON

5 Pre-Development Water Balance

Land Use		Area (m ²)	Precipitation (m ³)	Evapotranspiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Impervious Areas	Paved Area	-	-	-	-	-
	Roof Area	-	-	-	-	-
Pervious Areas	Landscape Area	235,300	206,123	120,944	46,848	38,330
Totals		235,300	206,123	120,944	46,848	38,330

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

6 Post-Development Water Balance

Land Use		Area (m ²)	Precipitation (m ³)	Evapotranspiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Impervious Areas	Paved Area	10,500	9,198	920	-	8,278
	Roof Area	9,840	8,620	862	-	7,758
	Res. Buffer	3,895	3,412	341	-	3,071
	SWM Pond	9,000	7,884	788	-	-
Pervious Areas	Landscape Area	202,065	177,009	103,861	40,231	32,916
Totals		235,300	206,123	106,773	40,231	52,023

7 Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

Comparison of Pre- and Post -Development

	Precipitation (m ³)	Evapotranspiration (m ³)	Infiltration (m ³)	Run-off (m ³)
Pre-Development	206,123	120,944	46,848	38,330
Post-Development	206,123	106,773	40,231	52,023
Change in Volume	-	-	14,171	13,693
Change in %	-	-	12	36

8

Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration (m ³ /yr)	46,848
Volume of Post-Development Infiltration (m ³ /yr)	40,231
Deficit from Pre to Post Development Infiltration (m ³ /yr)	6,617
Percentage of Roof Runoff required to match the pre-development infiltration (%)	61



Nitrate Attenuation

Calculations for Subdivision Development - 41 Lots

Input Data

Computed Values

Areas	Total
SITE AREA (m ²)	235300
BLDG FOOTPRINT (m ²)	13700
ROAD AREA (m ²)	10300
SWM POND AREA (m ²)	9000
Available Infiltration Area (m ²)	202300

Surplus water

0.363 m/yr
9.94E-04 m/day
201.0152 m³/day

Infiltration Factor

Hilly to Rolling land	0.15
Silty Sand	0.3
Cultivated land	0.1
Total	0.55

Infiltrated water

0.000547 m/day
110.5584 m³/day

Runoff 90.4568363 m³/day

PREDICTED NITRATE CONCENTRATIONS

	41 lots	41 Lots, Downspouts	41 Lots, Downspouts, 25% ditches	41 Lots, Downspouts, 15% ditches
Qe	41,000	41,000	41,000	41,000
Ce	40	40	40	40
Qi	110,558	125,391	130,369	128,580
Ci	0.4	0.4	0.4	0.4
Qt	151,558	166,391	171,369	169,580
mg/L	11.11	10.16	9.87	9.97



Appendix E

Water Well Survey Results

Ministry of the Environment,
Conservation and Parks

We Tag#: A395660 (nt Below)

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

A395660

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization Smart Homes Ottawa Inc	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) 6610 Fourth Line Road	Municipality North Gower	Province ON	Postal Code K0A 2T0
Telephone No. (inc. area code)			

Well Location

Address of Well Location (Street Number/Name) Rosedale Road South (No civic)	Township Montague	Lot 19	Concession 4
County/District/Municipality Lanark	City/Town/Village Smith Falls	Province Ontario	Postal Code
UTM Coordinates Zone Easting NAD 83 18 424769	Northings 4975272	Municipal Plan and Sublot Number	Other TW#1/3

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m)
	Top Soil			0' to 2'
Brown	Sandstone			2' to 18'
Grey	Sandstone			18' to 68'
Grey	Sandstone			68' to 74'
Grey	Sandstone			74' to 80'

* Test Well # 1 / 3 *

Annular Space			
Depth Set at (m)	From	To	Type of Sealant Used (Material and Type)
20'	0'		Neat cement

Method of Construction		Well Use	
☐ Cable Tool	☐ Diamond	☐ Public	☐ Commercial
☐ Rotary (Conventional)	☐ Jetting	☒ Domestic	☐ Not used
☐ Rotary (Reverse)	☐ Driving	☐ Municipal	☐ Dewatering
☐ Boring	☐ Digging	☐ Test Hole	☐ Monitoring
☒ Air percussion		☐ Irrigation	☐ Cooling & Air Conditioning
☐ Other, specify		☐ Industrial	
		☐ Other, specify	

Construction Record - Casing				Status of Well	
Inside Diameter (cm)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm)	Depth (m)	From	To
6 1/4"	Steel	.188	+2'	20'	20'
6"	Open Hole		20'	20'	80'

Construction Record - Screen			
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m)
			From
			To

Water Details		Hole Diameter	
Water found at Depth 68' 88' (m)	Kind of Water: ☐ Fresh ☒ Untested	Depth (m)	Diameter (cm)
Water found at Depth 74' (m)	Kind of Water: ☐ Fresh ☒ Untested	0' 20'	9 3/4"
Water found at Depth 74' (m)	Kind of Water: ☐ Fresh ☒ Untested	20' 80'	6"

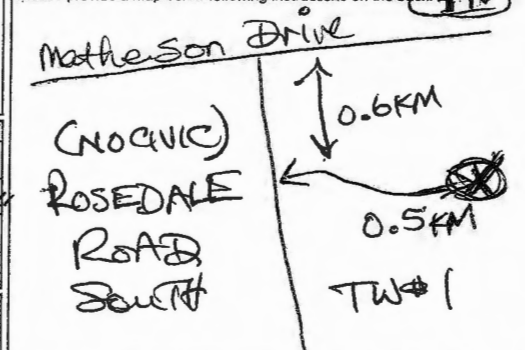
Well Contractor and Well Technician Information

Business Name of Well Contractor Air Rock Drilling Co. Ltd.	Well Contractor's Licence No. C7881
Business Address (Street Number/Name) 6659 Franktown Road	Municipality Richmond
Province ON	Postal Code K0A 2Z0
Business E-mail Address air-rock@sympatico.ca	
Bus. Telephone No. (inc. area code) 6138882170	Name of Well Technician (Last Name, First Name) Hanna, Jeremy
Well Technician's Licence No. T3632	Signature of Technician and/or Contractor <i>Jeremy Hanna</i>
Date 2024-01-29	

Results of Well Yield Testing				
After test of well yield, water was:	Draw Down		Recovery	
☐ Clear and sand free	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
☐ Other, specify Not tested	Static Level	31.8'		32.8'
If pumping discontinued, give reason: X	1	32.2	1	31.9
	2	32.4	2	31.8
	3	32.5	3	31.8
	4	32.6	4	31.8
	5	32.6	5	31.8
	10	32.7	10	31.8
	15	32.7	15	31.8
	20	32.8	20	31.8
	25	32.8	25	31.8
	30	32.8	30	31.8
If flowing give rate (l/min/GPM)	40	32.8	40	31.8
	50	32.8	50	31.8
	60	32.8	60	31.8
Recommended pump depth (m/ft)				
70				
Recommended pump rate (l/min/GPM)				
10				
Well production (l/min/GPM)				
20				
Inspected?				
☒ Yes ☐ No				

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 1/2 HR 10 GPM @ 70 FF	Well owner's Information package delivered ☒ Yes ☐ No	Date Package Delivered 2024-01-29	Ministry Use Only Audit No. 2408031
			Received


 Ministry of the Environment,
Conservation and Parks

W Tag#: A395659 (Print Below)

Well Record

Regulation 903 Ontario Water Resources Act

 Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
Smart Homes Ottawa Inc			
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code
6610 Fourth Line Road	North Gower	ON	K0A 2T0

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Rosedale Road South (No civic)	Montague	19	4
County/District/Municipality	City/Town/Village	Province	Postal Code
Lanark	Smith Falls	Ontario	
UTM Coordinates Zone Easting Northing	Municipal Plan and Sublot Number	Other	
NAD 83 18 425093 4975196		TW#2/3	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m)
	Top Soil			0' to 1'
Grey	Sandstone			1' to 28'
Black	Limestone			28' to 94'
Black	Limestone			94' to 100'
* Test well #2 / 3 *				

Annular Space			
Depth Set at (m)	Type of Sealant Used (Material and Type)	Volume Placed (m³)	
20' to 0'	Neat cement	7.80	

Method of Construction	Well Use
☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☒ Air percussion ☐ Other, specify _____	☐ Public ☒ Domestic ☐ Livestock ☐ Industrial ☐ Other, specify _____

Construction Record - Casing				Status of Well
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m)	
6 1/4"	Steel	.188	+2' to 20'	☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify _____ ☐ Other, specify _____
6 1/8"	Open Hole		20' to 100'	

Construction Record - Screen			
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m)
			From To

Water Details		Hole Diameter	
Water found at Depth (m)	Kind of Water: ☐ Fresh ☒ Untested	Depth (m)	Diameter (cm/in)
94.04 (m)	☐ Gas ☒ Other, specify _____	0' to 20'	9 3/4"
	☐ Gas ☐ Other, specify _____	20' to 100'	6 1/8"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Air Rock Drilling Co. Ltd.	C7881
Business Address (Street Number/Name)	Municipality
6656 Franktown Road	Richmond
Province	Postal Code
ON	K0A 2Z0
Business E-mail Address	
air-rock@sympatico.ca	
Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
8188382170	Hanna, Jeremy
Well Technician's Licence No.	Signature of Technician and/or Contractor
T3632	
Date Submitted	
2024 02 29	

Results of Well Yield Testing			
After test of well yield, water was:	Draw Down	Recovery	
☐ Clear and sand free ☐ Other, specify _____	Time (min)	Water Level (m)	Time (min)
If pumping discontinued, give reason:	Static Level	42.0'	42.9'
Pump intake set at (m)	1	42.3	1
80	2	42.5	2
Pumping rate (l/min / GPM)	3	42.6	3
20	4	42.6	4
Duration of pumping	5	42.7	5
hrs + min	10	42.8	10
Final water level end of pumping (m)	15	42.8	15
42.9'	20	42.9	20
If flowing give rate (l/min/GPM)	25	42.9	25
Recommended pump depth (m)	30	42.9	30
80	40	42.9	40
Recommended pump rate (l/min/GPM)	50	42.9	50
10	60	42.9	60
Well production (l/min/GPM)			
20			
Disinfected?			
☒ Yes ☐ No			

Map of Well Location

Please provide a map below following instructions on the back of this form.

Map showing location of well (TW#2) relative to Rosedale Road South and Madison Drive. The well is located 0.6 km north of Rosedale Road South and 0.7 km east of Madison Drive.

Comments:	Date Package Delivered	Ministry Use Only
1/2 HP - 10 GPM @ 88 FT	Y Y 2024 M M D D	Audit No. 2408032
Well owner's information package delivered		
☒ Yes ☐ No		
Received		



Ministry of the Environment,
Conservation and Parks

W Tag#: A395658 (Print Below)

A395658

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization Smart Homes Ottawa Inc	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) 6610 Fourth Line Road	Municipality North Gower	Province ON	Postal Code K0A 2T0

Well Location

Address of Well Location (Street Number/Name) Rosedale Road South	Township Montague	Lot 19	Concession 4
County/District/Municipality Lanark	City/Town/Village Smith Falls	Province Ontario	Postal Code
UTM Coordinates Zone Easting Northing NAD 83 18 424873 4975026	Municipal Plan and Sublot Number	Other TW#3/3	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From To
	Top Soil			0' 3'
Brown	Sandstone			3' 26'
Grey	Sandstone	W/ Black Limestone mix		26' 78'
Grey	Sandstone	W/ Black Limestone mix		76' 82'
X Test well # 3 / 3				

Annular Space			
Depth Set at (m/ft) From To 20' 0'	Type of Sealant Used (Material and Type) Neat cement	Volume Placed (m³) 7.80	

Method of Construction	Well-Use
☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☒ Boring ☐ Air percussion ☐ Other, specify	☐ Diamond ☐ Jetting ☒ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in) 6 1/4"	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Steel	Wall Thickness (cm/in) .188	Depth (m/ft) From To +2' 20'	☒ Water Supply	
6"	Open Hole		20' 82'	☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify	

Construction Record - Screen			
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From To

Water Details		Hole Diameter	
Water found at Depth (m/ft) 76.78	Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify	Depth (m/ft) From To 0' 20'	Diameter (cm/in) 9 3/4"
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify	20' 82'	6"

Well Contractor and Well Technician Information			
Business Name of Well Contractor Air Rock Drilling Co. Ltd.		Well Contractor's Licence No. C7881	
Business Address (Street Number/Name) 8859 Franktown Road		Municipality Richmond	
Province ON	Postal Code K0A 2Z0	Business E-mail Address air-rock@sympatico.ca	
Bus. Telephone No. (inc. area code) 613882170		Name of Well Technician (Last Name, First Name) Hanna, Jeremy	
Well Technician's Licence No. T3632		Signature of Technician and/or Contractor <i>[Signature]</i>	
Date Submitted 2024 02 29		Y Y Y Y M M D D	

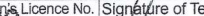
Results of Well Yield Testing			
After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify Not tested		If pumping discontinued, give reason:	
Pump intake set at (m/ft) 70	Pumping rate (l/min / GPM) 20	Duration of pumping 1 hrs + 0 min	Final water level end of pumping (m/ft) 35.9"
If flowing give rate (l/min/GPM)		Recommended pump depth (m/ft) 70	
Recommended pump rate (l/min/GPM) 10		Well production (l/min/GPM) 20	
Disinfected? ☒ Yes ☐ No			
Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
Static Level	35.2"	Static Level	35.9"
1	35.6	1	35.2
2	35.7	2	35.2
3	35.7	3	35.2
4	35.7	4	35.2
5	35.8	5	35.2
10	35.8	10	35.2
15	35.9	15	35.2
20	35.9	20	35.2
25	35.9	25	35.2
30	35.9	30	35.2
40	35.9	40	35.2
50	35.9	50	35.2
60	35.9	60	35.2

Map of Well Location	
Please provide a map below following instructions on the back	
Matheson Drive CNO (CIVIC) ROSEDALE ROAD SOUTH 0.6 KM 0.4 KM TW#3	

Comments: 1/2 HP - 10 GPM @ 70 ft	
Well owner's information package delivered ☒ Yes ☐ No	Ministry Use Only Audit No. 2408033 Received

Page of

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

Province ON	Postal Code K0A 2Z0	Business E-mail Address air-rock@sympatico.ca
Bus. Telephone No. (inc. area code) Name of Well Technician (Last Name, First Name) 6138382170 Hanna, Jeremy		
Well Technician's Licence No. T3632	Signature of Technician and/or Contractor 	Date Spooled 10 3 Y Y Y Y M M D D

Please provide a map below following instructions on the back.

Comments: 1/2HP-106PMSEA 270 PR

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
	Y Y 2023 M M 10 26	Audit No. Z407946
☒ Yes		
☐ No		Received

Water Well Records Summary Report

Produced by Cambium Inc. using MOECP Water Well Information System (WWIS)

All units in meters unless otherwise specified



Well ID: 3501204	Easting: 425346	UTM Zone 18	
Construction Date: 1952-06-20	Northing: 4974622	Positional Accuracy: unknown UTM	
Well Depth: 18.3	Water Kind FRESH	Pump Rate (LPM): 59	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate:	
Water First Found: 18.3	Primary Water Use: Livestock	Pumping Duration (h:m): 2 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	LIMESTONE	0	18.3

Well ID: 3501205	Easting: 424991	UTM Zone 18	
Construction Date: 1967-09-20	Northing: 4975034	Positional Accuracy: unknown UTM	
Well Depth: 15.2	Water Kind FRESH	Pump Rate (LPM): 32	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 23	
Water First Found: 14.3	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
2	LIMESTONE	1.22	15.2

Well ID: 3501206	Easting: 425370	UTM Zone 18	
Construction Date: 1953-02-03	Northing: 4974622	Positional Accuracy: unknown UTM	
Well Depth: 14.3	Water Kind FRESH	Pump Rate (LPM): 36	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate:	
Water First Found: 12.2	Primary Water Use: Livestock	Pumping Duration (h:m): 1 : 0	
Static Level: 7			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.83
2	SANDSTONE	1.83	14.3

Well ID: 3501226	Easting: 424326	UTM Zone 18	
Construction Date: 1962-01-22	Northing: 4975302	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 19.8	Water Kind FRESH	Pump Rate (LPM): 23	
Well Diameter (cm): 10.2	Final Status Water Supply	Recommended Pump Rate: 23	
Water First Found: 16.8	Primary Water Use: Livestock	Pumping Duration (h:m): 1 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	6.1
2	LIMESTONE	6.1	19.8

Well ID: 3502813	Easting: 424821	UTM Zone 18		
Construction Date: 1971-08-06	Northing: 4974942	Positional Accuracy: margin of error : 30 m - 100 m		
Well Depth: 19.8	Water Kind FRESH	Pump Rate (LPM): 36		
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 36		
Water First Found: 18.9	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0		
Static Level: 8				
Layer:	Driller's Description:	Top:	Bottom:	
1	TOPSOIL	0	0.30	
2	CLAY	0.30	1.22	
3	SANDSTONE	1.22	19.8	

Well ID: 3502920	Easting: 424991	UTM Zone 18		
Construction Date: 1972-01-20	Northing: 4974762	Positional Accuracy: margin of error : 30 m - 100 m		
Well Depth: 23.2	Water Kind FRESH	Pump Rate (LPM): 55		
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 55		
Water First Found: 18.3	Primary Water Use: Domestic	Pumping Duration (h:m): 0 : 30		
Static Level: 13				
Layer:	Driller's Description:	Top:	Bottom:	
1	TOPSOIL	0	0.30	
2	SANDSTONE	0.30	23.2	

Well ID: 3503379	Easting: 424609	UTM Zone 18		
Construction Date: 1973-09-13	Northing: 4974956	Positional Accuracy: margin of error : 30 m - 100 m		
Well Depth: 25	Water Kind Not stated	Pump Rate (LPM): 91		
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 91		
Water First Found: 23.8	Primary Water Use: Domestic	Pumping Duration (h:m): 0 : 30		
Static Level: 11				
Layer:	Driller's Description:	Top:	Bottom:	
1	TOPSOIL	0	0.61	
2	LIMESTONE	0.61	10.4	
3	SANDSTONE	10.4	23.5	
4	SANDSTONE	23.5	24.1	
5	SANDSTONE	24.1	25	

Well ID: 3504152	Easting: 424581	UTM Zone 18		
Construction Date: 1975-12-11	Northing: 4975022	Positional Accuracy: margin of error : 100 m - 300 m		
Well Depth: 20.4	Water Kind FRESH	Pump Rate (LPM): 73		
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 73		
Water First Found: 18.9	Primary Water Use: Domestic	Pumping Duration (h:m): 0 : 30		
Static Level: 9				
Layer:	Driller's Description:	Top:	Bottom:	
1	CLAY	0	2.13	
2	LIMESTONE	2.13	9.14	
3	SANDSTONE	9.14	20.4	

Well ID: 3504446	Easting: 425131	UTM Zone 18	
Construction Date: 1976-09-28	Northing: 4974572	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 23.2	Water Kind FRESH	Pump Rate (LPM): 50	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 50	
Water First Found: 21.6	Primary Water Use: Domestic	Pumping Duration (h:m): 0 : 30	
Static Level: 12			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
2	SANDSTONE	0.30	23.2

Well ID: 3504456	Easting: 425006	UTM Zone 18	
Construction Date: 1976-10-01	Northing: 4975897	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 24.4	Water Kind FRESH	Pump Rate (LPM): 273	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 227	
Water First Found: 22.3	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 4			
Layer:	Driller's Description:	Top:	Bottom:
1	SANDSTONE	0	24.4

Well ID: 3504509	Easting: 424981	UTM Zone 18	
Construction Date: 1976-12-09	Northing: 4975722	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 25.3	Water Kind Not stated	Pump Rate (LPM): 64	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45	
Water First Found: 25.3	Primary Water Use: Livestock	Pumping Duration (h:m): 1 : 20	
Static Level: 11			
Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.30
1	CLAY	0	0.30
1	CLAY	0	0.30
1	CLAY	0	0.30
2	LIMESTONE	0.30	25.3
2	LIMESTONE	0.30	25.3
2	LIMESTONE	0.30	25.3
2	LIMESTONE	0.30	25.3

Well ID: 3505174	Easting: 425131	UTM Zone 18	
Construction Date: 1978-09-16	Northing: 4974622	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 19.5	Water Kind FRESH	Pump Rate (LPM): 55	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 55	
Water First Found: 18.3	Primary Water Use: Domestic	Pumping Duration (h:m): 0 : 30	
Static Level: 14			
Layer:	Driller's Description:	Top:	Bottom:
1	SANDSTONE	0	19.5

Well ID: 3505409	Easting: 424430	UTM Zone 18	
Construction Date: 1979-05-25	Northing: 4975321	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 19.8	Water Kind FRESH	Pump Rate (LPM): 136	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 136	
Water First Found: 16.8	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 5			
Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0	0.91
1	FILL	0	0.91
1	FILL	0	0.91
2	SANDSTONE	0.91	19.8
2	SANDSTONE	0.91	19.8
2	SANDSTONE	0.91	19.8

Well ID: 3505483	Easting: 425030	UTM Zone 18	
Construction Date: 1979-08-27	Northing: 4974721	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 23.5	Water Kind FRESH	Pump Rate (LPM): 45	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45	
Water First Found: 22.3	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	12.2
2	LIMESTONE	0.61	12.2
3	SANDSTONE	12.2	23.5
3	SANDSTONE	12.2	23.5

Well ID: 3505713	Easting: 425430	UTM Zone 18	
Construction Date: 1980-03-03	Northing: 4974721	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 23.5	Water Kind FRESH	Pump Rate (LPM): 91	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 91	
Water First Found: 16.8	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 9			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	LIMESTONE	0.30	16.8
2	LIMESTONE	0.30	16.8
3	SANDSTONE	16.8	23.5
3	SANDSTONE	16.8	23.5

Well ID: 3505896	Easting: 424806	UTM Zone 18		
Construction Date: 1980-10-16	Northing: 4974812	Positional Accuracy: margin of error : 10 - 30 m		
Well Depth: 21.3		Water Kind FRESH	Pump Rate (LPM): 91	
Well Diameter (cm): 15.2		Final Status Water Supply	Recommended Pump Rate: 91	
Water First Found: 19.8		Primary Water Use: Domestic	Pumping Duration (h:m): : 30	
Static Level: 11				
Layer:	Driller's Description:	Top:	Bottom:	
1	CLAY	0	2.13	
2	LIMESTONE	2.13	7.62	
3	SANDSTONE	7.62	21.3	

Well ID: 3505918	Easting: 424230	UTM Zone 18		
Construction Date: 1980-11-25	Northing: 4975421	Positional Accuracy: margin of error : 100 m - 300 m		
Well Depth: 18.9		Water Kind FRESH	Pump Rate (LPM): 36	
Well Diameter (cm): 15.2		Final Status Water Supply	Recommended Pump Rate: 36	
Water First Found: 17.7		Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 2				
Layer:	Driller's Description:	Top:	Bottom:	
1	SANDSTONE	0	18.9	

Well ID: 3507155	Easting: 424830	UTM Zone 18		
Construction Date: 1976-08-09	Northing: 4975821	Positional Accuracy: margin of error : 100 m - 300 m		
Well Depth: 19.5	Water Kind Not stated	Pump Rate (LPM): 45		
Well Diameter (cm): 12.7	Final Status Water Supply	Recommended Pump Rate: 45		
Water First Found: 18.9	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 10		
Static Level: 6				
Layer:	Driller's Description:	Top:	Bottom:	
1	CLAY	0	1.22	
1	CLAY	0	1.22	
1	CLAY	0	1.22	
1	CLAY	0	1.22	
2	SANDSTONE	1.22	19.5	
2	SANDSTONE	1.22	19.5	
2	SANDSTONE	1.22	19.5	
2	SANDSTONE	1.22	19.5	

Well ID: 3507676	Easting: 425405	UTM Zone 18		
Construction Date: 1987-01-06	Northing: 4975374	Positional Accuracy: unknown UTM		
Well Depth: 19.5		Water Kind FRESH	Pump Rate (LPM): 91	
Well Diameter (cm): 15.2		Final Status Water Supply	Recommended Pump Rate: 91	
Water First Found: 18.3		Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 5				
Layer:	Driller's Description:	Top:	Bottom:	
1	SAND	0	1.83	
1	SAND	0	1.83	
2	SANDSTONE	1.83	19.5	
2	SANDSTONE	1.83	19.5	

Well ID: 3508196	Easting: 424595	UTM Zone 18	
Construction Date: 1988-01-08	Northing: 4975062	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 12.8	Water Kind FRESH	Pump Rate (LPM): 68	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 68	
Water First Found: 11.6	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 2			
Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.13
2	SANDSTONE	2.13	12.8

Well ID: 3509180	Easting: 424991	UTM Zone 18	
Construction Date: 1990-02-22	Northing: 4975034	Positional Accuracy: unknown UTM	
Well Depth: 19.8	Water Kind FRESH	Pump Rate (LPM): 182	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 182	
Water First Found: 18.3	Primary Water Use: Livestock	Pumping Duration (h:m): 1 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	7.62
2	LIMESTONE	0.61	7.62
3	SANDSTONE	7.62	19.8
3	SANDSTONE	7.62	19.8

Well ID: 3509560	Easting: 424991	UTM Zone 18	
Construction Date: 1990-12-11	Northing: 4975034	Positional Accuracy: unknown UTM	
Well Depth: 22	Water Kind FRESH	Pump Rate (LPM): 159	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45	
Water First Found: 17.7	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 6			
Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
2	CLAY	0.61	2.13
2	CLAY	0.61	2.13
3	LIMESTONE	2.13	6.1
3	LIMESTONE	2.13	6.1
4	SANDSTONE	6.1	22
4	SANDSTONE	6.1	22

Well ID: 3509627	Easting: 425333	UTM Zone 18	
Construction Date: 1991-01-18	Northing: 4975590	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 27.4	Water Kind FRESH	Pump Rate (LPM): 55	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 55	
Water First Found: 25	Primary Water Use: Cooling And A	Pumping Duration (h:m): 1 : 0	
Static Level: 13			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	9.14

Well ID: 3509628		Easting: 424991	UTM Zone 18	
Construction Date: 1991-01-18		Northing: 4975034	Positional Accuracy: unknown UTM	
Well Depth: 24.7		Water Kind	FRESH	Pump Rate (LPM): 68
Well Diameter (cm): 15.2		Final Status	Water Supply	Recommended Pump Rate: 68
Water First Found: 17.1		Primary Water Use:	Cooling And A	Pumping Duration (h:m): 1 : 0
Static Level: 12				
Layer:	Driller's Description:	Top:	Bottom:	
1	TOPSOIL	0	0.91	
1	TOPSOIL	0	0.91	
1	TOPSOIL	0	0.91	
2	SANDSTONE	0.91	24.7	
2	SANDSTONE	0.91	24.7	
2	SANDSTONE	0.91	24.7	

Well ID: 3509631		Easting: 424565	UTM Zone 18	
Construction Date: 1991-01-18		Northing: 4975403	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 24.4		Water Kind	FRESH	Pump Rate (LPM): 227
Well Diameter (cm): 15.2		Final Status	Water Supply	Recommended Pump Rate: 227
Water First Found: 16.5		Primary Water Use:	Domestic	Pumping Duration (h:m): 1 :
Static Level: 8				
Layer:	Driller's Description:	Top:	Bottom:	
1	CLAY	0	2.44	
1	CLAY	0	2.44	
2	SANDSTONE	2.44	24.4	
2	SANDSTONE	2.44	24.4	

Well ID: 3509632		Easting: 424564	UTM Zone 18	
Construction Date: 1991-01-18		Northing: 4975404	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 24.4		Water Kind	FRESH	Pump Rate (LPM): 227
Well Diameter (cm): 15.2		Final Status	Recharge Well	Recommended Pump Rate: 227
Water First Found: 18		Primary Water Use:	Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 9				
Layer:	Driller's Description:	Top:	Bottom:	
1	CLAY	0	1.83	
1	CLAY	0	1.83	
2	SANDSTONE	1.83	24.4	
2	SANDSTONE	1.83	24.4	

Well ID: 3509885		Easting: 425191	UTM Zone 18	
Construction Date: 1991-07-05		Northing: 4975865	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 24.4		Water Kind	FRESH	Pump Rate (LPM): 45
Well Diameter (cm): 12.7		Final Status	Water Supply	Recommended Pump Rate: 23
Water First Found: 22.9		Primary Water Use:	Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 5				
Layer:	Driller's Description:	Top:	Bottom:	
1	TILL	0	0.91	
2	SANDSTONE	0.91	24.4	

Well ID: 3510554	Easting: 425036	UTM Zone 18
Construction Date: 1992-12-03	Northing: 4975782	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 21.3	Water Kind FRESH	Pump Rate (LPM): 136
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 91
Water First Found: 9.75	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 8		
Layer:	Driller's Description:	Top: Bottom:
1	TOPSOIL	0 1.52
1	TOPSOIL	0 1.52
1	TOPSOIL	0 1.52
2	LIMESTONE	1.52 21.3
2	LIMESTONE	1.52 21.3
2	LIMESTONE	1.52 21.3

Well ID: 3511174	Easting: 424991	UTM Zone 18
Construction Date: 1994-08-12	Northing: 4975034	Positional Accuracy: unknown UTM
Well Depth: 29.6	Water Kind FRESH	Pump Rate (LPM): 91
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45
Water First Found: 29	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 11		
Layer:	Driller's Description:	Top: Bottom:
1	TOPSOIL	0 0.61
2	SANDSTONE	0.61 29.6

Well ID: 3511306	Easting: 424571	UTM Zone 18
Construction Date: 1994-11-14	Northing: 4975400	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 18.9	Water Kind Not stated	Pump Rate (LPM): 68
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 68
Water First Found: 15.9	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 8		
Layer:	Driller's Description:	Top: Bottom:
1	CLAY	0 2.74
1	CLAY	0 2.74
1	CLAY	0 2.74
1	CLAY	0 2.74
2	LIMESTONE	2.74 8.84
2	LIMESTONE	2.74 8.84
2	LIMESTONE	2.74 8.84
2	LIMESTONE	2.74 8.84
3	SANDSTONE	8.84 18.9
3	SANDSTONE	8.84 18.9
3	SANDSTONE	8.84 18.9
3	SANDSTONE	8.84 18.9

Well ID: 3511492
Construction Date: 1995-07-25

Easting: 424991
Northing: 4975034

UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 18.3
Well Diameter (cm): 15.2
Water First Found: 16.1
Static Level: 5

Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 68
Recommended Pump Rate: 68
Pumping Duration (h:m): 11 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3

Well ID: 3511965
Construction Date: 1997-02-21

Easting: 425405
Northing: 4975374

UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 28.7
Well Diameter (cm): 15.2
Water First Found: 27.7
Static Level: 1

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Livestock

Pump Rate (LPM): 91
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 15

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	1.22
1	GRAVEL	0	1.22
1	GRAVEL	0	1.22
2	LIMESTONE	1.22	28.6
2	LIMESTONE	1.22	28.6
2	LIMESTONE	1.22	28.6

Well ID: 3512062
Construction Date: 1997-06-17

Easting: 424991
Northing: 4975034

UTM Zone 18
Positional Accuracy: unknown UTM

Well Depth: 22.6
Well Diameter (cm): 15.2
Water First Found: 12.8
Static Level: 9

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 91
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
2	LIMESTONE	0.61	4.57
2	LIMESTONE	0.61	4.57
3	LIMESTONE	4.57	22.6

Well ID: 3512116	Easting: 424991	UTM Zone 18
Construction Date: 1997-08-28	Northing: 4975034	Positional Accuracy: unknown UTM
Well Depth: 22.6	Water Kind FRESH	Pump Rate (LPM): 86
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 86
Water First Found: 20.7	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 9		
Layer:	Driller's Description:	Top: Bottom:
1	CLAY	0 0.61
1	CLAY	0 0.61
1	CLAY	0 0.61
1	CLAY	0 0.61
2	LIMESTONE	0.61 22.6
2	LIMESTONE	0.61 22.6
2	LIMESTONE	0.61 22.6
2	LIMESTONE	0.61 22.6

Well ID: 3512498	Easting: 425009	UTM Zone 18
Construction Date: 1998-11-24	Northing: 4975828	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 28.0	Water Kind FRESH	Pump Rate (LPM): 45
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45
Water First Found: 26.8	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level: 8		
Layer:	Driller's Description:	Top: Bottom:
1	SAND	0 0.61
1	SAND	0 0.61
1	SAND	0 0.61
1	SAND	0 0.61
2	LIMESTONE	0.61 20.1
2	LIMESTONE	0.61 20.1
2	LIMESTONE	0.61 20.1
2	LIMESTONE	0.61 20.1
3	SANDSTONE	20.1 28.0
3	SANDSTONE	20.1 28.0
3	SANDSTONE	20.1 28.0
3	SANDSTONE	20.1 28.0

Well ID: 3512846	Easting: 424181	UTM Zone 18
Construction Date: 1999-12-17	Northing: 4975942	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 24.4	Water Kind FRESH	Pump Rate (LPM): 114
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 114
Water First Found: 18	Primary Water Use: Domestic	Pumping Duration (h:m): 1 :
Static Level: 11		
Layer:	Driller's Description:	Top: Bottom:
1	SAND	0 1.83
1	SAND	0 1.83

1	SAND	0	1.83
1	SAND	0	1.83
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4

Well ID: 3513877**Construction Date:** 2002-10-10**Easting:** 425401**Northing:** 4975374**UTM Zone** 18**Positional Accuracy:** unknown UTM**Well Depth:** 24.4**Well Diameter (cm):** 15.2**Water First Found:** 23.2**Static Level:** 5**Water Kind** Not stated**Final Status** Water Supply**Primary Water Use:** Domestic**Pump Rate (LPM):** 136**Recommended Pump Rate:** 136**Pumping Duration (h:m):** 1 : 0**Layer: Driller's Description: Top: Bottom:**

1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	24.4
2	LIMESTONE	0.61	24.4

Well ID: 3514012**Construction Date:** 2003-01-07**Easting:** 424571**Northing:** 4974688**UTM Zone** 18**Positional Accuracy:** margin of error : 1 km - 3 km**Well Depth:** 15.9**Well Diameter (cm):** 15.2**Water First Found:** 12.8**Static Level:** 4**Water Kind** FRESH**Final Status** Water Supply**Primary Water Use:** Domestic**Pump Rate (LPM):** 136**Recommended Pump Rate:** 45**Pumping Duration (h:m):** 1 : 0**Layer: Driller's Description: Top: Bottom:**

1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	SAND	0.61	1.52
2	SAND	0.61	1.52
3	CLAY	1.52	3.05
3	CLAY	1.52	3.05
4	GRAVEL	3.05	3.96
4	GRAVEL	3.05	3.96
5	SANDSTONE	3.96	15.9
5	SANDSTONE	3.96	15.9

Well ID: 3514013**Construction Date:** 2003-01-07**Easting:** 424571**Northing:** 4974688**UTM Zone** 18**Positional Accuracy:** margin of error : 1 km - 3 km**Well Depth:** 15.2**Well Diameter (cm):** 15.2**Water First Found:** 7.92**Static Level:** 2**Water Kind** FRESH**Final Status** Water Supply**Primary Water Use:** Domestic**Pump Rate (LPM):** 227**Recommended Pump Rate:** 45**Pumping Duration (h:m):** 1 : 0**Layer: Driller's Description: Top: Bottom:**

1	TOPSOIL	0	2.44
1	TOPSOIL	0	2.44
2	HARDPAN	2.44	3.66

2	HARDPAN	2.44	3.66
3	LIMESTONE	3.66	15.2
3	LIMESTONE	3.66	15.2

Well ID: 3514406	Easting: 425401	UTM Zone 18	
Construction Date: 2004-01-29	Northing: 4975375	Positional Accuracy: unknown UTM	
Well Depth: 22.6	Water Kind FRESH	Pump Rate (LPM): 45	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 45	
Water First Found: 21.3	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 8			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.83
2	LIMESTONE	1.83	22.6

Well ID: 3514548	Easting: 425025	UTM Zone 18	
Construction Date: 2004-06-24	Northing: 4975008	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth:	Water Kind	Pump Rate (LPM):	
Well Diameter (cm):	Final Status Abandoned-Qu	Recommended Pump Rate:	
Water First Found:	Primary Water Use: Domestic	Pumping Duration (h:m):	
Static Level:			
Layer:	Driller's Description:	Top:	Bottom:

Well ID: 3514549	Easting: 425031	UTM Zone 18	
Construction Date: 2004-06-24	Northing: 4975706	Positional Accuracy: margin of error : 100 m - 300 m	
Well Depth: 23.2	Water Kind FRESH	Pump Rate (LPM): 482	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 482	
Water First Found: 20.7	Primary Water Use: Domestic	Pumping Duration (h:m): 2 :	
Static Level: 5			
Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2

Well ID: 3514572	Easting: 425295	UTM Zone 18	
Construction Date: 2004-07-09	Northing: 4974720	Positional Accuracy: margin of error : 10 - 30 m	
Well Depth: 24.4	Water Kind	Pump Rate (LPM): 57	
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 32	
Water First Found: 23.5	Primary Water Use: Domestic	Pumping Duration (h:m): 1 :	
Static Level:			
Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91

1	CLAY	0	0.91
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4

Well ID: 3514905	Easting: 425167	UTM Zone 18
Construction Date: 2005-05-18	Northing: 4974871	Positional Accuracy: margin of error : 30 m - 100 m
Well Depth: 24.4	Water Kind	Pump Rate (LPM): 50
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 30
Water First Found: 16.5	Primary Water Use: Domestic	Pumping Duration (h:m): 1 :
Static Level:		

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3

4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4

Well ID: 3514939

Construction Date: 2005-06-14

Easting: 425194

Northing: 4974918

UTM Zone 18

Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 25.9

Well Diameter (cm):

Water First Found: 24.4

Static Level:

Water Kind

Final Status

Primary Water Use: Domestic

Pump Rate (LPM): 45

Recommended Pump Rate: 30

Pumping Duration (h:m): 1 :

Water Supply

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.79
1	TOPSOIL	0	0.79
2	SANDSTONE	0.79	16.8
2	SANDSTONE	0.79	16.8
3	SANDSTONE	16.8	17.1
3	SANDSTONE	16.8	17.1
4	SANDSTONE	17.1	24.1
4	SANDSTONE	17.1	24.1
5	SANDSTONE	24.1	24.7
5	SANDSTONE	24.1	24.7
6	SANDSTONE	24.7	25.9
6	SANDSTONE	24.7	25.9

Well ID: 3514989

Construction Date: 2005-07-11

Easting: 425160

Northing: 4974808

UTM Zone 18

Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 24.4

Well Diameter (cm): 15.2

Water First Found: 22.6

Static Level:

Water Kind

Final Status

Primary Water Use: Domestic

Pump Rate (LPM): 52

Recommended Pump Rate: 30

Pumping Duration (h:m): 1 :

Water Supply

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30

1	TOPSOIL	0	0.30
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4

Well ID: 3515018

Construction Date: 2005-07-28

Eastings: 424248

Northings: 4975444

UTM Zone 18

Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 13.7

Well Diameter (cm):

Water First Found: 8.23

Static Level: 2

Water Kind FRESH

Final Status Water Supply

Primary Water Use: Domestic

Pump Rate (LPM): 159

Recommended Pump Rate: 45

Pumping Duration (h:m): 2 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7

Well ID: 3515067

Construction Date: 2005-09-07

Eastings: 425136

Northings: 4974837

UTM Zone 18

Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 24.4

Well Diameter (cm):

Water First Found: 22

Static Level:

Water Kind

Final Status Water Supply

Primary Water Use: Domestic

Pump Rate (LPM): 45

Recommended Pump Rate: 30

Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3

2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4

Well ID: 3515321**Construction Date:** 2006-05-12**Easting:** 425391**Northing:** 4974943**UTM Zone** 18**Positional Accuracy:** margin of error : 10 - 30 m**Well Depth:** 24.4**Well Diameter (cm):****Water First Found:** 12.2**Static Level:** 12**Water Kind**

FRESH

Final Status

Water Supply

Primary Water Use:

Domestic

Pump Rate (LPM):

45

Recommended Pump Rate: 45**Pumping Duration (h:m):** 2 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4

Well ID: 3515503**Construction Date:** 2006-11-17**Easting:** 425268**Northing:** 4974973**UTM Zone** 18**Positional Accuracy:** margin of error : 10 - 30 m**Well Depth:** 24.4**Well Diameter (cm):** 15.2**Water First Found:** 16.5**Static Level:****Water Kind**

FRESH

Final Status

Water Supply

Primary Water Use:

Domestic

Pump Rate (LPM):

87

Recommended Pump Rate: 12**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
3	SANDSTONE	15.2	16.8
3	SANDSTONE	15.2	16.8
3	SANDSTONE	15.2	16.8

3	SANDSTONE	15.2	16.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4

Well ID: 7048403	Easting: 425200	UTM Zone 18
Construction Date: 2007-08-17	Northing: 4974843	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 24.4	Water Kind	Pump Rate (LPM): 80
Well Diameter (cm):	Final Status Water Supply	Recommended Pump Rate: 35
Water First Found: 22.9	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0
Static Level:		

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	
1	CLAY	0	
2	SANDSTONE		0.61
2	SANDSTONE		0.61
3	SANDSTONE	0.61	2.43
3	SANDSTONE	0.61	2.43
4	SANDSTONE	2.43	22.9
4	SANDSTONE	2.43	22.9
5	SANDSTONE	22.9	23.2
5	SANDSTONE	22.9	23.2
6		23.2	24.4
6		23.2	24.4

Well ID: 7109832	Easting: 424516	UTM Zone 18
Construction Date: 2008-08-14	Northing: 4975241	Positional Accuracy: margin of error : 10 - 30 m
Well Depth: 18.3	Water Kind Untested	Pump Rate (LPM): 414
Well Diameter (cm): 15.2	Final Status Water Supply	Recommended Pump Rate: 414
Water First Found: 15.9	Primary Water Use: Domestic	Pumping Duration (h:m): 1 :
Static Level: 4		

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3

2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3

Well ID: 7122399**Easting:** 425098**UTM Zone** 18**Construction Date:** 2009-04-28**Northing:** 4974747**Positional Accuracy:** margin of error : 30 m - 100 m**Well Depth:** 24.4**Water Kind** Untested**Pump Rate (LPM):** 68**Well Diameter (cm):** 38.1**Final Status** Water Supply**Recommended Pump Rate:** 68**Water First Found:** 22.9**Primary Water Use:** Domestic**Pumping Duration (h:m):** 1 : 0**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
2	SANDSTONE	1.22	22.3
3	SANDSTONE	22.3	22.9
4	SANDSTONE	22.9	24.4

Well ID: 7122400**Easting:** 425117**UTM Zone** 18**Construction Date:** 2009-04-28**Northing:** 4974777**Positional Accuracy:** margin of error : 30 m - 100 m**Well Depth:** 24.4**Water Kind** Untested**Pump Rate (LPM):** 68**Well Diameter (cm):** 15**Final Status** Water Supply**Recommended Pump Rate:** 68**Water First Found:** 22.3**Primary Water Use:** Domestic**Pumping Duration (h:m):** 1 : 0**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.76
1	CLAY	0	0.76
2	SANDSTONE	0.76	22.3
2	SANDSTONE	0.76	22.3
3	SANDSTONE	22.3	22.9
3	SANDSTONE	22.3	22.9
4	SANDSTONE	22.9	24.4
4	SANDSTONE	22.9	24.4

Well ID: 7192550**Easting:** 424533**UTM Zone** 18**Construction Date:** 2012-12-04**Northing:** 4975223**Positional Accuracy:** margin of error : 30 m - 100 m**Well Depth:** 18.3**Water Kind** Untested**Pump Rate (LPM):** 91**Well Diameter (cm):** 15.9**Final Status** Water Supply**Recommended Pump Rate:** 91**Water First Found:** 14.6**Primary Water Use:** Domestic**Pumping Duration (h:m):** 1 :**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
2	SAND	1.22	12.2

2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3

Well ID: 7228026	Easting: 424567	UTM Zone 18
Construction Date: 2014-09-22	Northing: 4975187	Positional Accuracy: margin of error : 30 m - 100 m
Well Depth: 18.6	Water Kind Untested	Pump Rate (LPM): 91
Well Diameter (cm): 14.9	Final Status Water Supply	Recommended Pump Rate: 91
Water First Found: 16.1	Primary Water Use: Domestic	Pumping Duration (h:m): 1 :
Static Level: 3		

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7

3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6

Well ID: 7268446	Easting: 424760	UTM Zone 18	
Construction Date: 2016-08-10	Northing: 4974829	Positional Accuracy: margin of error : 30 m - 100 m	
Well Depth: 24.4	Water Kind Untested	Pump Rate (LPM): 91	
Well Diameter (cm): 15.9	Final Status Water Supply	Recommended Pump Rate: 91	
Water First Found: 17.7	Primary Water Use: Domestic	Pumping Duration (h:m): 1 : 0	
Static Level: 7			

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	1.22
1	SAND	0	1.22
1	SAND	0	1.22
1	SAND	0	1.22
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4

Well ID: 7268447

Construction Date: 2016-08-10

Easting: 424277

Northing: 4975064

UTM Zone 18

Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 29.9

Well Diameter (cm): 15.6

Water First Found: 27.4

Static Level: 6

Water Kind

Final Status

Primary Water Use: Domestic

Untested

Water Supply

Pump Rate (LPM): 91

Recommended Pump Rate: 91

Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
2	SAND	18.9	27.4
2	SAND	18.9	27.4
2	SAND	18.9	27.4
2	SAND	18.9	27.4
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9



Environmental

Geotechnical

Building Sciences

Construction Quality
Verification

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Locations

Peterborough
Kingston
Barrie
Oshawa

Laboratory

Peterborough



February 9, 2024

Dear property owner,

Cambium is conducting a groundwater study for the proposed subdivision located southeast of the intersection of Matheson Drive and Rosedale Road South. As part of the assessment, we are taking inventory of private groundwater users located adjacent to the work area. The purpose of the inventory is to identify nearby water supply wells that may be sensitive to the development and to catalogue the existing groundwater conditions, water levels, yields, water quality, etc.

If a supply well is located on your property, we are requesting that you please review and complete the attached questionnaire. Complete as much information as possible and scan the document (or take a photograph) and email to kyle.horner@cambium-inc.com. Please note, Cambium Inc. may contact you at a later date to request permission to monitor the water level in your well in the future.

You are not obligated to complete this form, your participation is voluntary, and all results regarding your well will be confidential. If you choose to provide a response to this letter, please do so before Friday, February 23, 2024.

If you have any questions regarding this project, please contact Kyle Horner at 613 876 4516.

Best regards,

Kyle Horner, Ph.D., P.Geo.
Senior Hydrogeologist / Senior Project
Manager, Cambium Inc.

KH/kh

Attached: Water Well Survey Questionnaire



Well Use Survey Summary Report

Number	Street	Spoke to owner	Participated in program	Comments	Water Level (mtop)	Depth (mtop)	Well Record #	UTM	
								mE	mN
100	Bower Boulevard	Yes	No	Gave letter to homeowner					
105	Bower Boulevard	No	-	Left letter in mailbox					
115	Bower Boulevard	No	-	Left letter in mailbox					
116	Bower Boulevard	Yes	No	Gave letter to homeowner					
125	Bower Boulevard	Yes	No	Gave letter to homeowner					
126	Bower Boulevard	No	-	Left letter in mailbox					
135	Bower Boulevard	No	-	Left letter in mailbox					
136	Bower Boulevard	No	-	Left letter in mailbox					
146	Bower Boulevard	No	-	Left letter in mailbox					
147	Bower Boulevard	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	24.38	A051443	425200	4974843
151	Bower Boulevard	Yes	No	Gave letter to homeowner					
156	Bower Boulevard	Yes	No	Gave letter to homeowner					
166	Bower Boulevard	Yes	No	Gave letter to homeowner					
167	Bower Boulevard	No	-	Left letter in mailbox					
173	Bower Boulevard	No	-	Left letter in mailbox					
182	Bower Boulevard	No	-	Left letter in mailbox					
746	Rosedal Rd South	No	-	Left letter in mailbox					
760	Rosedal Rd South	No	-	Left letter in mailbox					
765	Rosedal Rd South	No	-	Left letter in mailbox					
771	Rosedal Rd South	No	-	Left letter in mailbox					
780	Rosedal Rd South	Yes	No	Gave letter to homeowner					
782	Rosedal Rd South	No	-	Left letter in mailbox					
785	Rosedal Rd South	No	-	Left letter in mailbox					
795	Rosedal Rd South	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	~30	-	-	-
805	Rosedal Rd South	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	24.4	A360999	424701	4974928
815	Rosedal Rd South	No	-	Left letter in mailbox					
843	Rosedal Rd South	No	-	Left letter in mailbox					
845	Rosedal Rd South	No	-	Left letter in mailbox					
862	Rosedal Rd South	Yes	No	Gave letter to homeowner					

Well Use Survey Summary Report

[illegible]

Hydrogeological Assessment
Smart Homes Ottawa Inc.
Ref. No.: 19387-001
2024-04-29

Well Use Survey Summary Report

[illegible]

Hydrogeological Assessment
Smart Homes Ottawa Inc.
Ref. No.: 19387-001
2024-04-29

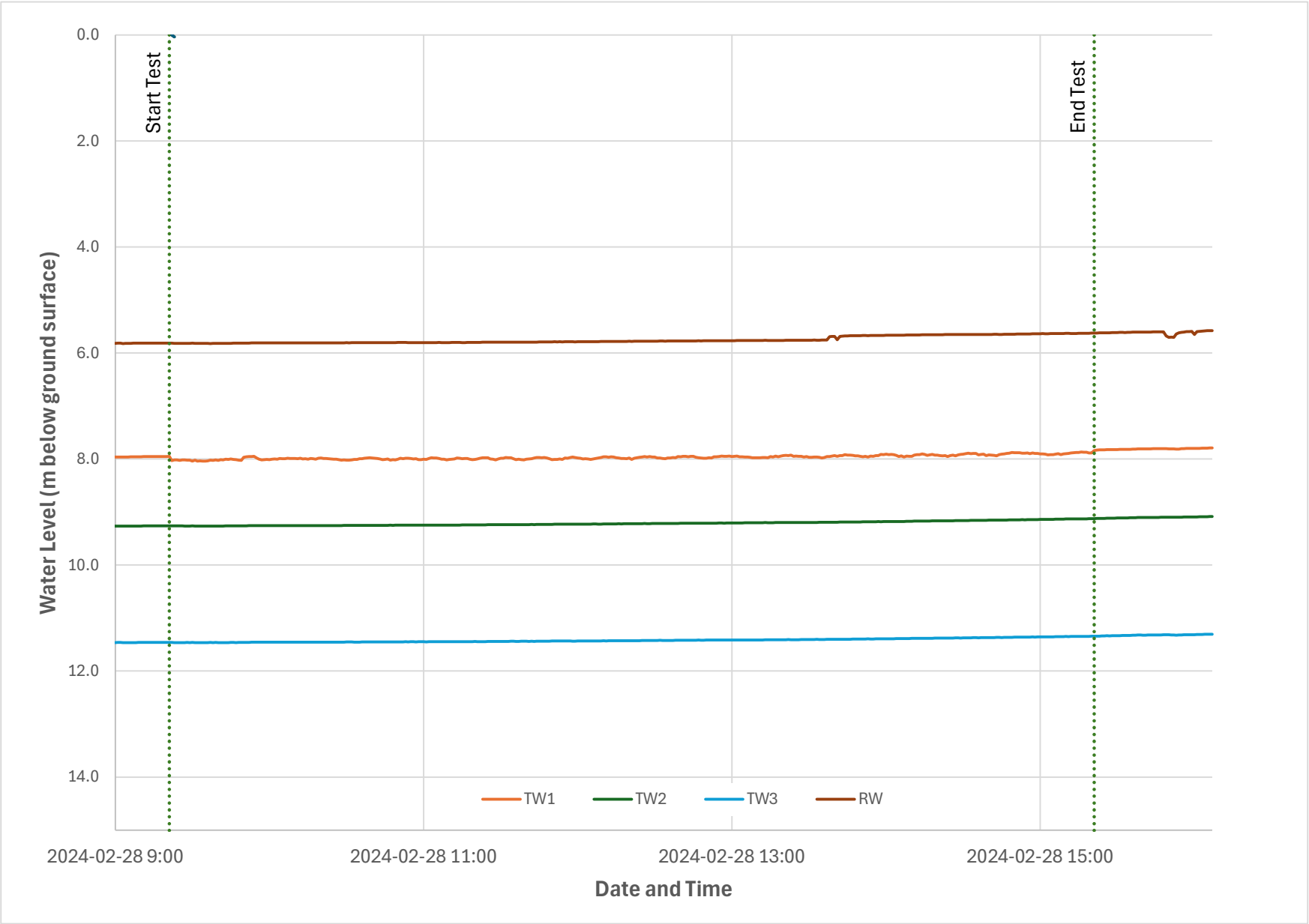
Well Use Survey Summary Report

[illegible]

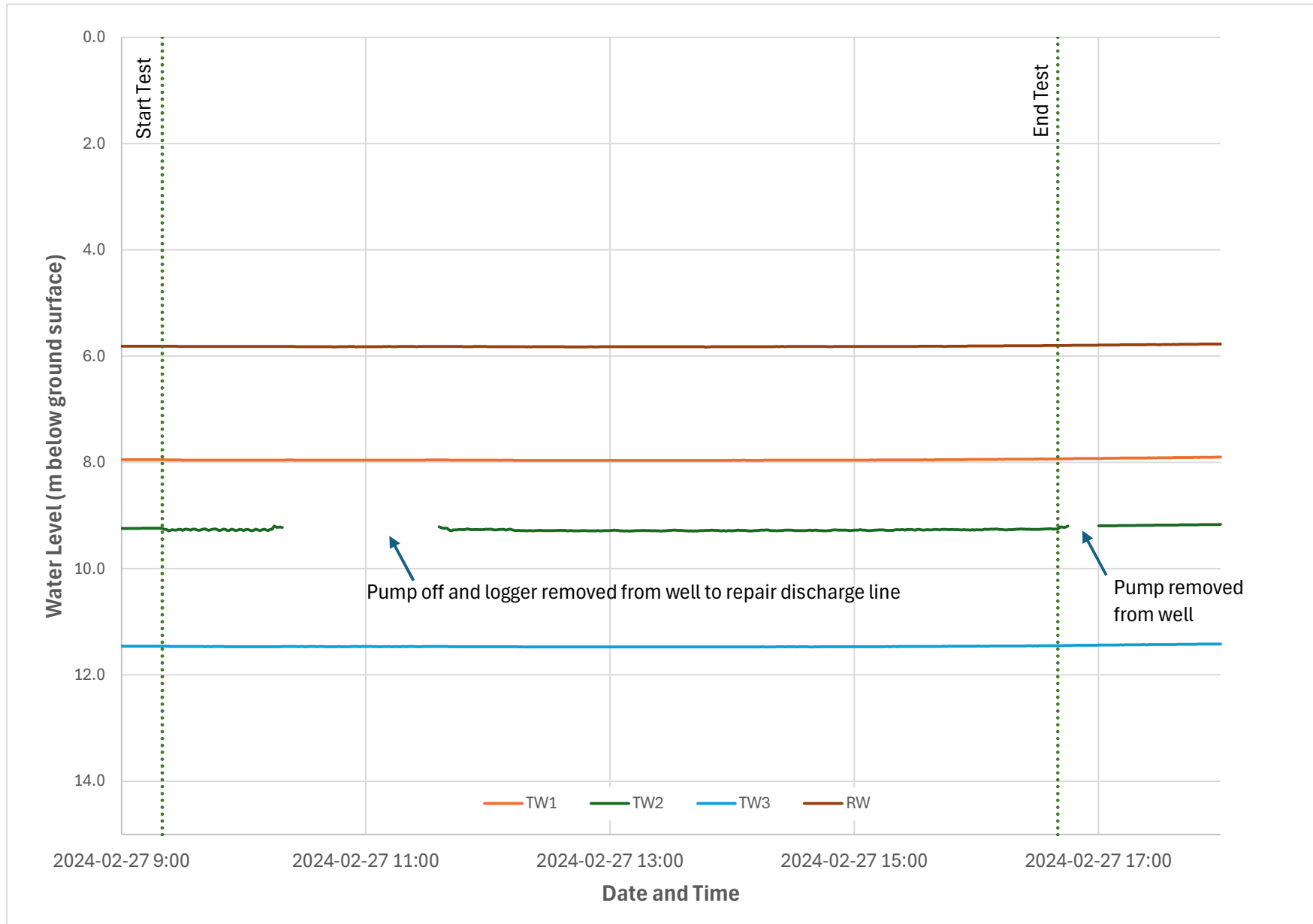


Appendix F

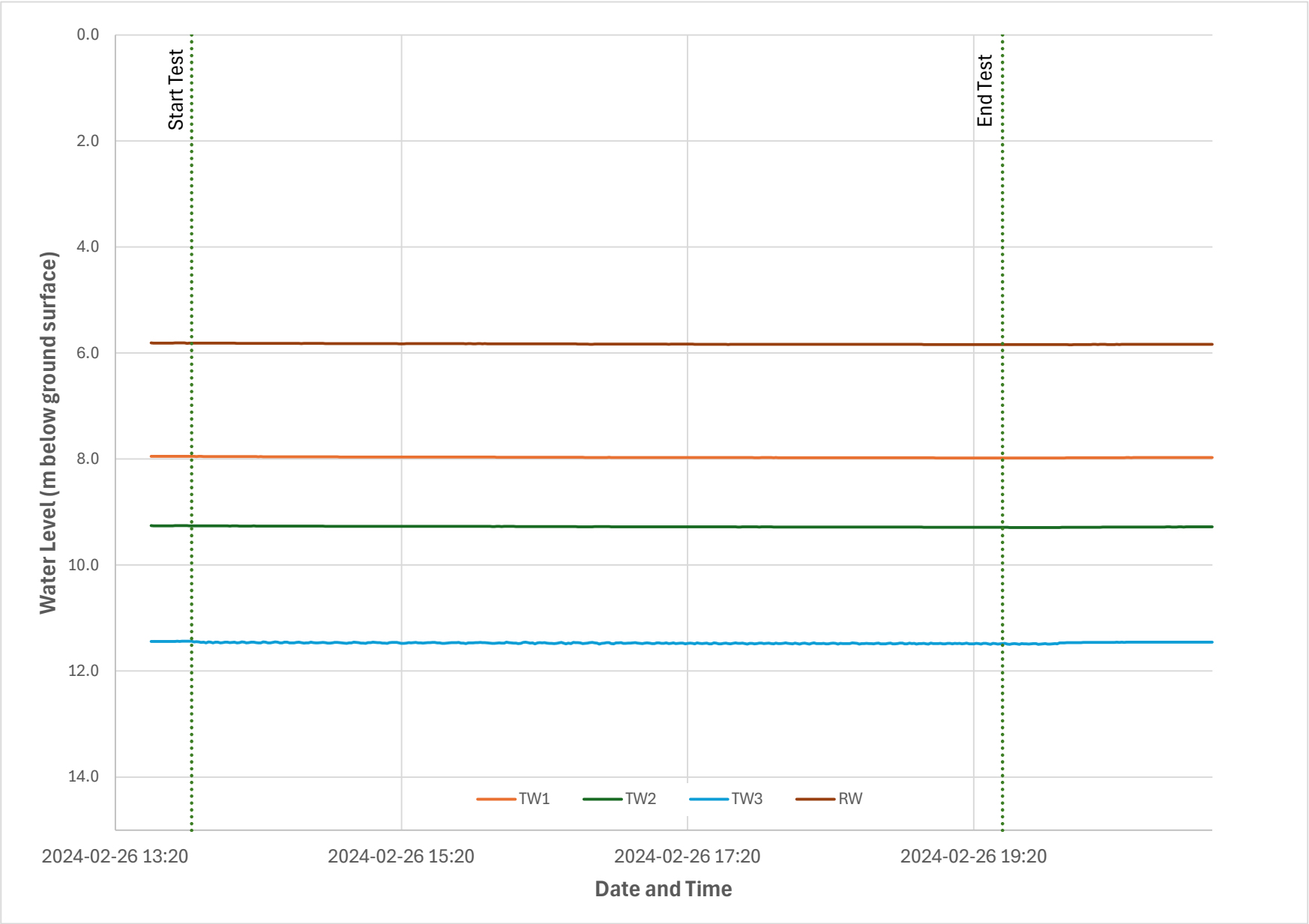
Hydraulic Pumping Test Results



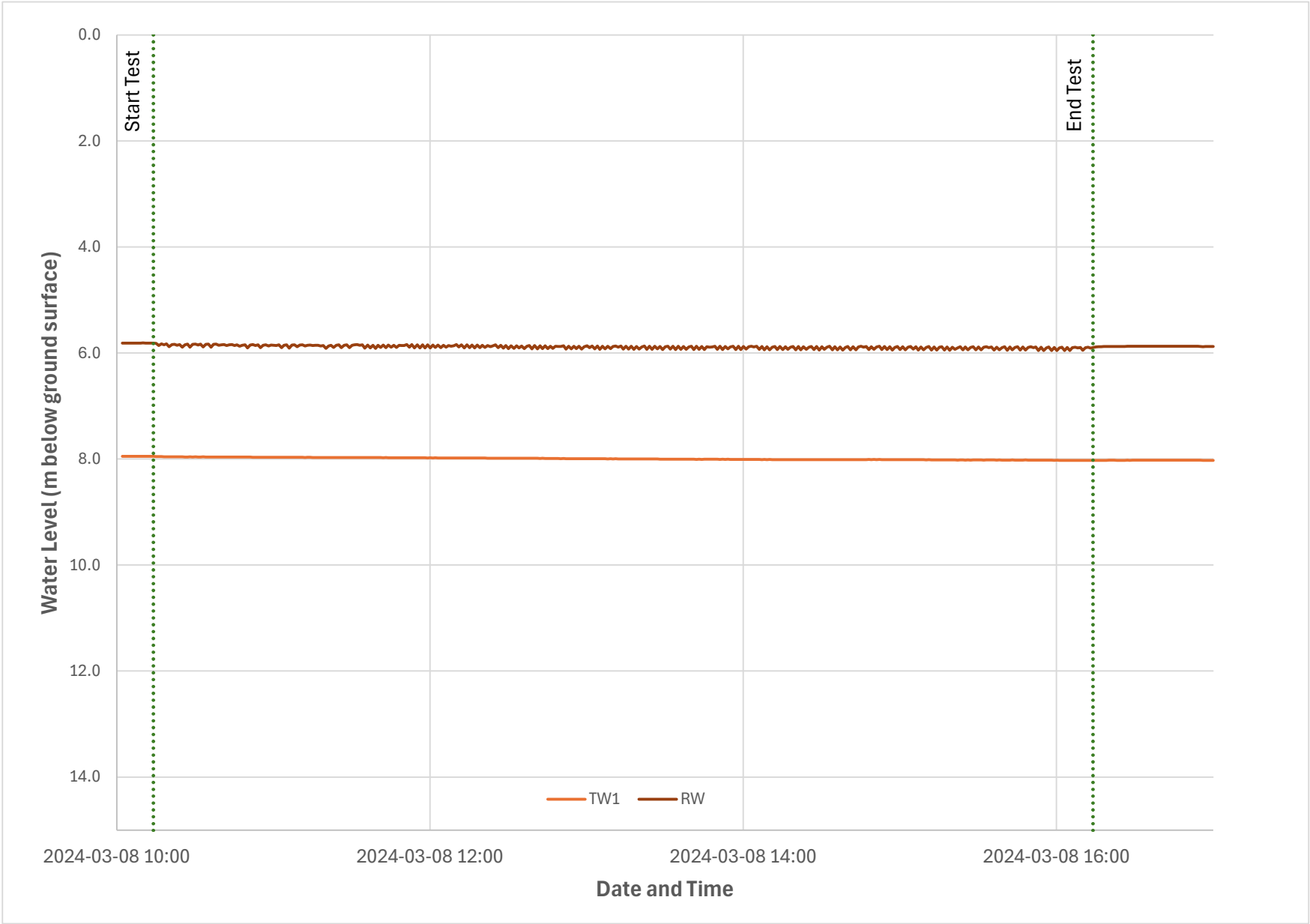
Measured Water Levels for TW1 Pumping Test



Measured Water Levels for TW2 Pumping Test



Measured Water Levels for TW3 Pumping Test



Measured Water Levels for RW1 Pumping Test



Appendix G
Water Quality Results



Your Project #: 19387-001
Your C.O.C. #: 977413-03-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/06

Report #: R8055255

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C462310

Received: 2024/03/01, 08:51

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/03/04	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/03/05		
Anion and Cation Sum	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/03/01	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL)	1	N/A	2024/03/01	CAM SOP-00552	
Total Ammonia-N	1	N/A	2024/03/05	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/03/04	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/04	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/03/04	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/03/05		Auto Calc
Turbidity	1	N/A	2024/03/01	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: 19387-001
Your C.O.C. #: 977413-03-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/06
Report #: R8055255
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C462310

Received: 2024/03/01, 08:51

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Metals analysis was performed on the sample 'as received'.

(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YNA332			YNA332		
Sampling Date		2024/02/28 14:50			2024/02/28 14:50		
COC Number		977413-03-01			977413-03-01		
	UNITS	TW1	RDL	QC Batch	TW1 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	3.75	N/A	9250424			
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	180	1.0	9250087			
Calculated TDS	mg/L	180	1.0	9250422			
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	1.5	1.0	9250087			
Cation Sum	me/L	3.92	N/A	9250424			
Hardness (CaCO ₃)	mg/L	190	1.0	9250421			
Ion Balance (% Difference)	%	2.21	N/A	9250423			
Langelier Index (@ 20C)	N/A	0.482		9250426			
Langelier Index (@ 4C)	N/A	0.232		9250427			
Saturation pH (@ 20C)	N/A	7.46		9250426			
Saturation pH (@ 4C)	N/A	7.71		9250427			
Inorganics							
Total Ammonia-N	mg/L	<0.050	0.050	9253581			
Conductivity	umho/cm	360	1.0	9252632			
Dissolved Organic Carbon	mg/L	1.6	0.40	9248281			
Orthophosphate (P)	mg/L	<0.010	0.010	9251735	<0.010	0.010	9251735
pH	pH	7.94		9252633			
Dissolved Sulphate (SO ₄)	mg/L	3.5	1.0	9251733	3.4	1.0	9251733
Alkalinity (Total as CaCO ₃)	mg/L	180	1.0	9252631			
Dissolved Chloride (Cl ⁻)	mg/L	<1.0	1.0	9251730	<1.0	1.0	9251730
Nitrite (N)	mg/L	<0.010	0.010	9250717			
Nitrate (N)	mg/L	0.26	0.10	9250717			
Metals							
Aluminum (Al)	ug/L	<4.9	4.9	9247907			
Antimony (Sb)	ug/L	<0.50	0.50	9247907			
Arsenic (As)	ug/L	<1.0	1.0	9247907			
Barium (Ba)	ug/L	27	2.0	9247907			
Beryllium (Be)	ug/L	<0.40	0.40	9247907			
Boron (B)	ug/L	<10	10	9247907			
Cadmium (Cd)	ug/L	<0.090	0.090	9247907			
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
Lab-Dup = Laboratory Initiated Duplicate							
N/A = Not Applicable							

BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YNA332			YNA332		
Sampling Date		2024/02/28 14:50			2024/02/28 14:50		
COC Number		977413-03-01			977413-03-01		
	UNITS	TW1	RDL	QC Batch	TW1 Lab-Dup	RDL	QC Batch
Calcium (Ca)	ug/L	46000	200	9247907			
Chromium (Cr)	ug/L	<5.0	5.0	9247907			
Cobalt (Co)	ug/L	<0.50	0.50	9247907			
Copper (Cu)	ug/L	<0.90	0.90	9247907			
Iron (Fe)	ug/L	<100	100	9247907			
Lead (Pb)	ug/L	<0.50	0.50	9247907			
Lithium (Li)	ug/L	<5.0	5.0	9247907			
Magnesium (Mg)	ug/L	19000	50	9247907			
Manganese (Mn)	ug/L	<2.0	2.0	9247907			
Molybdenum (Mo)	ug/L	<0.50	0.50	9247907			
Nickel (Ni)	ug/L	<1.0	1.0	9247907			
Phosphorus (P)	ug/L	<100	100	9247907			
Potassium (K)	ug/L	650	200	9247907			
Selenium (Se)	ug/L	<2.0	2.0	9247907			
Silicon (Si)	ug/L	1600	50	9247907			
Silver (Ag)	ug/L	<0.090	0.090	9247907			
Sodium (Na)	ug/L	750	100	9247907			
Strontium (Sr)	ug/L	31	1.0	9247907			
Thallium (Tl)	ug/L	<0.050	0.050	9247907			
Titanium (Ti)	ug/L	<5.0	5.0	9247907			
Uranium (U)	ug/L	0.41	0.10	9247907			
Vanadium (V)	ug/L	<0.50	0.50	9247907			
Zinc (Zn)	ug/L	17	5.0	9247907			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



**BUREAU
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YNA332		
Sampling Date		2024/02/28 14:50		
COC Number		977413-03-01		
	UNITS	TW1	RDL	QC Batch
Inorganics				
Turbidity	NTU	<0.1	0.1	9251388
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



Bureau Veritas Job #: C462310
Report Date: 2024/03/06

Cambium Environmental Inc
Client Project #: 19387-001
Sampler Initials: MC

MICROBIOLOGY (WATER)

Bureau Veritas ID		YNA332	
Sampling Date		2024/02/28 14:50	
COC Number		977413-03-01	
	UNITS	TW1	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	9250958
Background	CFU/100mL	220	9250895
Total Coliforms	CFU/100mL	27	9250895
Escherichia coli	CFU/100mL	0	9250895
QC Batch = Quality Control Batch			



**BUREAU
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

TEST SUMMARY

Bureau Veritas ID: YNA332

Sample ID: TW1

Matrix: Water

Collected: 2024/02/28

Shipped:

Received: 2024/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9250087	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9251730	N/A	2024/03/04	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO ₃)		9250421	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9250423	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9250424	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9250895	N/A	2024/03/01	Aayushi Patel
Fecal coliform, (CFU/100mL)	PL	9250958	N/A	2024/03/01	Aayushi Patel
Total Ammonia-N	LACH/NH ₄	9253581	N/A	2024/03/05	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9250717	N/A	2024/03/04	Chandra Nandlal
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9251735	N/A	2024/03/04	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9250426	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9250427	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9251733	N/A	2024/03/04	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9250422	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9251388	N/A	2024/03/01	Leily Karimi

Bureau Veritas ID: YNA332 Dup

Sample ID: TW1

Matrix: Water

Collected: 2024/02/28

Shipped:

Received: 2024/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9251730	N/A	2024/03/04	Alina Dobreanu
Orthophosphate	KONE	9251735	N/A	2024/03/04	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	9251733	N/A	2024/03/04	Alina Dobreanu



BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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Results relate only to the items tested.

BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20

BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

QUALITY ASSURANCE REPORT(CONT'D)

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9250717	Nitrate (N)	2024/03/04	97	80 - 120	98	80 - 120	<0.10	mg/L	1.2	20
9250717	Nitrite (N)	2024/03/04	101	80 - 120	104	80 - 120	<0.010	mg/L	2.1	20
9251388	Turbidity	2024/03/01			100	80 - 120	<0.1	NTU	NC	20
9251730	Dissolved Chloride (Cl-)	2024/03/04	94	80 - 120	94	80 - 120	<1.0	mg/L	NC	20
9251733	Dissolved Sulphate (SO4)	2024/03/04	92	75 - 125	93	80 - 120	<1.0	mg/L	0.86	20
9251735	Orthophosphate (P)	2024/03/04	94	75 - 125	92	80 - 120	<0.010	mg/L	NC	20
9252631	Alkalinity (Total as CaCO3)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A
9253581	Total Ammonia-N	2024/03/05	NC	75 - 125	103	80 - 120	<0.050	mg/L	0.54	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read 'Anastassia Hamanov'.

Anastassia Hamanov, Scientific Specialist

A handwritten signature in black ink, appearing to read 'Aayushi Patel'.

Aayushi Patel, B.sc in Biotechnology, Lab Technician

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 Bureau Veritas 6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 www.bvna.com		CHAIN () NONT-2024-03-008																	
INVOICE TO: Company Name: #17950 Cambium Environmental Inc Attention: ACCOUNTS PAYABLE Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5 Tel: (705) 742-7900 Fax: (705) 742-7907 Email: accounting@cambium-inc.com		REPORT TO: Company Name: #26906 Cambium Environmental Inc Attention: Kyle Horner Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3 Tel: (613) 389-2323 Fax: Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i																	
PROJECT INFORMATION: Quotation #: C26318 P.O. #: Project: 19387-001. Project Name: Site #: Sampled By: Maren Catt		der #: 13 Manager: Christine Gipton C#977413-03-01																	
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY																			
Regulation 153 (2011) ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table _____		Other Regulations ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality _____ ☒ PWQO ☐ Reg 406 Table _____ ☐ Other _____																	
Special Instructions _____		ANALYSIS REQUESTED (PLEASE BE SPECIFIC) Turnaround Time (TAT) Required: _____ Please provide advance notice for rush projects.																	
Include Criteria on Certificate of Analysis (Y/N)? _____		Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)																	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)									# of Bottles	Comments
1	TW1	Feb. 28, 2024	2:50pm	GW		✓	✓	✓	✓									5	PH: 7.17 Temp: 11.7°C
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Laboratory Use Only										
Maren Catt		24/02/28	7:30pm	Guan Guan Sawani		2024/03/01	08:51		Time Sensitive	Temperature (°C) on Recept	Custody Seal Present	Yes	No						
										5/5/17		✓							
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.										* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.					** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.				
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Your Project #: 19387-001.
Your C.O.C. #: 977413-02-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/06

Report #: R8055485

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C460880

Received: 2024/02/29, 10:34

Sample Matrix: Ground Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	1	N/A	2024/03/01	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity (1)	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3) (1)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (1, 3)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2024/03/05		
Anion and Cation Sum (1)	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2024/02/29	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2024/02/29	CAM SOP-00552	
Total Ammonia-N (1)	1	N/A	2024/03/01	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1, 4)	1	N/A	2024/03/01	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (1)	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate (1)	1	N/A	2024/02/29	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C) (1)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C) (1)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry (1)	1	N/A	2024/03/01	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc) (1)	1	N/A	2024/03/05		Auto Calc
Turbidity (1)	1	N/A	2024/02/29	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or



Your Project #: 19387-001.
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BUREAU VERITAS JOB #: C460880

Received: 2024/02/29, 10:34

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
- (2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (3) Metals analysis was performed on the sample 'as received'.
- (4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YMT605		
Sampling Date		2024/02/27 16:10		
COC Number		977413-02-01		
	UNITS	TW2	RDL	QC Batch
Calculated Parameters				
Anion Sum	me/L	4.38	N/A	9247937
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	200	1.0	9247934
Calculated TDS	mg/L	230	1.0	9247933
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	1.4	1.0	9247934
Cation Sum	me/L	4.63	N/A	9247937
Hardness (CaCO ₃)	mg/L	210	1.0	9247935
Ion Balance (% Difference)	%	2.82	N/A	9247936
Langelier Index (@ 20C)	N/A	0.506		9247938
Langelier Index (@ 4C)	N/A	0.256		9247939
Saturation pH (@ 20C)	N/A	7.36		9247938
Saturation pH (@ 4C)	N/A	7.61		9247939
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	9248977
Conductivity	umho/cm	420	1.0	9252632
Dissolved Organic Carbon	mg/L	1.5	0.40	9248281
Orthophosphate (P)	mg/L	<0.010	0.010	9248304
pH	pH	7.87		9252633
Dissolved Sulphate (SO ₄)	mg/L	6.8	1.0	9248305
Alkalinity (Total as CaCO ₃)	mg/L	200	1.0	9252631
Dissolved Chloride (Cl ⁻)	mg/L	8.2	1.0	9248307
Nitrite (N)	mg/L	<0.010	0.010	9248650
Nitrate (N)	mg/L	0.30	0.10	9248650
Metals				
Aluminum (Al)	ug/L	8.5	4.9	9247907
Antimony (Sb)	ug/L	<0.50	0.50	9247907
Arsenic (As)	ug/L	<1.0	1.0	9247907
Barium (Ba)	ug/L	240	2.0	9247907
Beryllium (Be)	ug/L	<0.40	0.40	9247907
Boron (B)	ug/L	<10	10	9247907
Cadmium (Cd)	ug/L	<0.090	0.090	9247907
Calcium (Ca)	ug/L	54000	200	9247907
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
N/A = Not Applicable				



BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YMT605		
Sampling Date		2024/02/27 16:10		
COC Number		977413-02-01		
	UNITS	TW2	RDL	QC Batch
Chromium (Cr)	ug/L	<5.0	5.0	9247907
Cobalt (Co)	ug/L	<0.50	0.50	9247907
Copper (Cu)	ug/L	1.5	0.90	9247907
Iron (Fe)	ug/L	<100	100	9247907
Lead (Pb)	ug/L	<0.50	0.50	9247907
Lithium (Li)	ug/L	<5.0	5.0	9247907
Magnesium (Mg)	ug/L	18000	50	9247907
Manganese (Mn)	ug/L	2.2	2.0	9247907
Molybdenum (Mo)	ug/L	0.59	0.50	9247907
Nickel (Ni)	ug/L	<1.0	1.0	9247907
Phosphorus (P)	ug/L	<100	100	9247907
Potassium (K)	ug/L	1400	200	9247907
Selenium (Se)	ug/L	<2.0	2.0	9247907
Silicon (Si)	ug/L	2800	50	9247907
Silver (Ag)	ug/L	<0.090	0.090	9247907
Sodium (Na)	ug/L	9800	100	9247907
Strontium (Sr)	ug/L	64	1.0	9247907
Thallium (Tl)	ug/L	<0.050	0.050	9247907
Titanium (Ti)	ug/L	<5.0	5.0	9247907
Uranium (U)	ug/L	1.1	0.10	9247907
Vanadium (V)	ug/L	<0.50	0.50	9247907
Zinc (Zn)	ug/L	22	5.0	9247907
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU
VERITAS**

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		YMT605		
Sampling Date		2024/02/27 16:10		
COC Number		977413-02-01		
	UNITS	TW2	RDL	QC Batch
Inorganics				
Turbidity	NTU	0.4	0.1	9248975
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



Bureau Veritas Job #: C460880
Report Date: 2024/03/06

Cambium Environmental Inc
Client Project #: 19387-001.
Sampler Initials: MC

MICROBIOLOGY (GROUND WATER)

Bureau Veritas ID		YMT605	
Sampling Date		2024/02/27 16:10	
COC Number		977413-02-01	
	UNITS	TW2	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	9248235
Background	CFU/100mL	610	9248199
Total Coliforms	CFU/100mL	0	9248199
Escherichia coli	CFU/100mL	0	9248199
QC Batch = Quality Control Batch			



BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

TEST SUMMARY

Bureau Veritas ID: YMT605
Sample ID: TW2
Matrix: Ground Water

Collected: 2024/02/27
Shipped:
Received: 2024/02/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9247934	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9248307	N/A	2024/03/01	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO ₃)		9247935	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9247936	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9247937	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9248199	N/A	2024/02/29	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	9248235	N/A	2024/02/29	Paramjit Paramjit
Total Ammonia-N	LACH/NH ₄	9248977	N/A	2024/03/01	Chandra Nandlal
Nitrate & Nitrite as Nitrogen in Water	LACH	9248650	N/A	2024/03/01	Jinal Chavda
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9248304	N/A	2024/02/29	Massarat Jan
Sat. pH and Langelier Index (@ 20C)	CALC	9247938	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9247939	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9248305	N/A	2024/03/01	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9247933	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9248975	N/A	2024/02/29	Leily Karimi



Bureau Veritas Job #: C460880
Report Date: 2024/03/06

Cambium Environmental Inc
Client Project #: 19387-001.
Sampler Initials: MC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
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Results relate only to the items tested.

BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20
9248304	Orthophosphate (P)	2024/02/29	95	75 - 125	91	80 - 120	<0.010	mg/L	NC	20

BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

QUALITY ASSURANCE REPORT(CONT'D)

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9248305	Dissolved Sulphate (SO ₄)	2024/03/01	94	75 - 125	97	80 - 120	<1.0	mg/L	6.3	20
9248307	Dissolved Chloride (Cl ⁻)	2024/03/01	98	80 - 120	95	80 - 120	<1.0	mg/L	NC	20
9248650	Nitrate (N)	2024/03/01	105	80 - 120	100	80 - 120	<0.10	mg/L	NC	20
9248650	Nitrite (N)	2024/03/01	106	80 - 120	103	80 - 120	<0.010	mg/L	1.9	20
9248975	Turbidity	2024/02/29			100	80 - 120	<0.1	NTU	1.7	20
9248977	Total Ammonia-N	2024/03/01	100	75 - 125	100	80 - 120	<0.050	mg/L	NC	20
9252631	Alkalinity (Total as CaCO ₃)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read "Anastassia Hamanov".

Anastassia Hamanov, Scientific Specialist

A handwritten signature in black ink, appearing to read "Paramjit".

Paramjit Paramjit, Analyst I

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

		Bureau Veritas 6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com		Received in Ottawa		CHAIN		29-Feb-24 10:34 Christine Gripton C460880 AN4 ENV-1241	
INVOICE TO: Company Name: #17950 Cambium Environmental Inc Attention: ACCOUNTS PAYABLE Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5 Tel: (705) 742-7900 Fax: (705) 742-7907 Email: accounting@Cambium-inc.com		REPORT TO: Company Name: #26906 Cambium Environmental Inc Attention: Kyle Horner Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3 Tel: (613) 389-2323 Fax: (613) 389-2323 Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i		PROJECT INFORMATION: Quotation #: C26318 P.O. #: 19387-001 Project: 19387-001 Project Name: Site #: <u>Maren Catt</u> Sampled By:		Order #: 413 Project Manager: Christine Gripton		COC #:	
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY				ANALYSIS REQUESTED (PLEASE BE SPECIFIC)				Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
Regulation 153 (2011) ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table		Other Regulations ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality _____ ☒ PWQO ☐ Reg 406 Table ☐ Other		Special Instructions		Field Filtered (please circle): Metals / Hg / Cr / V		Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	
Include Criteria on Certificate of Analysis (Y/N)?				Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)		# of Bottles: _____ Comments:		pH: 7.2 Temp: 12.8	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle):	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)
1	TW2	Feb 27, 2024		GW		✓	✓	✓	✓
2									
3									
4									
5									
6									
7									
8									
9									
10									

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		# Jars used and not submitted		Laboratory Use Only	
Maren Catt		2024/02/27		5:54 PM		Samantha Durand		2024/02/28		10:34		0		Temperature (°C) on Receipt: 3.32 Custody Seal Present: ☒ Intact: ☒	
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COCS-TERMS-AND-CONDITIONS. * IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. ** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.															

White: Bureau Veritas Yellow: Client
 01110
 onice

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS



Your Project #: 19387-001
Your C.O.C. #: C#977413-01-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/05

Report #: R8054238

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C459276

Received: 2024/02/27, 09:19

Sample Matrix: Ground Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	1	N/A	2024/02/29	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity (1)	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3) (1)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (1, 3)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2024/03/05		
Anion and Cation Sum (1)	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2024/02/28	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2024/02/28	CAM SOP-00552	
Total Ammonia-N (1)	1	N/A	2024/03/01	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1, 4)	1	N/A	2024/02/29	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (1)	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate (1)	1	N/A	2024/02/29	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C) (1)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C) (1)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry (1)	1	N/A	2024/02/29	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc) (1)	1	N/A	2024/03/05		Auto Calc
Turbidity (1)	1	N/A	2024/02/28	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or



Your Project #: 19387-001
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Report Date: 2024/03/05
Report #: R8054238
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C459276

Received: 2024/02/27, 09:19

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8

(2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(3) Metals analysis was performed on the sample 'as received'.

(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

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BUREAU
VERITAS

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YMK942			YMK942		
Sampling Date		2024/02/26 19:30			2024/02/26 19:30		
COC Number		C#977413-01-01			C#977413-01-01		
	UNITS	TW3	RDL	QC Batch	TW3 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	6.19	N/A	9245116			
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	270	1.0	9245030			
Calculated TDS	mg/L	320	1.0	9245119			
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	1.4	1.0	9245030			
Cation Sum	me/L	6.43	N/A	9245116			
Hardness (CaCO ₃)	mg/L	300	1.0	9245031			
Ion Balance (% Difference)	%	1.86	N/A	9245115			
Langelier Index (@ 20C)	N/A	0.608		9245117			
Langelier Index (@ 4C)	N/A	0.359		9245118			
Saturation pH (@ 20C)	N/A	7.14		9245117			
Saturation pH (@ 4C)	N/A	7.39		9245118			
Inorganics							
Total Ammonia-N	mg/L	<0.050	0.050	9248977			
Conductivity	umho/cm	590	1.0	9252632	600	1.0	9252632
Dissolved Organic Carbon	mg/L	1.7	0.40	9248281			
Orthophosphate (P)	mg/L	<0.010	0.010	9246263	<0.010	0.010	9246263
pH	pH	7.75		9252633	7.80		9252633
Dissolved Sulphate (SO ₄)	mg/L	16	1.0	9246264	15	1.0	9246264
Alkalinity (Total as CaCO ₃)	mg/L	270	1.0	9252631	270	1.0	9252631
Dissolved Chloride (Cl ⁻)	mg/L	15	1.0	9246265	15	1.0	9246265
Nitrite (N)	mg/L	<0.010	0.010	9246466			
Nitrate (N)	mg/L	0.64	0.10	9246466			
Metals							
Aluminum (Al)	ug/L	<4.9	4.9	9247907	<4.9	4.9	9247907
Antimony (Sb)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Arsenic (As)	ug/L	<1.0	1.0	9247907	<1.0	1.0	9247907
Barium (Ba)	ug/L	460	2.0	9247907	450	2.0	9247907
Beryllium (Be)	ug/L	<0.40	0.40	9247907	<0.40	0.40	9247907
Boron (B)	ug/L	11	10	9247907	10	10	9247907
Cadmium (Cd)	ug/L	<0.090	0.090	9247907	<0.090	0.090	9247907
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**BUREAU
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YMK942			YMK942		
Sampling Date		2024/02/26 19:30			2024/02/26 19:30		
COC Number		C#977413-01-01			C#977413-01-01		
	UNITS	TW3	RDL	QC Batch	TW3 Lab-Dup	RDL	QC Batch
Calcium (Ca)	ug/L	72000	200	9247907	72000	200	9247907
Chromium (Cr)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Cobalt (Co)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Copper (Cu)	ug/L	1.6	0.90	9247907	1.7	0.90	9247907
Iron (Fe)	ug/L	<100	100	9247907	<100	100	9247907
Lead (Pb)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Lithium (Li)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Magnesium (Mg)	ug/L	29000	50	9247907	29000	50	9247907
Manganese (Mn)	ug/L	4.1	2.0	9247907	4.3	2.0	9247907
Molybdenum (Mo)	ug/L	0.85	0.50	9247907	0.83	0.50	9247907
Nickel (Ni)	ug/L	<1.0	1.0	9247907	<1.0	1.0	9247907
Phosphorus (P)	ug/L	<100	100	9247907	<100	100	9247907
Potassium (K)	ug/L	6700	200	9247907	6700	200	9247907
Selenium (Se)	ug/L	<2.0	2.0	9247907	<2.0	2.0	9247907
Silicon (Si)	ug/L	2600	50	9247907	2700	50	9247907
Silver (Ag)	ug/L	<0.090	0.090	9247907	<0.090	0.090	9247907
Sodium (Na)	ug/L	7100	100	9247907	7100	100	9247907
Strontium (Sr)	ug/L	130	1.0	9247907	130	1.0	9247907
Thallium (Tl)	ug/L	0.15	0.050	9247907	0.11	0.050	9247907
Titanium (Ti)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Uranium (U)	ug/L	1.8	0.10	9247907	1.8	0.10	9247907
Vanadium (V)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Zinc (Zn)	ug/L	38	5.0	9247907	37	5.0	9247907
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



**BUREAU
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		YMK942		
Sampling Date		2024/02/26 19:30		
COC Number		C#977413-01-01		
	UNITS	TW3	RDL	QC Batch
Inorganics				
Turbidity	NTU	0.3	0.1	9245519
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

MICROBIOLOGY (GROUND WATER)

Bureau Veritas ID		YMK942	
Sampling Date		2024/02/26 19:30	
COC Number		C#977413-01-01	
	UNITS	TW3	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	9245734
Background	CFU/100mL	70	9245714
Total Coliforms	CFU/100mL	0	9245714
Escherichia coli	CFU/100mL	0	9245714
QC Batch = Quality Control Batch			



**BUREAU
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

TEST SUMMARY

Bureau Veritas ID: YMK942
Sample ID: TW3
Matrix: Ground Water

Collected: 2024/02/26
Shipped:
Received: 2024/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9245030	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9246265	N/A	2024/02/29	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO ₃)		9245031	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9245115	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9245116	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9245714	N/A	2024/02/28	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	9245734	N/A	2024/02/28	Paramjit Paramjit
Total Ammonia-N	LACH/NH ₄	9248977	N/A	2024/03/01	Chandra Nandlal
Nitrate & Nitrite as Nitrogen in Water	LACH	9246466	N/A	2024/02/29	Jinal Chavda
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9246263	N/A	2024/02/29	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9245117	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9245118	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9246264	N/A	2024/02/29	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9245119	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9245519	N/A	2024/02/28	Vidhi Khatri

Bureau Veritas ID: YMK942 Dup
Sample ID: TW3
Matrix: Ground Water

Collected: 2024/02/26
Shipped:
Received: 2024/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9246265	N/A	2024/02/29	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9246263	N/A	2024/02/29	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	9246264	N/A	2024/02/29	Alina Dobreanu



Bureau Veritas Job #: C459276
Report Date: 2024/03/05

Cambium Environmental Inc
Client Project #: 19387-001
Sampler Initials: MC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C
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Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9245519	Turbidity	2024/02/28			101	80 - 120	<0.1	NTU	0.30	20
9246263	Orthophosphate (P)	2024/02/29	101	75 - 125	95	80 - 120	<0.010	mg/L	NC	20
9246264	Dissolved Sulphate (SO4)	2024/02/29	94	75 - 125	97	80 - 120	<1.0	mg/L	0.85	20
9246265	Dissolved Chloride (Cl-)	2024/02/29	89	80 - 120	97	80 - 120	<1.0	mg/L	1.1	20
9246466	Nitrate (N)	2024/02/29	93	80 - 120	92	80 - 120	<0.10	mg/L	NC	20
9246466	Nitrite (N)	2024/02/29	101	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20

BUREAU
VERITAS

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

QUALITY ASSURANCE REPORT(CONT'D)

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20
9248977	Total Ammonia-N	2024/03/01	100	75 - 125	100	80 - 120	<0.050	mg/L	NC	20
9252631	Alkalinity (Total as CaCO3)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read "Anastassia Hamanov".

Anastassia Hamanov, Scientific Specialist

A handwritten signature in black ink, appearing to read "Paramjit".

Paramjit Paramjit, Analyst I

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



NONT-2024-02-2021

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		BOTTLE INFORMATION:	
Company Name: #17950 Cambium Environmental Inc		Company Name: #26906 Cambium Environmental Inc		Quotation #: C26318		Bottle Order #: 977413	
Attention: ACCOUNTS PAYABLE		Attention: Kyle Horner		P.O. #:		Barcode	
Address: 194 Sophia Street PO Box 325		Address: 31 Hyperion Court, Suite 102		Project: 19387-001.		977413	
Peterborough ON K9H 1E5		Kingston ON K7P 7G3		Project Name:		Project Manager:	
Tel: (705) 742-7900 Fax: (705) 742-7907		Tel: (613) 389-2323 Fax:		Site #:		Christine Gripton	
Email: accounting@cambium-inc.com		Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i		Sampled By: Maren Catt			
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY				ANALYSIS REQUESTED (PLEASE BE SPECIFIC)			
Regulation 153 (2011)		Other Regulations		Special Instructions		Turnaround Time (TAT) Required:	
☐ Table 1 ☐ Res/Park ☐ Medium/Fine		☐ CCME ☐ Sanitary Sewer Bylaw				Please provide advance notice for rush projects	
☐ Table 2 ☐ Ind/Comm ☐ Coarse		☐ Reg 558 ☐ Storm Sewer Bylaw				Regular (Standard) TAT:	
☐ Table 3 ☐ Agri/Other ☐ For RSC		☐ MISA Municipality				(will be applied if Rush TAT is not specified);	
☐ Table		☒ PWQO ☐ Reg 406 Table				Standard TAT = 5-7 Working days for most tests..	
		☐ Other				Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	
Include Criteria on Certificate of Analysis (Y/N)?						Job Specific Rush TAT (if applies to entire submission)	
Sample Barcode Label		Sample (Location) Identification		Date Sampled		Date Required: Time Required:	
Time Sampled		Matrix				Rush Confirmation Number: (call lab for #)	
1		TW3		2024/02/26 7:30 GW		5	
2							
3							
4							
5							
6							
7							
8							
9							
10							
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		RECEIVED BY: (Signature/Print)	
Maren Catt		2024/02/26 9:00pm		Samuel Durand and Maren Catt		2024/02/27 09:19	
						2024/02/28 08:57	
# jars used and not submitted		Laboratory Use Only		Time Seals		Temperature (°C) on Reel	
100 jars				1,2,3		Custody Seal	
						Present	
						Intact	
						Yes	
						No	
* UNLESS OTHERWISE AGREED IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.				* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.			
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.				SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS			
				White: Bureau Veritas Yellow: Client			
				885			
				116			



Your Project #: 19387-001
Your C.O.C. #: C#977413-04-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/18

Report #: R8070487

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C471497

Received: 2024/03/09, 08:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/03/09	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/03/11	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/03/11	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/03/09	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/03/12	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/03/12	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/03/12	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/03/12		
Anion and Cation Sum	1	N/A	2024/03/12		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/03/09	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL)	1	N/A	2024/03/09	CAM SOP-00552	
Total Ammonia-N	1	N/A	2024/03/14	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/03/11	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/03/09	2024/03/09	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/11	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/03/12		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/03/12		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/03/11	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/03/12		Auto Calc
Turbidity	1	N/A	2024/03/09	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: 19387-001
Your C.O.C. #: C#977413-04-01

Attention: Kyle Horner

Cambium Environmental Inc
31 Hyperion Court, Suite 102
Kingston, ON
Canada K7P 7G3

Report Date: 2024/03/18
Report #: R8070487
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C471497

Received: 2024/03/09, 08:29

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Metals analysis was performed on the sample 'as received'.

(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YOW510			YOW510		
Sampling Date		2024/03/08 03:45			2024/03/08 03:45		
COC Number		C#977413-04-01			C#977413-04-01		
	UNITS	RW1	RDL	QC Batch	RW1 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	5.33	N/A	9265376			
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	210	1.0	9265372			
Calculated TDS	mg/L	280	1.0	9265371			
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	<1.0	1.0	9265372			
Cation Sum	me/L	5.69	N/A	9265376			
Hardness (CaCO ₃)	mg/L	260	1.0	9265374			
Ion Balance (% Difference)	%	3.23	N/A	9265375			
Langelier Index (@ 20C)	N/A	0.387		9265377			
Langelier Index (@ 4C)	N/A	0.137		9265378			
Saturation pH (@ 20C)	N/A	7.28		9265377			
Saturation pH (@ 4C)	N/A	7.53		9265378			
Inorganics							
Total Ammonia-N	mg/L	<0.050	0.050	9268916			
Conductivity	umho/cm	540	1.0	9265752	540	1.0	9265752
Dissolved Organic Carbon	mg/L	1.5	0.40	9265829			
Orthophosphate (P)	mg/L	<0.010	0.010	9265797			
pH	pH	7.66		9265753	7.72		9265753
Dissolved Sulphate (SO ₄)	mg/L	14	1.0	9265796			
Alkalinity (Total as CaCO ₃)	mg/L	210	1.0	9265745	220	1.0	9265745
Dissolved Chloride (Cl ⁻)	mg/L	22	1.0	9265795			
Nitrite (N)	mg/L	<0.010	0.010	9265766			
Nitrate (N)	mg/L	1.79	0.10	9265766			
Metals							
Aluminum (Al)	ug/L	<4.9	4.9	9267670			
Antimony (Sb)	ug/L	<0.50	0.50	9267670			
Arsenic (As)	ug/L	<1.0	1.0	9267670			
Barium (Ba)	ug/L	220	2.0	9267670			
Beryllium (Be)	ug/L	<0.40	0.40	9267670			
Boron (B)	ug/L	16	10	9267670			
Cadmium (Cd)	ug/L	<0.090	0.090	9267670			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**BUREAU
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID		YOW510			YOW510		
Sampling Date		2024/03/08 03:45			2024/03/08 03:45		
COC Number		C#977413-04-01			C#977413-04-01		
	UNITS	RW1	RDL	QC Batch	RW1 Lab-Dup	RDL	QC Batch
Calcium (Ca)	ug/L	64000	200	9267670			
Chromium (Cr)	ug/L	<5.0	5.0	9267670			
Cobalt (Co)	ug/L	<0.50	0.50	9267670			
Copper (Cu)	ug/L	2.8	0.90	9267670			
Iron (Fe)	ug/L	<100	100	9267670			
Lead (Pb)	ug/L	<0.50	0.50	9267670			
Lithium (Li)	ug/L	<5.0	5.0	9267670			
Magnesium (Mg)	ug/L	23000	50	9267670			
Manganese (Mn)	ug/L	3.0	2.0	9267670			
Molybdenum (Mo)	ug/L	0.83	0.50	9267670			
Nickel (Ni)	ug/L	<1.0	1.0	9267670			
Phosphorus (P)	ug/L	<100	100	9267670			
Potassium (K)	ug/L	1400	200	9267670			
Selenium (Se)	ug/L	<2.0	2.0	9267670			
Silicon (Si)	ug/L	2500	50	9267670			
Silver (Ag)	ug/L	<0.090	0.090	9267670			
Sodium (Na)	ug/L	12000	100	9267670			
Strontium (Sr)	ug/L	72	1.0	9267670			
Thallium (Tl)	ug/L	<0.050	0.050	9267670			
Titanium (Ti)	ug/L	<5.0	5.0	9267670			
Uranium (U)	ug/L	1.6	0.10	9267670			
Vanadium (V)	ug/L	<0.50	0.50	9267670			
Zinc (Zn)	ug/L	5.5	5.0	9267670			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



**BUREAU
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		YOW510		
Sampling Date		2024/03/08 03:45		
COC Number		C#977413-04-01		
	UNITS	RW1	RDL	QC Batch
Inorganics				
Turbidity	NTU	0.2	0.1	9264888
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

MICROBIOLOGY (WATER)

Bureau Veritas ID		YOW510	
Sampling Date		2024/03/08 03:45	
COC Number		C#977413-04-01	
	UNITS	RW1	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	9265968
Background	CFU/100mL	1300	9265967
Total Coliforms	CFU/100mL	0	9265967
Escherichia coli	CFU/100mL	0	9265967
QC Batch = Quality Control Batch			



**BUREAU
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

TEST SUMMARY

Bureau Veritas ID: YOW510

Sample ID: RW1

Matrix: Water

Collected: 2024/03/08

Shipped:

Received: 2024/03/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9265745	N/A	2024/03/09	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9265372	N/A	2024/03/11	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9265795	N/A	2024/03/11	Alina Dobreanu
Conductivity	AT	9265752	N/A	2024/03/09	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9265829	N/A	2024/03/12	Gyulshen Idriz
Hardness (calculated as CaCO ₃)		9265374	N/A	2024/03/12	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9267670	N/A	2024/03/12	Azita Fazaeli
Ion Balance (% Difference)	CALC	9265375	N/A	2024/03/12	Automated Statchk
Anion and Cation Sum	CALC	9265376	N/A	2024/03/12	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9265967	N/A	2024/03/09	Farhana Rahman
Fecal coliform, (CFU/100mL)	PL	9265968	N/A	2024/03/09	Farhana Rahman
Total Ammonia-N	LACH/NH ₄	9268916	N/A	2024/03/14	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9265766	N/A	2024/03/11	Chandra Nandlal
pH	AT	9265753	2024/03/09	2024/03/09	Nachiketa Gohil
Orthophosphate	KONE	9265797	N/A	2024/03/11	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9265377	N/A	2024/03/12	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9265378	N/A	2024/03/12	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9265796	N/A	2024/03/11	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9265371	N/A	2024/03/12	Automated Statchk
Turbidity	AT	9264888	N/A	2024/03/09	Vidhi Khatri

Bureau Veritas ID: YOW510 Dup

Sample ID: RW1

Matrix: Water

Collected: 2024/03/08

Shipped:

Received: 2024/03/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9265745	N/A	2024/03/09	Nachiketa Gohil
Conductivity	AT	9265752	N/A	2024/03/09	Nachiketa Gohil
pH	AT	9265753	2024/03/09	2024/03/09	Nachiketa Gohil



BUREAU
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.0°C
-----------	-------

Results relate only to the items tested.

BUREAU
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9264888	Turbidity	2024/03/09			101	80 - 120	<0.1	NTU	0.64	20
9265745	Alkalinity (Total as CaCO3)	2024/03/09			94	85 - 115	<1.0	mg/L	3.1	20
9265752	Conductivity	2024/03/09			103	85 - 115	<1.0	umho/cm	0.55	10
9265753	pH	2024/03/09			102	98 - 103			0.77	N/A
9265766	Nitrate (N)	2024/03/11	100	80 - 120	96	80 - 120	<0.10	mg/L	NC	20
9265766	Nitrite (N)	2024/03/11	73 (1)	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9265795	Dissolved Chloride (Cl-)	2024/03/11	NC	80 - 120	90	80 - 120	<1.0	mg/L	1.6	20
9265796	Dissolved Sulphate (SO4)	2024/03/08	NC	75 - 125	93	80 - 120	<1.0	mg/L	1.3	20
9265797	Orthophosphate (P)	2024/03/11	95	75 - 125	94	80 - 120	<0.010	mg/L	NC	20
9265829	Dissolved Organic Carbon	2024/03/12	119	80 - 120	96	80 - 120	<0.40	mg/L	1.3	20
9267670	Aluminum (Al)	2024/03/12	103	80 - 120	100	80 - 120	<4.9	ug/L		
9267670	Antimony (Sb)	2024/03/12	111	80 - 120	104	80 - 120	<0.50	ug/L		
9267670	Arsenic (As)	2024/03/12	103	80 - 120	100	80 - 120	<1.0	ug/L		
9267670	Barium (Ba)	2024/03/12	102	80 - 120	95	80 - 120	<2.0	ug/L		
9267670	Beryllium (Be)	2024/03/12	105	80 - 120	99	80 - 120	<0.40	ug/L		
9267670	Boron (B)	2024/03/12	106	80 - 120	100	80 - 120	<10	ug/L		
9267670	Cadmium (Cd)	2024/03/12	105	80 - 120	99	80 - 120	<0.090	ug/L		
9267670	Calcium (Ca)	2024/03/12	NC	80 - 120	101	80 - 120	<200	ug/L		
9267670	Chromium (Cr)	2024/03/12	101	80 - 120	97	80 - 120	<5.0	ug/L		
9267670	Cobalt (Co)	2024/03/12	100	80 - 120	97	80 - 120	<0.50	ug/L		
9267670	Copper (Cu)	2024/03/12	100	80 - 120	97	80 - 120	<0.90	ug/L		
9267670	Iron (Fe)	2024/03/12	104	80 - 120	99	80 - 120	<100	ug/L		
9267670	Lead (Pb)	2024/03/12	103	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
9267670	Lithium (Li)	2024/03/12	107	80 - 120	101	80 - 120	<5.0	ug/L		
9267670	Magnesium (Mg)	2024/03/12	102	80 - 120	99	80 - 120	<50	ug/L		
9267670	Manganese (Mn)	2024/03/12	101	80 - 120	98	80 - 120	<2.0	ug/L		
9267670	Molybdenum (Mo)	2024/03/12	107	80 - 120	100	80 - 120	<0.50	ug/L		
9267670	Nickel (Ni)	2024/03/12	100	80 - 120	97	80 - 120	<1.0	ug/L		
9267670	Phosphorus (P)	2024/03/12	104	80 - 120	100	80 - 120	<100	ug/L		
9267670	Potassium (K)	2024/03/12	102	80 - 120	99	80 - 120	<200	ug/L		
9267670	Selenium (Se)	2024/03/12	104	80 - 120	101	80 - 120	<2.0	ug/L		

BUREAU
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

QUALITY ASSURANCE REPORT(CONT'D)

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9267670	Silicon (Si)	2024/03/12	104	80 - 120	100	80 - 120	<50	ug/L		
9267670	Silver (Ag)	2024/03/12	104	80 - 120	99	80 - 120	<0.090	ug/L		
9267670	Sodium (Na)	2024/03/12	100	80 - 120	100	80 - 120	<100	ug/L		
9267670	Strontium (Sr)	2024/03/12	101	80 - 120	99	80 - 120	<1.0	ug/L		
9267670	Thallium (Tl)	2024/03/12	103	80 - 120	98	80 - 120	<0.050	ug/L		
9267670	Titanium (Ti)	2024/03/12	103	80 - 120	101	80 - 120	<5.0	ug/L		
9267670	Uranium (U)	2024/03/12	108	80 - 120	102	80 - 120	<0.10	ug/L		
9267670	Vanadium (V)	2024/03/12	103	80 - 120	98	80 - 120	<0.50	ug/L		
9267670	Zinc (Zn)	2024/03/12	103	80 - 120	100	80 - 120	<5.0	ug/L		
9268916	Total Ammonia-N	2024/03/14	97	75 - 125	101	80 - 120	<0.050	mg/L	20	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read 'Anastassia Hamanov'.

Anastassia Hamanov, Scientific Specialist

A handwritten signature in black ink, appearing to read 'Farhana Rahman'.

Farhana Rahman, Senior Analyst

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 www.bvna.com										Page of				
CHAIN OF CUSTODY RECORD														
INVOICE TO:					REPORT TO:					PROJECT INFORMATION:		Laboratory Use Only:		
Company Name: #17950 Cambium Environmental Inc					Company Name: #26906 Cambium Environmental Inc					Quotation #: C26318		Bureau Veritas Job #:		
Attention: ACCOUNTS PAYABLE					Attention: Kyle Horner					P.O. #:		Bottle Order #:		
Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5					Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3					Project: 19387-001		COC #:		
Tel: (705) 742-7900 Fax: (705) 742-7907					Tel: (613) 389-2323 Fax:					Project Name:		Project Manager:		
Email: accounting@cambiun-inc.com					Email: kyle.horner@cambiun-inc.com, maren.catt@cambiun-i					Site #:		Christine Gripton		
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY					ANALYSIS REQUESTED (PLEASE BE SPECIFIC)					Turnaround Time (TAT) Required: Please provide advance notice for rush projects				
Regulation 153 (2011) ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table _____			Other Regulations ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA ☐ Municipality _____ ☐ PWQO ☐ Reg 406 Table _____ ☐ Other _____			Special Instructions 			Field Filtered (please circle): Metals / Hg / Cr / V Total Coliforms / E. coli, CFU/100mL Fecal coliform, (CFU/100mL) Turbidity RCAP - Comprehensive (Drinking Water)			Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
Include Criteria on Certificate of Analysis (Y/N)? _____									Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)					
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix							# of Bottles	Comments		
1	RW1	March 8, 2014	3:45	GW							5	PH: 7.11 Temp: 10.0 °C		
2														
3														
4														
5														
6														
7														
8														
9														
10														
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted		Laboratory Use Only				
Maren Catt		24/03/08	9:20 AM	VIA VIYUSHTI PATEL		2024/03/09	09:29			Time Sensitive: 4/4/4 Temperature (°C) on Receipt: _____ Custody Seal: Present ☒ Intact ☒ Yes ☒ No ☐				
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.										White: Bureau Veritas. Yellow: Client on file				
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.										SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS				
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCs.														

Bureau Veritas Canada (2019) Inc.



CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G106720
REPORT No: 25-017009 - Rev. 0
Report To:

Cambium Environmental - Kingston
31 Hyperion Crt
Suite 102
Kingston, ON K7K 7G3

CADUCEON Environmental Laboratories

285 Dalton Ave
Kingston, ON K7K 6Z1

Attention: Kyle Horner

DATE RECEIVED: 2025-Jun-13
DATE REPORTED: 2025-Jun-18
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 19387-001
P.O. NUMBER: 19387-001

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	PCURIEL	2025-Jun-14	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	STAILLON	2025-Jun-16	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	SBOUDREAU	2025-Jun-16	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
Coliforms - DC Media (Liquid)	1	KINGSTON	BBURTCH	2025-Jun-13	ECTC-001	MECP E3407
DOC (Liquid)	1	OTTAWA	SLOZO	2025-Jun-16	C-OC-01	EPA 415.2
HPC Spread Plate (Liquid)	1	KINGSTON	BBURTCH	2025-Jun-13	HPC-001	SM 9215D
Ion Balance (Calc)	1	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	TPRICE	2025-Jun-16	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	1	OTTAWA	GFENTON	2025-Jun-13	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	VHAMMOND	2025-Jun-13	NH3-001	SM 4500NH3
Phenols (Liquid)	1	KINGSTON	EHINCH	2025-Jun-18	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	MWILSON	2025-Jun-13	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	MWILSON	2025-Jun-16	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	YLIEN	2025-Jun-17	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	ECARTER	2025-Jun-13	A-TURB-01	SM 2130B

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

CADUCEON Environmental Laboratories Certificate of Analysis

Final Report

REPORT No: 25-017009 - Rev. 0

					Client I.D.
					TW1
					Sample I.D.
					25-017009-1
					Date Collected
					2025-Jun-12
Parameter	Units	R.L.	Limits	DWG	
Total Coliform (DC Media)	CFU/100mL	1	0	MAC	0
E coli (DC Media)	CFU/100mL	1	0	MAC	0
Background (DC Media)	CFU/100mL	1			15
Heterotrophic Plate Count	CFU/1mL	2			<10
Alkalinity(CaCO ₃) to pH4.5	mg/L	5	500	OG	265
TDS (Calc. from Cond.)	mg/L	3	500	AO	335
Conductivity @25°C	uS/cm	1			646
pH @25°C	pH units	-	8.5	OG	7.90
Colour	TCU	2	5	AO	<2
Turbidity	NTU	0.1	5	AO	1.8
Fluoride	mg/L	0.1	1.5	MAC	<0.1
Chloride	mg/L	0.5	250	AO	42.0
Nitrate (N)	mg/L	0.05	10.0	MAC	1.92
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.05
Sulphate	mg/L	1	500	AO	17
Total Kjeldahl Nitrogen	mg/L	0.1			0.2
Ammonia (N)-Total (NH ₃ +NH ₄)	mg/L	0.05			<0.05
Dissolved Organic Carbon	mg/L	0.8	5	AO	2.0
Tannin & Lignin	mg/L	0.5			<0.5
Sulphide	mg/L	0.01	0.05	AO	<0.01
Phenolics	mg/L	0.001			<0.001



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CADUCEON Environmental Laboratories Certificate of Analysis

Final Report

REPORT No: 25-017009 - Rev. 0

					Client I.D.
					TW1
					Sample I.D.
					25-017009-1
					Date Collected
					2025-Jun-12
Parameter	Units	R.L.	Limits	DWG	
Hardness (as CaCO ₃)	mg/L as CaCO ₃	0.02	100	OG	323
Aluminum	mg/L	0.01	0.1	OG	0.02
Barium	mg/L	0.001	1	MAC	0.398
Boron	mg/L	0.005	5	MAC	0.013
Calcium	mg/L	0.02			77.5
Iron	mg/L	0.005	0.3	AO	0.059
Magnesium	mg/L	0.02			31.6
Manganese	mg/L	0.001	0.05	AO	0.010
Potassium	mg/L	0.1			1.5
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	16.4
Strontium	mg/L	0.001			0.112
Zinc	mg/L	0.005	5	AO	<0.005
Antimony	mg/L	0.0001	0.006	MAC	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	0.0004
Beryllium	mg/L	0.0001			<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001
Cobalt	mg/L	0.0001			0.0004
Copper	mg/L	0.0001	1	AO	0.0013
Lead	mg/L	0.00002	0.010	MAC	0.00002
Molybdenum	mg/L	0.0001			0.0006



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					Client I.D.
					TW1
					Sample I.D.
					25-017009-1
					Date Collected
					2025-Jun-12
Parameter	Units	R.L.	Limits	DWG	
Nickel	mg/L	0.0002			0.0012
Selenium	mg/L	0.001	0.05	MAC	<0.001
Silver	mg/L	0.0001			0.0003
Thallium	mg/L	0.00005			<0.00005
Uranium	mg/L	0.00005	0.02	MAC	0.00138
Vanadium	mg/L	0.0001			<0.0001
Anion Sum	meq/L	-			6.97
Cation Sum	meq/L	-			7.22
% Difference	%	-			1.77
TDS (Ion Sum Calc)	mg/L	1	500	AO	354
Conductivity Calc	µmho/cm	-			667

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Summary of Exceedances		
Operational Guidelines		
TW1	Found Value	Limit
Hardness (as CaCO3)	323	100



Michelle Dubien
Data Specialist