Rosseau Springs Limited

Hydrogeological Report
Proposed Lot Development/Severances – Rosseau Springs
Seguin Township, ON

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1 Executive Summary

EXP Services Inc. (EXP) was retained by Rosseau Springs Limited ("the Client") to complete a hydrogeological assessment for a proposed subdivision lot development at the property located immediately south of Highway 632 and adjacent to Maplehurst Road, in Rosseau, Ontario; hereinafter referred to as the 'Site.' The property is approximately 116 hectares (287 acres) and the proposed development will consist of 50 lots. Lots will be serviced with individual groundwater wells and septic systems. Areas north of the Site are generally undeveloped, while areas west, south and east of the Site (along the shoreline) have significant permanent and seasonal developments, all of which are individually serviced for wastewater (septic systems) and water (groundwater and/or surface water).

As observed during the hydrogeological assessment and past geotechnical investigation, hydrogeological conditions vary across the Site, with overburden thickness ranging from nil to 20 feet. Historically, no groundwater or monitoring wells existed on the Site and, as such, three (3) drilled 6" diameter wells were installed in bedrock to assess aquifer conditions.

An assessment of water quantity was obtained through pumping tests on the three (3) new wells, as well as a review of well logs in areas adjacent to the Site. Pumping tests and existing well records suggest a mix of very high yield and low yield wells, with pumping rates ranging from 5 gpm to 10 gpm, and well recoveries (>95%) as short as 30 minutes. Observations were consistent with bedrock aquifers, whereby fracture distribution and resulting hydraulic conductivity is extremely variable throughout. Overall, the Site appears to provide a sufficient quantity of water. Where well recharge rates are relatively low, hydraulic stimulation, supplemental storage and/or increased drill depths should be sufficient in producing reasonable quantities of water.

An assessment of groundwater quality from the three (3) new test wells and two (2) nearby residential wells showed groundwater quality typical of bedrock aquifers exposed to the surface in Northern Ontario. Due to bedrock fractures being exposed to the surface, this facilitates the rapid movement of microbes (such as coliforms found in the soil) from the surface into the subsurface. Results showed several exceedances for aesthetic or operational Ontario Drinking Water Objectives (ODWO) – all of which can be addressed with standard water treatment systems. In addition, exceedances were noted for biological parameters when compared to their respective maximum allowable Ontario Drinking Water Standards (ODWS); however, exceedances on the Site were similar to those noted at residential wells near the Site. Any biological exceedances in groundwater can be addressed with standard water treatment systems, such as those typically used to treat surface water supplies.

An assessment of contaminant loading from septic effluent was conducted nitrate, as well as for phosphorus and UIA because of the Site's close proximity to a major waterbody. Results showed both nitrate and UIA loading across the property is significantly less than the maximum allowable standards, while placement of septic systems away from property lines closest to receptor bodies (Lake Rosseau) should provide sufficient attenuation of contaminants. In addition, standard phosphorus and nitrate treatment on septic systems can significantly reduce contaminant loading, which would greatly reduce any concerns regarding contaminants "short-circuiting" from the surface of one property to the subsurface of an adjacent property via fractures.

Overall, results suggest water quality and quantity/access is typical of bedrock aquifers in Northern Ontario, whereby well yields varied, and notable coliform bacteria were noted at some well locations. In areas where well yield is low, this can be addressed with hydraulic stimulation or the drilling of an additional well, or the well supply can be supplemented with additional storage. Any ODWO exceedances can be addressed on an optional basis with standard water treatment systems. Any ODWS exceedances can also be addressed with standard water treatment systems, which must be implemented before use as a potable water source. Contaminant loading predictions are less than the applicable standards for both nitrate and UIA, while appropriate placement of septic systems away from property lines nearest to Lake Rosseau should provide sufficient attenuation for phosphorus loads. Contaminant removal from septic effluent can greatly reduce contaminant loads, which will minimize the impacts of nitrate loading on adjacent properties.

2 Introduction

EXP Services Inc. (EXP) was retained by Rosseau Springs Limited ("the Client") to complete a hydrogeological report for a proposed subdivision lot development at the property located immediately south of Highway 632 and adjacent to Maplehurst Road in Rosseau, Ontario; hereinafter referred to as the 'Site'. **Drawing 1** contained in **Appendix A** shows the Site plan and its relative location to surroundings. **Drawing 2** shows the preliminary lot boundaries within the Site. The servicing study is required to address requirements from the Seguin Township Planning Department.

EXP was also retained to complete a servicing options report to demonstrate the potential for servicing the subdivision on full municipal services and communal sewage and water services has been investigated. The servicing options report recommended individual on-site sewage systems and individual water supply (generally private water wells and, in some instances where permissible, surface water from Lake Rosseau) were the preferred options for servicing this proposed subdivision.

3 Scope of Work

EXP completed the following scope of work:

- Review existing information to characterize Site hydrogeological conditions;
- Complete an on-Site septic system impact assessment, with consideration to the requirements of Ministry of Environment, Conservation and Parks (MECP) Procedures D-5-4;
- Complete an on-Site water supply assessment, with consideration to the requirements of MECP Procedures D-5-5; and
- Complete a hydrogeological report that provides the findings, conclusions and recommendations.

4 Site Description

The Site is located immediately south of Highway 632 and adjacent to Maplehurst Drive (see **Drawing 1**) in the town of Rosseau (Lots 6, 7 and 8, Concessions 4 and 5, with property identification numbers of 52199-0221, 52200-0327, 52200-0335 and 52199-0220). It is generally forested with no noted developments. Surrounding properties consisted of undeveloped, forested areas to the north and sparse residential developments to the west, south and east along Lake Rosseau.

The Site is within an area with moderate-high local relief, ranging from approximately 281 masl in north areas, to 246 masl in south areas. Topography in areas adjacent to the Site show similar topographic variations, with a topographic high of 274 masl to the southwest of the Site (beyond Sucker Bay) and a topographic high of 264 masl to the east. Topographic lows were noted in all shoreline areas around the Site, which showed elevations of approximately 230 masl. Rock outcrops were noted in multiple areas throughout the Site, with steep gradients in the north and east areas of the Site.

During the Site visit, ponding was noted in central areas of the Site, while a single approximately west to east flowing waterbody was noted in the north areas of the Site. Based on local area topography and surrounding waterbodies, the Site appears to act as a drainage divide, with groundwater in west areas of the Site flowing west to Sucker Bay and groundwater in east areas of the Site flowing east to Cameron Bay. In general, groundwater is expected to follow Site topography and flow towards Lake Rosseau.

The proposed subdivision is to include 50 lots across the approximately 116-hectare Site, with lots ranging from 0.41 to 0.62 hectares (**Drawing 2, Appendix A**). The proposed lots are, generally, not waterfront, but are proximal to Lake Rosseau. The Site plan for the proposed lots is shown in **Drawing 1** in **Appendix A** of this report.

5 On-Site Sewage System Impacts

5.1 Potential Groundwater Impacts

MECP Procedures D-5-4 describes a three-step procedure to assess the impacts of individual on-site sewage systems to groundwater:

- Step 1: Assess whether average lot size is greater than 1 hectare (ha).
- Step 2: Demonstrate whether on-site individual sewage systems are hydraulically isolated from existing or potential water supply aquifers.
- Step 3: Examine potential contaminant loadings to groundwater from the proposed on-site sewage systems.

MECP Procedure D-5-4 stipulates that if lot sizes are greater than 1 ha, or if the average lot size is 1 ha with no lot less than 0.8 ha, a hydrogeological assessment may not be required. The Site is proposed to be developed into 50 lots and, as such, it can be assumed that all lots will have an average size less than 1 ha. Since the proposed lot number does not allow for an average lot size greater than 1 ha, Step 2 and Step 3 were completed.

MECP Procedures D-5-4 stipulates that individual on-site sewage systems may be deemed acceptable if it can be demonstrated that effluent from on-site sewage systems are hydraulically isolated from existing or potential supply aquifers in the vicinity.

The Site is in an area characterized by minor clay glaciolacustrine deposits overlying metamorphic bedrock, whereby clay provides a confining layer in some (particularly low-lying) areas of the Site. As noted in the well logs, overlying clay showed a maximum thickness of 18 feet at the A364133 well location, while bedrock was noted to surface at the A364139 well location. Although overburden (where present) may have low permeability, the area is generally characterized by thin soil cover and exposed bedrock. These conditions are not amenable for hydraulic isolation between surface infrastructure and shallow aquifers. As such, it is concluded that hydraulic isolation does not exist between potential on-site sewage systems and the existing or potential supply aquifers. It is necessary to proceed to Step 3 of the procedure to assess the potential impacts of contaminant loadings of the on-site sewage systems on existing or potential supply aquifers.

EXP completed a predictive assessment of potential combined impacts from the on-site sewage systems to water supply sources at the Site boundaries based on MECP Procedures D-5-4. In addition, the location of the proposed subdivision near the shore of Lake Rosseau into consideration in the predictive assessment. A predictive assessment of potential combined impacts from the on-site sewage systems to water supply aquifers at the Site boundaries was completed.

The contaminant attenuation model for the Site was based on the following assumptions:

- Dilution from infiltrating precipitation as the only mechanism for attenuation of contaminants;
- The approximate total size of the proposed lots is 116 ha so, collectively, an area of 1,160,000 m^2 available for infiltrating precipitation;
- Utilization of precipitation data from Environment Canada for Beatrice 2 Station (23.90 km away), Huntsville WPCP Station (40.47 km away) and Muskoka Airport Station (41.89 km away), which had average annual precipitations (between 1981 to 2010) of 1197.7 mm, 1034.0 mm and 1105.1 mm, respectively. Thus, the average annual precipitation at the Site was assumed to be 1112.3 mm;
- Utilization of evapotranspiration data from Environment Canada for the Muskoka area and the Muskoka Watershed Council, which indicates an average annual evapotranspiration in the range of 500 mm to 600 mm;
- Estimation of infiltration based on site-specific conditions, including soils, topography, geology and impermeable surfaces (such as paved areas – if any): The entire moisture surplus is assumed available for infiltration within the infiltration areas. While some of the moisture surplus may become runoff, this is assumed to be a minimal amount;
- Based on these data, a conservative average annual moisture surplus of 350 mm is designated for the Site;
- Nitrate-nitrogen is the critical contaminant;

- A nitrate-nitrogen concentration of 0.5 mg/L has been designated for the infiltrating precipitation. This is considered conservative for precipitation in northern Ontario.
- The estimated daily effluent flow rate for the Site is 1,600 L/lot/day. Assuming individual sewage systems for the fifty (50) proposed lots, the combined effluent flow rate for the Site is estimated at 80,000 L/day.

The contaminant concentrations at the Site boundaries (C_T) were derived from the total mass loading of nitrate-nitrogen in input waters (M_T) divided by the total volume of the input waters (V_T):

$$C_T = M_T / V_T$$

V_T is equal to the total volume of infiltrating precipitation (V_i) and the total volume of discharge from all on-site sewage systems (V_e). M_T is equal to the total mass of contaminant contained in both the infiltration precipitation (M_i) and the sewage effluent (M_e):

$$M_i = C_i \times V_i$$
$$M_e = C_e \times V_e,$$

Where C_i and C_e are the nitrate-nitrogen concentrations in infiltrating precipitation and sewage effluent, respectively.

The total predicted nitrate-nitrogen loadings to groundwater from the effluent sources at the Site are based on projected loadings from infiltrating precipitation and from sewage effluent discharges per the formulae defined above (**Table 4.1**). The predicted nitrogen-nitrate loadings to groundwater across the entire Site (116 hectares) indicate a concentration of approximately 2.7 mg/L, which is below the Ontario Drinking Water Objective (ODWO) of 10 mg/L.

In addition, for the smallest lot size of 0.41 ha, the predicted nitrogen-nitrate loadings indicate a concentration of approximately 11.6 mg/L. For the largest lot size of 0.62 ha, a nitrogen-nitrate concentration of approximately 8.5 mg/L was predicted at the property boundary. Overall, smaller proposed property sizes are predicted to have nitrogen-nitrate concentrations slightly above the Ontario Drinking Water Objective (ODWO) of 10 mg/L at the property boundaries, while large properties are below the ODWO.

Table 4.1 Predicted nitrate/nitrogen loading

Basic Assumptions:

1600 L/day effluent flow per household
recharge = 0.35 m/yr (based on Environment Canada Data for ET and Precip)
no groundwater crossflow, no enhanced recharge, no in-situ denitrification

Calculation Scenario:	1 Entire Property	2 Small Lot (0.41 ha)	3 Large Lot (0.62 ha)	4 Waterfront lot (4.8 ha)
Number Houses	50	1	1	1
Effluent Volume per House (L/day)	1,600	1,600	1,600	1,600
Nitrate Concentration in Effluent (mg/L)	40	40	40	40
Nitrate Mass in Effluent per House (g/day)	64	64	64	64
Recharge Area (m^2)	1,160,000	4,100	6,200	48,000
Recharge Rate (m/yr)	0.35	0.35	0.35	0.35
Total Mass Nitrate (g/yr)	1,168,000	23,360	23,360	23,360
Volume Effluent (m^3/yr)	29,200	584	584	584
Volume Recharge (m^3/yr)	406,000	1,435	2,170	16,800
Total Volume Water (m^3/yr)	435,200	2,019	2,754	17,384
Resultant Nitrate Loading (g/m^3 or mg/L)	2.7	11.6	8.5	1.3

5.2 Potential Impacts to Lake Rosseau

The objective of the hydrogeological study is to assess potential impacts to both surface water and groundwater uses from effluent discharges of the individual lot sewage systems. It is noted that existing lots obtain water supply from Lake Rosseau and, as such, potential impacts to surface water for both potable and non-potable uses were assessed. Contaminants of concern for surface water impacts are identified as total phosphorus and un-ionized ammonia (NH3; also referred to as UIA).

EXP completed a predictive assessment of potential combined impacts from the on-site sewage systems to surface water in Lake Rosseau near to the Site. The same contaminant attenuation model as described in **Section 4.1** was used. This includes approximately 350 mm of infiltration and an estimated septic effluent flow rate of 1,600 L/lot/day.

5.2.1 Total Phosphorus Loadings and Phosphorus Concentrations in Surface Water

The MECP Design Guideline for Sewage Works, 2008 (Table 22-2) provides concentrations of contaminants in typical residential wastewater. Total phosphorus is listed as ranging from 6 mg/L to 12 mg/L. Paterson et al. (2006) recommended a septic effluent concentration of 9 mg/L be used for predictive assessments.

Numerous studies have shown that dissolved phosphorus is significantly attenuated in both the unsaturated zone and the saturated zone between the residential septic bed and the discharge point to surface water. Factors, such as soil pH, metals concentrations, organic content and soil thickness contribute to determining how much phosphorous will adsorb or precipitate from solution. Paterson et al. (2006) focused on inland lakes within the Precambrian Shield and proposed input coefficients based on distance from the surface water body, which are listed in **Table 4.2**.

Based on the proposed Site plan, a single lot appears immediately adjacent to Lake Rosseau, while remaining lots range from approximately 60 m to greater than 300 m from the major surface water body (Lake Rosseau). The location of the septic beds will depend on the final plan of the lot owner, but it can be assumed septic beds will be at least 15 m from Lake Rosseau and 3 m from the property line, per The Ontario Building Code Requirements. Thus, phosphorus loadings to the lake are assumed to be between 0% and 100% of the load originating from the septic bed.

Table 4.2 Estimated Phosphorus Loading to Surface Water from Septic Bed (from Paterson et al., 2006).

Distance between Septic Bed and Surface Water Body	% P Load to Surface Water Body
0 – 100 m	100
100 m – 200 m	66
200 m – 300 m	33
>300 m	0

Assumptions in the predictive assessment of total phosphorus loadings to the lake included:

- Dilution from infiltrating precipitation as the only mechanism for attenuation of contaminants;
- The approximate total size of the proposed lots is 116 ha so, collectively, an area of 1,160,000 m^2 available for infiltrating precipitation;
- Utilization of precipitation data from Environment Canada for Beatrice 2 Station (23.90 km away), Huntsville WPCP Station (40.47 km away) and Muskoka Airport Station (41.89 km away), which had average annual precipitations (between 1981 to 2010) of 1197.7 mm, 1034.0 mm and 1105.1 mm, respectively. Thus, the average annual precipitation at the Site was assumed to be 1112.3 mm;
- Utilization of evapotranspiration data from Environment Canada for the Muskoka area and the Muskoka Watershed Council, which indicates an average annual evapotranspiration in the range of 500 mm to 600 mm;

- The entire moisture surplus is assumed available for infiltration within the infiltration areas. While some of the moisture surplus may become runoff, this is assumed to be a minimal amount;
- Based on these data, a conservative average annual moisture surplus of 350 mm is designated for the Site;
- Total phosphorus is the critical contaminant;
- No phosphorus loading has been designated for the infiltrating precipitation; and
- The estimated daily effluent flow rate for the Site is 1,600 L/lot/day. Assuming individual sewage systems for the fifty (50) proposed lots, the combined effluent flow rate for the Site is estimated at 80,000 L/day.

Based on the above assumptions, the predicted total phosphorus concentrations at the discharge point to Lake Rosseau are summarized in **Table 4.3**. Scenarios 1, 2, 3 and 4 assume the average distance between all 50 septic beds and the surface waterbody are less than 100 m, 100 to 200 m, 200 to 300 m and greater than 300 m. As noted, phosphorus loading predictions ranged from 0 mg/L (average distance > 300 m) to 0.60 mg/L (average distance less than 100 m).

Due to the geography of the Site, a significant number of lots are situated away from Lake Rosseau – that is, they are further in land and are not waterfront. As such, additional calculations were conducted to predict phosphorus with septic beds at varying distances away from the waterbody (**Table 4.4**).

Scenarios 1 to 3 are generally possible septic bed arrangements, based on the current Site Plan. In Scenario 1, it was assumed septic beds would be located near the property boundary nearest to the waterbody, which yielded a predicted phosphorus loading of 0.173 mg/L. In Scenario 2, it was assumed septic beds for all 50 lots would be a sufficient distance away from the property line nearest to the waterbody, which yielded a predicted phosphorus loading of 0.076 mg/L. In Scenario 3, it was assumed septic beds would be located near the property boundary furthest from the waterbody, which yielded a predicted phosphorus loading of 0.0056 mg/L.

According to the Provincial Water Quality Objectives (PWQO) for total phosphorus, the level required to prevent excessive plant growth in lakes is 0.02 mg/L. Therefore, Scenarios 1 to 3 in **Table 4.3** and **Table 4.4** suggest discharge of effluent impacted groundwater may be an environmental concern.

Table 4.3 Predicted phosphorus loading in Lake Rosseau using average septic distance

Basic Assumptions:
1600 L/day effluent flow per household
recharge = 0.35 m/yr (based on Environment Canada Data for ET and Precip)
no groundwater crossflow, no enhanced recharge

Calculation Scenario: **Average Distance of Septic Bed from Waterbody**	1 < 100 m	2 100 - 200 m	3 200 - 300 m	4 > 300 m
Number Houses or Lots	50	50	50	50
Effluent Volume per House (L/day/house)	1,600	1,600	1,600	1,600
Phosphorus Concentration in Effluent (mg/L)	9	9	9	9
Adjusted Phosphorus Concentration in Effluent (mg/L)	9	6	3	0
Phosphorus Mass in Effluent per House (g/day/house)	14	10	5	0
Recharge Area (m^2)	1,160,000	1,160,000	1,160,000	1,160,000
Recharge Rate (m/yr)	0.35	0.35	0.35	0.35
Total Mass Nitrate (g/yr)	262,800	175,200	87,600	0
Volume Effluent (m^3/yr)	29,200	29,200	29,200	29,200
Volume Recharge (m^3/yr)	406,000	406,000	406,000	406,000
Total Volume Water (m^3/yr)	435,200	435,200	435,200	435,200
Resultant Phosphorus Loading (g/m^3 or mg/L)	0.60	0.40	0.20	0.00

Notes:
Adjusted effluent concentrations determined from **Table 4.2** values
Assumes all septic beds are at specified distance away from waterbody

Table 4.4 Predicted phosphorus loading in Lake Rosseau for varying septic locations

Basic Assumptions:
1600 L/day effluent flow per household
recharge = 0.35 m/yr (based on Environment Canada Data for ET and Precip)
no groundwater crossflow, no enhanced recharge

Possible Scenarios: **(Distance of Septic Bed from Waterbody)**	1	2	3	4	5
Number Houses or Lots (< 100 m)	7	0	0	0	0
Number Houses or Lots (100 to 200 m)	5	7	7	0	2
Number Houses or Lots (200 to 300 m)	12	5	0	5	1
Number Houses or Lots (> 300 m)	26	38	43	45	47
Effluent Volume per House (L/day/house)	1,600	1,600	1,600	1,600	1,600
Phosphorus Concentration in Effluent (mg/L)	2.58	1.14	0.84	0.30	0.30
Phosphorus Mass in Effluent per House (g/day/house)	4.13	1.82	1.34	0.48	0.48
Recharge Area (m^2)	1,160,000	1,160,000	1,160,000	1,160,000	1,160,000
Recharge Rate (m/yr)	0.35	0.35	0.35	0.35	0.35
Total Mass Nitrate (g/yr)	75,336	33,288	24,528	8,760	8,760
Volume Effluent (m^3/yr)	29,200	29,200	29,200	29,200	29,200
Volume Recharge (m^3/yr)	406,000	406,000	406,000	406,000	406,000
Total Volume Water (m^3/yr)	435,200	435,200	435,200	435,200	435,200
Resultant Phosphorus Loading (g/m^3 or mg/L)	0.173	0.076	0.056	0.020	0.020

Notes:
Phosphorus concentration in effluent is a weighted average based on **Table 4.2** values

5.2.2 Ammonia Loadings and Concentrations in Surface Water

The MECP Design Guideline for Sewage Works, 2008 (Table 22-2) provides concentrations of contaminants in typical residential wastewater. Total ammonia-Nitrogen (TAN) is listed as ranging from 4 mg/L to 13 mg/L. Conservatively, an average concentration of TAN in raw residential wastewater is 10 mg/L.

Ammonia is generally present in sewage effluent in two forms: ionized ammonia (NH4+) and un-ionized ammonia (NH3; also referred to as UIA). Both forms of ammonia persist in anaerobic conditions in effluent and contaminated groundwater; however, UIA is significantly more toxic to aquatic life. The relative concentration of UIA is dependent on both water temperature and pH, and is based on the following equation:

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

$$pKa = 0.09018 + 2729.92/T$$

Where f is the fraction of total ammonium nitrogen that is UIA; and T is the ambient water temperature (in Kelvin). Conservatively, the temperature and pH of groundwater below the residential septic beds are assumed to be no higher than 15°C and 7.0, respectively. Based on the above equations, this equates to a relative UIA percentage of 0.27%. As such, a TAN concentration of 10 mg/L equates to a UIA of (10 x 0.0027 =) 0.027 mg/L.

Assumptions in the predictive assessment of total phosphorus loadings to the lake included:

- Dilution from infiltrating precipitation as the only mechanism for attenuation of contaminants;
- The approximate size of the proposed lots is 116 ha so, collectively, an area of 1,160,000 m^2 available for infiltrating precipitation;
- Utilization of precipitation data from Environment Canada for Beatrice 2 Station (23.90 km away), Huntsville WPCP Station (40.47 km away) and Muskoka Airport Station (41.89 km away), which had average annual precipitations (between 1981 to 2010) of 1197.7 mm, 1034.0 mm and 1105.1 mm, respectively. Thus, the average annual precipitation at the Site was assumed to be 1112.3 mm;
- Utilization of evapotranspiration data from Environment Canada for the Muskoka area and the Muskoka Watershed Council, which indicates an average annual evapotranspiration in the range of 500 mm to 600 mm;
- The entire moisture surplus is assumed available for infiltration within the infiltration areas. While some of the moisture surplus may become runoff, this is assumed to be a minimal amount;
- Based on these data, a conservative average annual moisture surplus of 350 mm is designated for the Site;
- UIA is the critical contaminant;
- No ammonia loading has been designated for the infiltrating precipitation;
- The estimated daily effluent flow rate for the Site is 1,600 L/lot/day. Assuming individual sewage systems for the fifty (50) proposed lots, the combined effluent flow rate for the Site is estimated at 80,000 L/day;
- At the point of discharge: UIA concentrations (Ce) of combined effluent loads originating from the 50 lots are assumed to be 0.027 mg/L;

Based on the above assumptions, the predicted UIA concentration at the discharge point to Lake Rosseau is estimated to be 0.0018 mg/L. The Provincial Water Quality Objective (PWQO) for UIA is established at 0.02 mg/L, which suggests UIA loadings in Lake Rosseau are not expected to be an environmental concern.

Table 4.5 Predicted UIA loading

Basic Assumptions:

1600 L/day effluent flow per household
recharge = 0.35 m/yr (based on Environment Canada Data for ET and Precip)
no groundwater crossflow, no enhanced recharge, no in-situ denitrification

Calculation Scenario:	1 Entire Property
Number Houses	50
Effluent Volume per House (L/day)	1,600
UIA Concentration in Effluent (mg/L)	0.027
UIA Mass in Effluent per House (g/day)	0.043
Recharge Area (m^2)	1,160,000
Recharge Rate (m/yr)	0.35
Total Mass UIA (g/yr)	788
Volume Effluent (m^3/yr)	29,200
Volume Recharge (m^3/yr)	406,000
Total Volume Water (m^3/yr)	435,200
Resultant UIA Loading (g/m^3 or mg/L)	0.00181

6 On-site Water Supply

6.1 Hydrogeological Setting

EXP assessed the potential for the Site to provide groundwater-source water supply. The Site generally consists of forests, with one proposed lot at the waterfront and the remaining 49 lots inland. The Site shows a topographic high inland, with a moderate to high slope towards Lake Rosseau.

The Site is currently undeveloped and there are no existing water wells. However, a search of the MECP Water Well Information System (WWIS) database showed a total of thirteen (13) existing water wells within a one kilometer radius of the approximate Site center, several of which are located adjacent to the proposed development (**Drawing 3**). The wells were completed between 1972 and 2020 and depths ranged from 36.6 m (120 feet) to 122.0 m (400 feet). All the water wells were completed in bedrock with soil thicknesses ranging from nil to 5.5 m. Well logs generally described overburden as coarse, including sand and gravel, and boulders. In addition, all the wells from the WWIS database were listed as water supply wells and reported to have fresh water. Recommended pumping rates ranged from 2 to 20 gpm (7.5 to 75 litres per minute).

According to Ontario Geological Survey (OGS) Google Earth Bedrock maps, the Site is underlain by commonly layered biotite magmatic rocks and gneisses, and locally includes quartzofeldspathic gneisses, orthogneisses and paragneisses. Quaternary Geology maps from the OGS suggest the Site is underlain by undifferentiated igneous and metamorphic rock, exposed at the surface or covered by a discontinuous, thin layer of drift. Quaternary geology maps also suggest the presence of gravel and sand glaciofluvial outwash deposits in areas south of the Site, while areas north of the Site are underlain by silt and clay glaciolacustrine deposits. Both of these observations are consistent with historic and new well records.

Previously, EXP completed a Geotechnical investigation of the Site (November 24, 2022), which included approximately 43 test pits across the 116 hectare lot (**Drawing 4, Appendix A**). In general, shallow bedrock was encountered throughout the Site, while overburden (if any) largely consisted of sands and varying degrees of silt and gravel. Select samples were analyzed for grain size and showed soils were consistent with field observations during test pitting – that is, soils were determined to be predominantly sand with varying amounts of silt and gravel. Laboratory testing of the soils indicated an estimated design percolation time of approximately 5-10 min/cm in sands with relatively more gravel and 10-15 min/cm in sands with relatively more silt. Depth to groundwater was not determined during the fieldwork; however, water was encountered in some test pits (possible perched water tables atop bedrock).

6.2 New Site Wells

No monitoring or residential wells existed on the Site and, as such, three (3) wells were installed to assess water quality and quantity across the Site. According to well records, the A364133 well was drilled to a depth of 180 feet, with approximately 18 feet of clay overburden and bedrock to depth. As noted, the well appeared to be flowing artesian, with a water level recorded at 2 feet above ground (top of casing height). During the driller pumping test, a pumping rate of 10 gpm yielded 11 feet of drawdown in one (1) hour. The A364139 well was drilled to a depth of 360 feet and was bedrock to surface. A static water level was noted at a depth of 9.5 feet. During the driller pumping test, a pumping rate of 7 gpm yielded approximately 37 feet of drawdown in one (1) hour. The A364138 well was drilled to a depth of 360 feet, with approximately 1.5 feet of clay overburden and bedrock to depth. A static water level was noted at a depth of 86.5 feet. During the driller pumping test, a pumping rate of 7 gpm yielded approximately 142 feet of drawdown in one (1) hour.

6.3 Pumping Test

Pumping tests were conducted on the three (3) newly constructed wells, which were located in the northwest, northcentral and southcentral areas of the Site (**Drawing 3** in **Appendix A**). According to D-5-5 Private Wells: Water Supply Assessment recommendations, pumping tests should be conducted for six (6) hours at a given well, while maintaining a pumping rate equal to (3.75 Lpm) * (number of bedrooms + 1). Assuming 4-5 bedrooms per household, this suggests a conservative pumping rate of 3.75 Lpm * 6 = 22.5 Lpm, where sustainable – that is, where excessive drawdown to the intake does not occur. In considering observations from well records noted in **Section 5.2**, test pumping rates were 62.5 Lpm (16.5 gpm) for A364133

and 22.7 Lpm (6.0 gpm) for A364139. In addition, due to the large drawdown noted in the well record, step-test pumping rates were 7.9 Lpm (2.1 gpm), 10.3 Lpm (2.72 gpm) and 13.9 Lpm (3.7 gpm) for A364138 for approximately 30 minute steps.

Pumping tests were conducted with consideration to D-5-5. Prior to pumping, static water levels were measured (relative to the top of pipe) and dataloggers were installed. For the A364133, A364139 and A364138 wells, installation depths were approximately 15 m, 20 m and 33 m below the top of pipe, respectively. During the pumping-phase, manual water levels were measured at the pumping well at regular intervals. In addition, manual water levels were obtained in the other two (2) wells, which acted as observation wells. A single constant pumping rate was maintained for pumping tests on wells AA364133 and A364139 for the entire duration of the test. Conversely, a step-test (with two steps) was conducted on the A364138 well, which maintained constant pumping rates for each step. During the recovery phase, the pump was turned off and water levels were again monitored at regular intervals for the duration of the recovery.

7 Results

7.1 On-Site Sewage System

Based on the hydrogeological assessment, the Site is capable of supporting individual on-site sewage systems such that predicted nitrate-nitrogen loadings to groundwater at the Site boundary will be below the ODWO of 10 mg/L. However, there is potential for elevated levels of nitrates in groundwater beneath and adjacent to the Site from the combined impact of individual sewage systems on the lots. In particular, smaller lots may be vulnerable to elevated nitrate levels in groundwater.

Due to thin presence of thin (or no) overburden across the Site, nitrate/nitrogen from septic systems may be a concern in the groundwater. Ontario regulations, including Ontario Regulation 903 and the Ontario Building Code, have rules concerning separation distances between septic beds and water wells. Nonetheless, proximity to larger septic beds – especially during peak occupancy periods – may lead to high nitrate levels in source groundwater. In addition, because the aquifer system is not assumed to be hydraulically disconnected from the surface, this suggests “short-circuiting” of contaminants into the subsurface can occur via fractures exposed to the surface.

There is potential for elevated levels of total phosphorus in surface water in Lake Rosseau adjacent to the Site from the combined impact of individual sewage systems on the lots. Depending on the location and number of septic beds, this can mitigate potential impacts on the adjacent lake. In addition, UIA loading was noted to be well below the PWQO, suggesting a low potential for impacts to Lake Rosseau.

7.2 On-Site Water Supply

As noted, nearly all lots are not waterfront and, as such, individual wells will be the source of water supply at each lot. Due to extensive bedrock and shallow overburden across the Site, groundwater will be supplied from the fractured bedrock unit. The aquifer system is generally unconfined, but some low-lying areas (near A364133) appear to have confining conditions.

7.2.1 Water Quality

Water samples were obtained from the three (3) newly drilled wells and two (2) existing residential wells. Samples were taken immediately following the pumping test to ensure groundwater best represented aquifer water quality. At residential sample locations, outdoor, untreated taps were used to fill sample bottles. Prior to sampling, taps were fully opened and ran for ten (10) minutes. Note, due to a hold time exceedance, the A364133 well was re-sampled. Results of the sampling events are provided in **Table 6.1**. Overall, groundwater quality showed exceedances for multiple health related contaminants at one or more drilled locations, including: Total Coliform, E. Coli, Total Coliform Background, Turbidity and Sodium. Additional exceedances included aesthetic and operational objectives, such as colour, total dissolved solids, hardness, iron and manganese. Note, treatment options are provided in **Section 7**.

Table 6.1 Groundwater Quality

	Units	ODWS Standard	A364133	A364139	20 ROS	39 ROS	A364138	A364133
Sample Date & Time	---	---	5/17/2023	5/17/2023	5/17/2023	5/17/2023	5/17/2023	5/31/2023
Analysis	***	***	***	***	***	***	***	***
Health Related								
Total Coliform	cfu/100mL	ND	---	0	30	0	NDOGT	0
E. Coli	cfu/100mL	ND	---	0	0	0	NDOGT	0
Fecal Coliform	cfu/100mL	ND	---	0	0	0	0	0
Total Coliform Background	cfu/100mL	ND	---	68	61	0	NDOGT	---
Nitrite (as N)	as N mg/L	1	0.003 <MDL	0.003 <MDL	0.003 <MDL	0.003 <MDL	0.003 <MDL	---
Nitrate (as N)	as N mg/L	10	0.006 <MDL	0.006 <MDL	0.006 <MDL	0.006 <MDL	0.327	---
Nitrate + Nitrite (as N)	as N mg/L	---	0.006 <MDL	0.006 <MDL	0.006 <MDL	0.006 <MDL	0.327	---
Conditional Health Related*								
Sodium	mg/L	20 (200)	13.4	3.97	110	25.9	1.96	---
Non-Health Related								
Conductivity	uS/cm	---	239	177	1480	344	188	---
pH	No unit	(6.5-8.5)	7.89	6.92	7.3	8.04	7.28	---
Alkalinity	mg/L as CaCO3	(30-500)	71	80	27	115	63	---
Colour	TCU	(5)	< 3	55	< 3	< 3	< 3	---
Turbidity	NTU	1 (5)	4.6	28	0.2	< 0.10	17	0.15
Total Dissolved Solids	mg/L	(500)	157	111	1070	214	126	---
Ammonia+Ammonium (N)	as N mg/L	---	< 0.04	0.11	0.12	< 0.04	< 0.04	---
Chloride	mg/L	---	1.9	1.1	210	23	0.76	---
Sulphate	mg/L	---	47	9.4	480	29	26	---
Hardness	mg/L as CaCO3	(80-100)	104	79.2	548	116	86.5	---
Calcium	mg/L	---	34.4	25	198	37.2	29.4	---
Iron	µg/L	(300)	1252	9208	23	8	859	---
Magnesium	mg/L	---	4.44	4.08	13.2	5.67	3.17	---
Manganese	µg/L	(50)	47.7	709	51.9	22.6	53.4	---
Dissolved Organic Carbon	mg/L	(5)	< 1	5	< 1	< 1	2	---

--- denotes no noted parameter standard
( ) denotes Aesthetic Objective
Exceedance when compared to standard
*may be a risk to someone with a sodium restricted diet

7.2.2 Well and Aquifer Assessment

Pumping Test Observations

During pumping tests, no drawdown was observed in designated observation wells; however, due to the significant distances between the newly drilled wells, this was expected. In any case, pumping the highest yield well (A364133), which would have the largest drawdown cone radius, had no impact on the observation wells, while also appearing to approach a steady state. As such, it can be assumed that prolonged pumping of the A364133 well at a lower pumping rate would reach a steady state (as noted in the driller log) and would not have significant interference on adjacent wells. In general, pumping test data was consistent with observations in well logs, whereby well yields ranged from very good to poor. Note, due to the absence of a check-valve on the pump, recovery data was assumed to be relatively unreliable and, as such, well record recovery data was used for analyses.

Drawdown data is presented in **Figures 6.4, 6.5 and 6.6**. The dashed blue lines indicate the approximate static water levels, while dashed red lines indicate the approximate drawdown depth. In addition, the dashed orange lines indicate lines of best fit. As can be seen in the drawdown figures, the slope of the line likely changes in response to an impermeable boundary. In addition, recovery data suggests the A364133 well was likely influenced by a constant head boundary (nearby creek or Lake Rosseau).

Transmissivity

Although aquifer storativity cannot be determined because no drawdown was observed in observation wells, transmissivity (T) can be determined through an analysis of drawdown data. Based on the equation $T = 0.183Q/\Delta s$, where T is transmissivity (m^2/day), Q is pumping rate (m^3/day) and Δs is the slope of the line across one log interval, we can determine the following for each well location:

A364133	**A364138**	**A364139**
$T = 0.183Q/\Delta s = 0.183*89.9/0.71 =$ **23.17 m^2/day**	$T = 0.183Q/\Delta s = 0.183*15.4/2.0 =$ **1.41 m^2/day**	$T = 0.183Q/\Delta s = 0.183*32.7/2.8 =$ **2.14 m^2/day**

Specific Capacity

In addition, specific capacity for each well can be calculated by dividing pumping rate (L/min) by drawdown (m). Results were as follows from data in **Figures 6.4, 6.5** and **6.6**:

A364133	**A364138**	**A364139**
SC = Q/H = 62.5/5.56 = **11.24 L/min per m of drawdown**	SC = Q/H = 10.7/40.22 = **0.27 L/min per m of drawdown**	SC = Q/H = 22.7/39.78= **0.57 L/min per m of drawdown**

Assuming pumps are set at the recommended pump depth noted in the well logs, and that water levels should not be drawn down below 1 m above the pump, the available drawdown is as follows:

A364133	**A364138**	**A364139**
30 m	73 m	55 m

To calculate the well production rate, we can multiply the available drawdown by the specific capacity. Results for each well are as follows:

A364133	**A364138**	**A364139**
337.2 L/min	19.71 L/min	31.35 L/min

Based on log-linear relationships observed in **Figures 6.4, 6.5** and **6.6**, the A364133 well can maintain the applicable pumping rate, indefinitely. Conversely, the A364139 well will become dry (greater than 55 m of drawdown) after approximately 200 minutes of continuous pumping at the noted rate, while A364138 will become dry (greater than 73 m of drawdown) after approximately 200 minutes of pumping at the noted average rate. As such, we can calculate the amount of water produced from each well by multiplying the pumping rates by the time for water levels to reach 1 m above the pump depth:

A364133	**A364138**	**A364139**
Volume water = indefinite amount	Volume water = 10.7 * 200 = 2140 L over 200 minute interval	Volume water = 22.7 * 200 = 4540 L over 200 minute interval

Figure 6.4 Drawdown data from the A364133 well pumping test

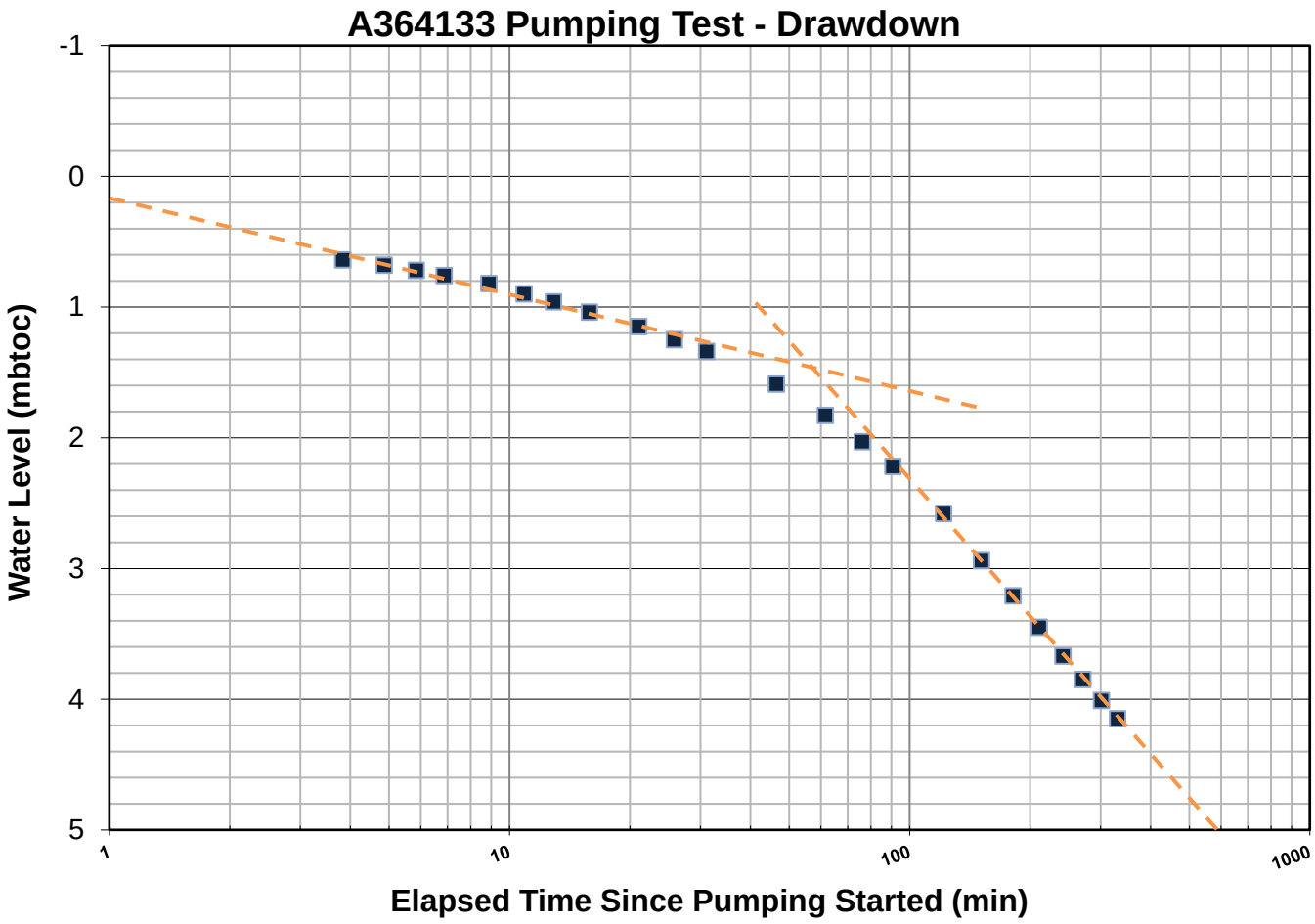


Figure 6.5 Drawdown data from the A364139 well pumping test

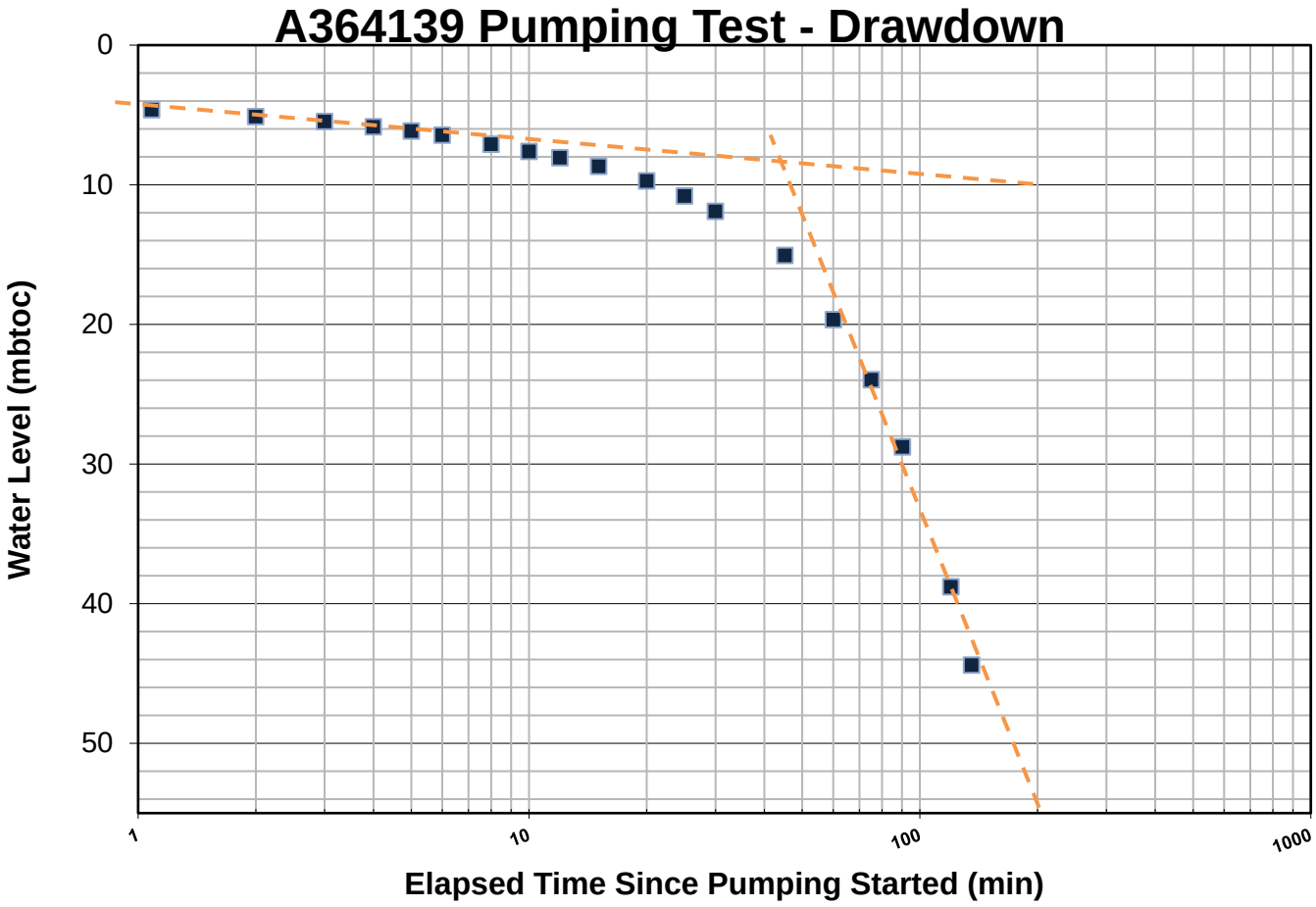
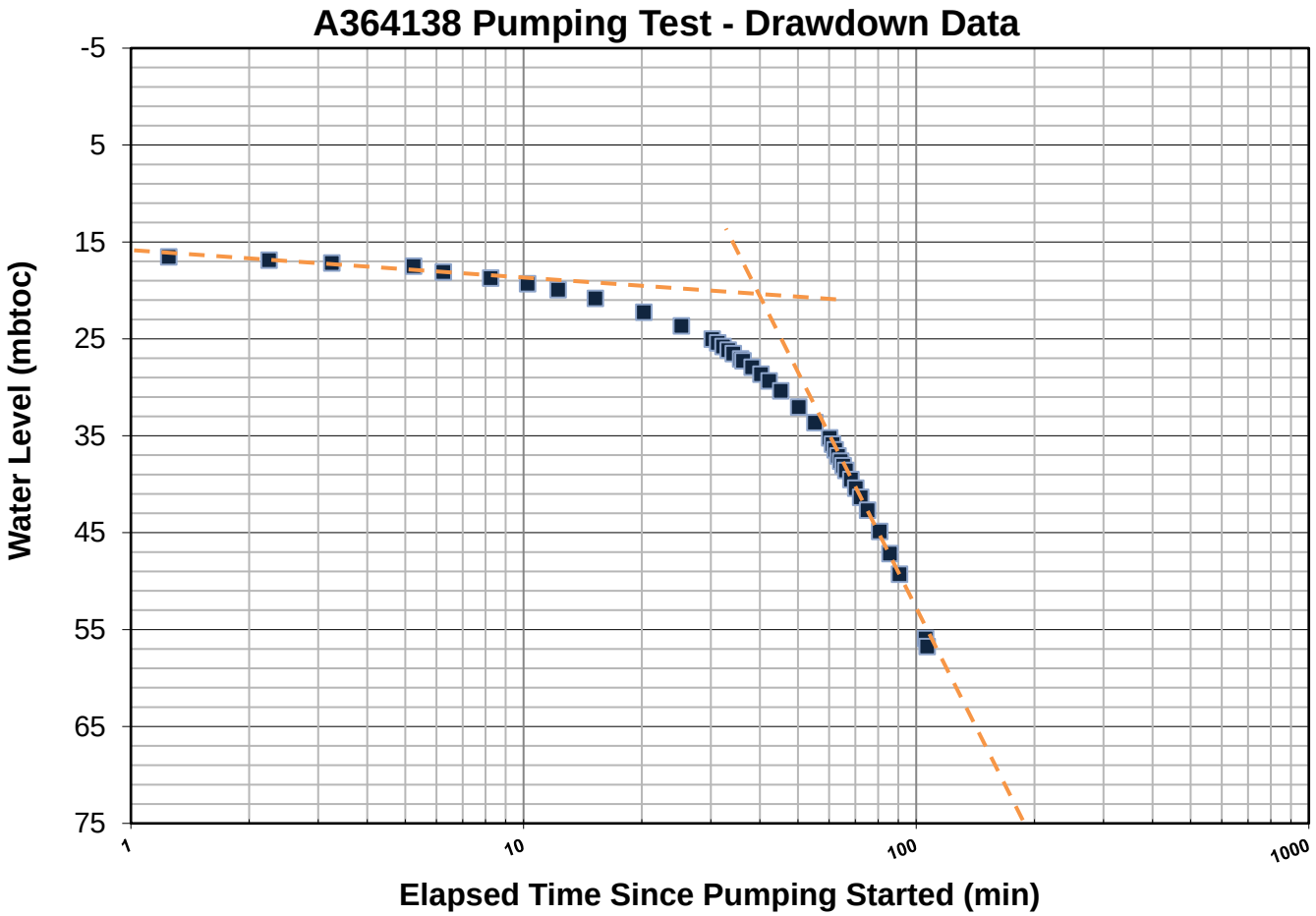


Figure 6.6 Drawdown data from the A364138 well pumping test



Well Record Recovery Test

As noted in the well logs (**Appendix B**), residual drawdown data varied across well locations (**Figures 6.7, 6.8, 6.9**). Assuming a casing radius of 7.62 cm, this suggests a well cross-sectional area of 0.018 m^2. The 1-hour recovery for each well can be calculated using A*H/t, where A = cross sectional area (m^2), H = the difference between the initial and final head in the well after 1 hour and t = 1 hour (except where noted in the equation). Calculations for each well are as follows:

A364133	**A364138**	**A364139**
Volume water into well = 0.018*2.24 = 0.04 m^3/hour = **40 L/hour** Note, drawdown stabilized after 30 mins. Thus, the well can produce **2271.25 L/hour** with a drawdown of approximately 3.5 m.	Volume water into well = 0.018*33.91 = 0.61 m^3/hour = **610 L/hour**	Volume water into well = 0.018*11.17/0.66 = 0.30 m^3/hour = **305 L/hour**

Review of Adjacent Well Logs

A review of well records in areas immediately adjacent to the Site were reviewed. Record 4801421 (northeast of the Site) showed a 296' deep well with no drawdown during a 1-hour pumping test, suggesting a very high yield. Record 4803454, northwest of the Site showed a bedrock well to 400', which saw a drawdown from 22' to 400' during a 1-hour pumping test. As such, the recommended rate was 2 gpm. Record A018197 (located south of the Site) showed a bedrock well to a depth of 97.5 m. Data showed a drawdown of 43 m over 1-hour of pumping, when pumped at 20 L/min, while recovery was 26 m over 1-hour. As such, the well has a moderate yield and recovery.

8 Conclusions and Recommendations

Based on the hydrogeological assessment (and adjacent well log information), the following conclusions are provided:

- Assuming a requirement of 450 L/day/person, households require approximately 2250 L of water supply per day (assumed 4 bedrooms plus 1);
- Both high and low yield wells should be able to provide sufficient quantities of water to individual residences;
- Based on nitrate/nitrogen loading calculations, the Site is capable of supporting individual on-site sewage systems such that predicted nitrate-nitrogen loadings to groundwater at the Site boundary will be below the ODWO of 10 mg/L. However, due to the close proximity and possible short circuiting of groundwater flow, smaller lots in the Site may be vulnerable to elevated nitrate-nitrogen levels in groundwater beneath;
- Collectively, attenuated discharge of sewage effluent from the combined lots to Lake Rosseau may exceed the PWQO of total phosphorus, but this could be mediated with placement of septic systems away from property boundaries nearest to the receptor;
- The attenuated discharge is unlikely to exceed PWQO limits for UIA; and
- Several health-related exceedances were noted in well water samples.

The following recommendations are provided:

1. A minimum 15 m clearance distance should be maintained between all septic fields and the shoreline of Lake Rosseau, and septic beds should be placed as far from adjacent property boundaries as planning will allow (minimum 3 m from property lines and 15 m from residential wells);
2. Low yield wells can be fixed with supplemental storage, which can store water during intermittent pumping;
3. Where low yield wells have been determined, hydraulic stimulation may be used to increase yield;
4. Due to hydraulic connectivity between the surface and subsurface aquifer, and due to notable metals and bacterial concentrations in the aquifer water supply across the Site and adjacent areas, *nitrate and biological treatment systems must be implemented to ensure treated water quality meets Ontario Drinking Water Standards*. In addition, metals treatment systems should be implemented to ensure water quality meets ODWS;
5. Based on the current 50-lot proposal, septic treatment systems should include the removal of both nitrogen and phosphorus to ensure mass loading does not exceed ODWS (groundwater) and PWQO (surface water) guidelines;
6. To limit exposure of water wells to shallow groundwater, bedrock wells should be cased to, at minimum, 20' into bedrock (see Ontario Regulation 903);
7. If the single waterfront lot is to use surface water, the water quality of Lake Rosseau should be tested to assess its potential as a potential potable water source;
8. All new wells should be tested for water quality to determine required treatment systems (in general, this should include particle filters for turbidity and elevated metals, softeners and microbial treatment); and

9. Prior to use as a residential water supply, all water supply wells should be tested to ensure *treated water* does not exceed Ontario Drinking Water Standards and Objectives.

There are a number of available nitrate treatment systems, including the POINTTM system, the Waterloo Biofilter and the Premier Tech Environment Ecoflow Biofilter. Many of the readily available nitrate treatment systems are capable of consistently removing 40% of nitrogen compounds from the effluent. Typically, these systems require smaller field bed areas compared to conventional systems.

Available information, including case studies, suggests Waterloo Biofilter systems can consistently remove the following total nitrogen compounds:

- Single-Pass Waterloo System – 25 to 35% total nitrogen removal.
- Double-Pass Waterloo System – 50 – 65% total nitrogen removal.

Phosphorus removal from septic systems can also be achieved through multiple means. Some systems may require post-treatment of phosphorus-rich sludge, while others may remove phosphorus without the accumulation of sludge.

Summary of Findings

Overall, to minimize groundwater impacts from short-circuiting septic effluent – that is, effluent entering the subsurface through fractures at the surface – nitrate/nitrogen removal systems are recommended on all septic systems to ensure ODWS and PWQO criteria are met. In addition, to prevent adverse impacts of phosphorus loading on nearby surface waterbodies (Lake Rosseau), phosphorus removal systems are also recommended for all septic systems to ensure PWQO criteria are met.

Because the aquifer was determined to be largely hydraulically connected to the surface, and because bacteria were noted in groundwater samples at new and existing wells, residential treatment systems ***must*** be used to remove biological contaminants. This may include chlorination or UV light treatment. In addition, it is recommended that drinking water supply treatment systems should include water softeners (where hard water is encountered), as well as treatment systems that remove metals (generally applies to aesthetic objectives).

Lastly, all new water supply wells should be installed by a licensed contractor (per O. Reg. 903) and shocked (chlorinated) after installation. In addition, untreated water samples should be collected and analysed from newly drilled wells to ensure appropriate treatment systems can be applied. After treatment systems have been applied, treated water samples should again be analyzed to ensure parameters are within the maximum acceptable concentration (MAC) for health-related parameters or do not exceed objectives for aesthetic and operational guidelines. As noted, due to the hydraulic connectivity between the surface and aquifer, and the presence of bacteria, both chlorination and UV filters are recommended for drinking water treatment.

9 General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation.

More specific information with respect to the conditions at individual lots, including the groundwater quality and well yields, may become apparent during site development operations.

The environmental investigation was carried out to address the intent of applicable provincial and municipal Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of Environment and the Seguin Township. It should also be noted that current Regulations, Guidelines, Policies, Standards, Protocols and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report. Achieving the study objectives stated in this report has required us to arrive at conclusions based upon

the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Our undertaking at **EXP**, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

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10 Closure

We trust this summary report is satisfactory for your purposes. If you have any questions regarding our submission, please do not hesitate to contact this office.

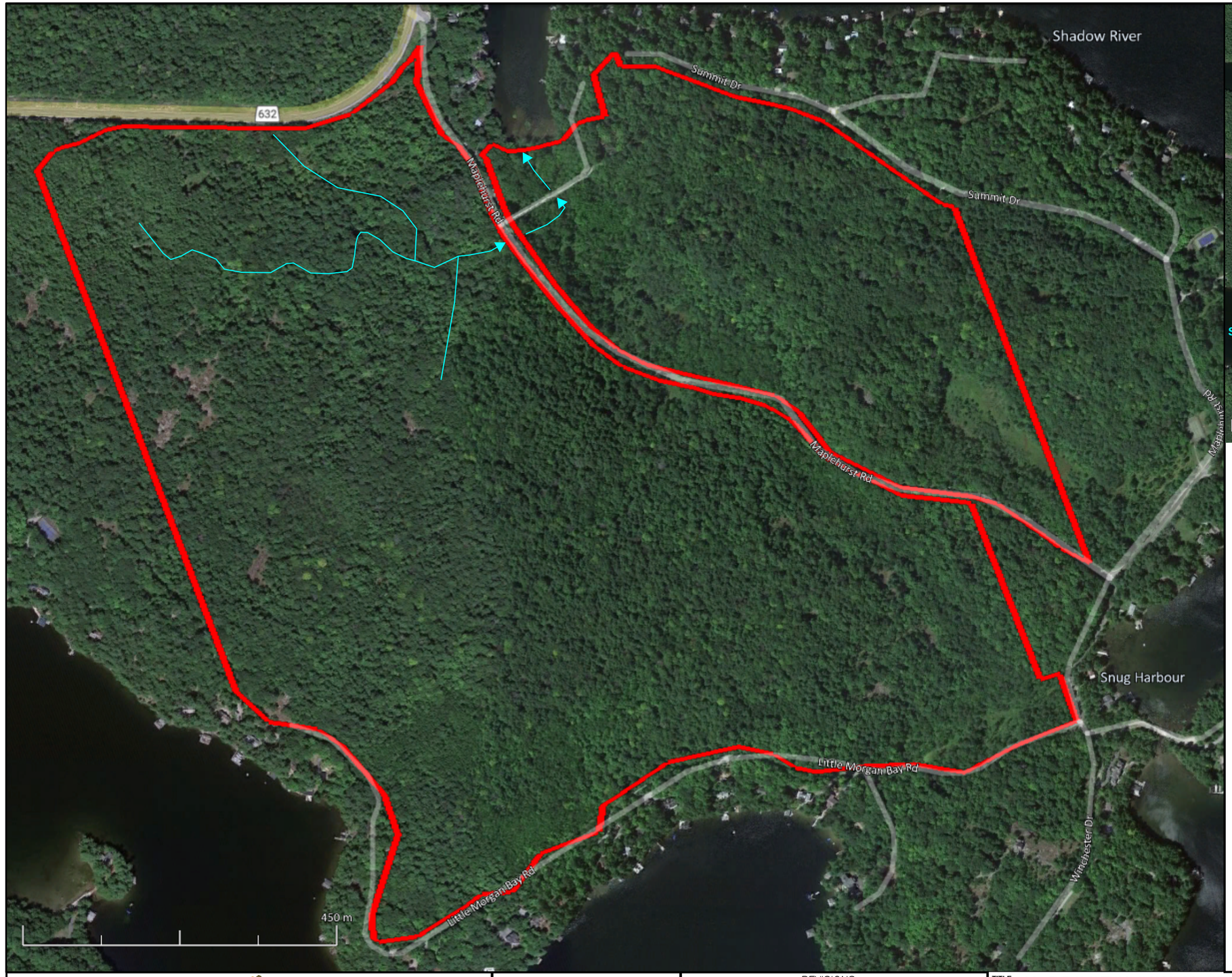
Yours truly,

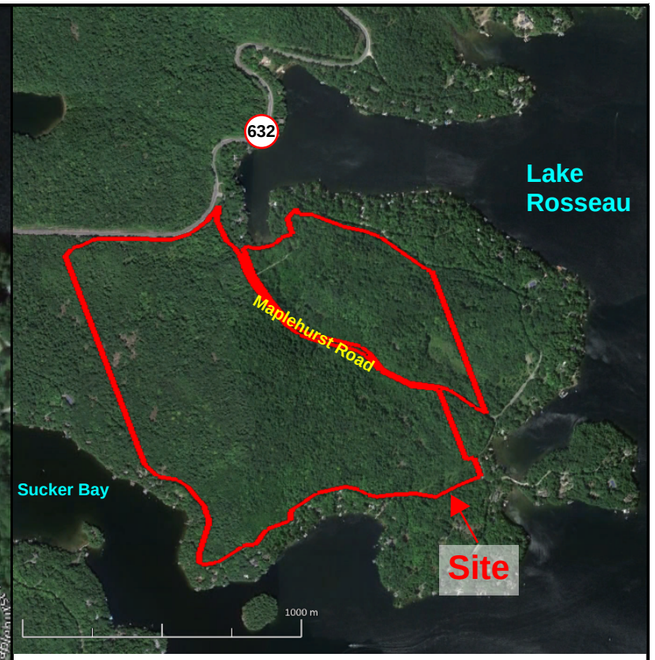
EXP Services Inc.

Jamie Batten, GIT.
Hydrogeologist, Earth & Environmental
Northeastern Ontario

FOR: Delwar Ahmed, P. Geo.
Sr. Reviewer/Hydrogeologist, E & E

Appendix A – Drawings





Approximate Noted Waterbody

Approximate Site Boundary

N

exp Services Inc.
Sudbury Branch
t: +1.705.674.4401 | f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
Canada

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REVISIONS

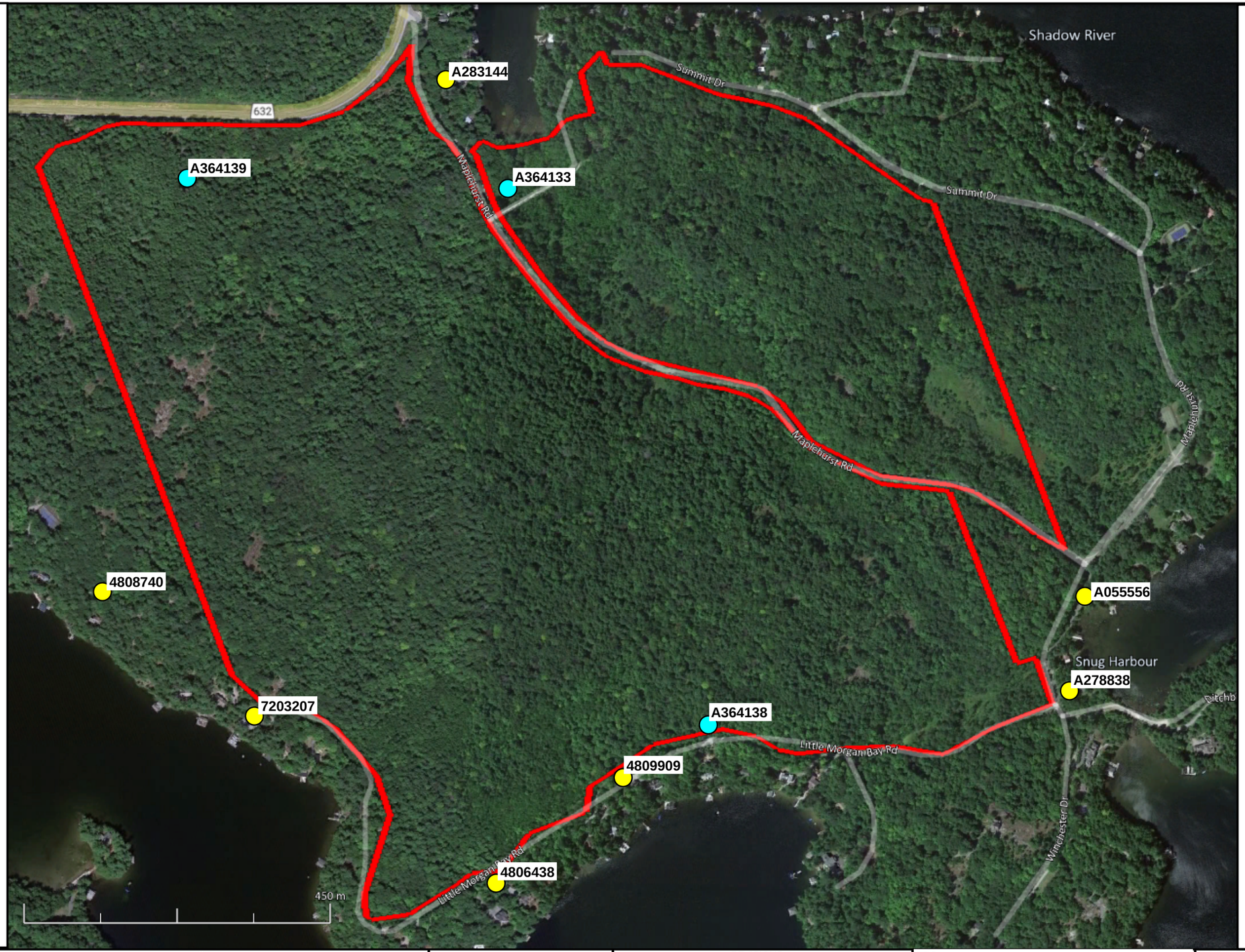
No.	DESCRIPTION	DATE

TITLE: **HYDROGEOLOGICAL STUDY SITE PLAN**

PROJECT AND LOCATION: **Rosseau Springs Development**

Rosseau, Ontario

PROJECT NO.	DATE	SCALE:	DWG NO.
SUD-22025423-A0	June 2023		1



Approximate Site Boundary

Nearest Existing Wells

New Wells (pumped during pumping test)

N

exp Services Inc.
Sudbury Branch
t: +1.705.674.4401 | f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
Canada

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REVISIONS

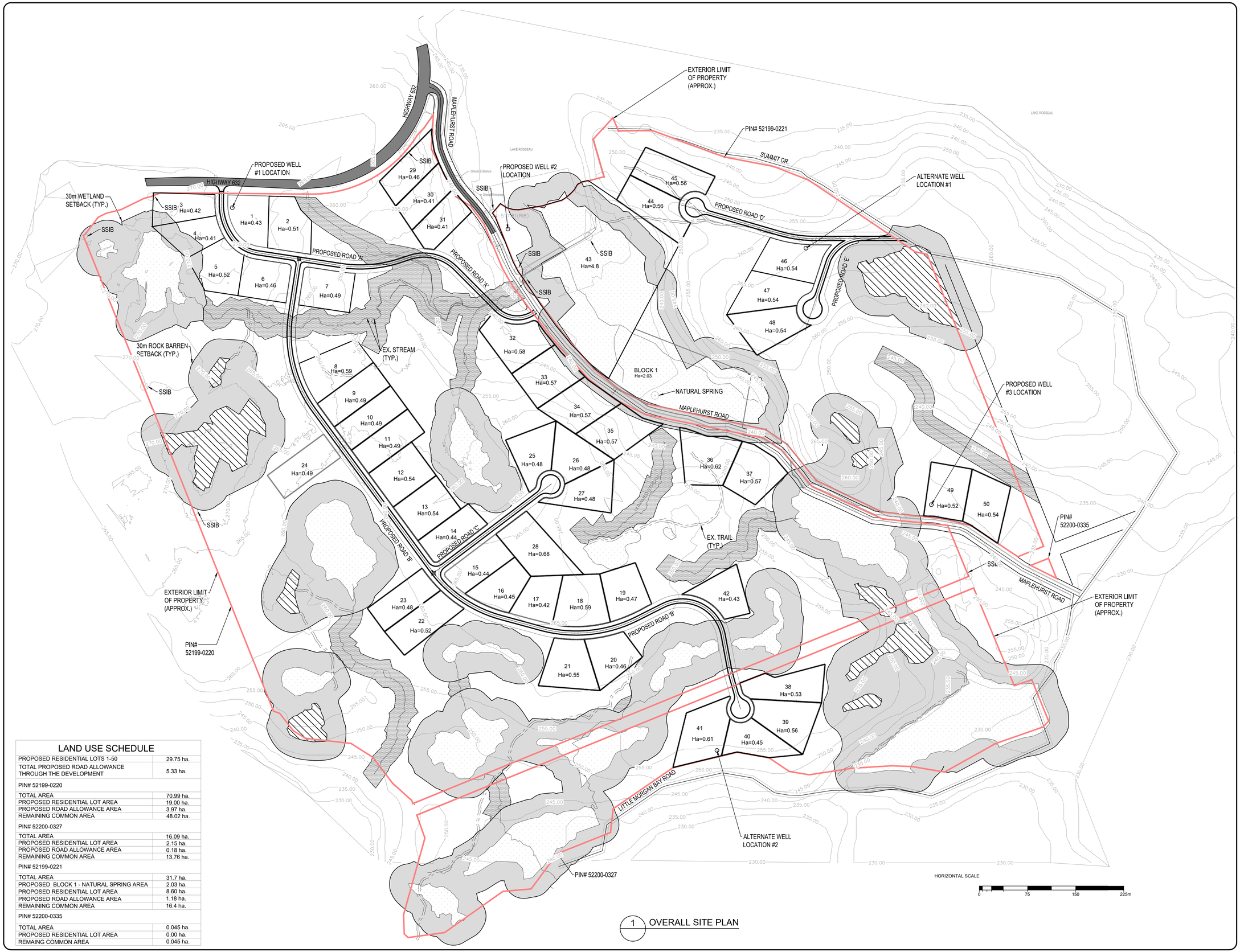
No.	DESCRIPTION	DATE

TITLE: **HYDROGEOLOGICAL STUDY WELL LOCATIONS**

PROJECT AND LOCATION: **Rosseau Springs Development**

Rosseau, Ontario

PROJECT NO.	DATE	SCALE:	DWG NO.
SUD-22025423-A0	June 2023		2



1 OVERALL SITE PLAN

LAND USE SCHEDULE

PROPOSED RESIDENTIAL LOTS 1-50	29.75 ha.
TOTAL PROPOSED ROAD ALLOWANCE THROUGH THE DEVELOPMENT	5.33 ha.
PIN# 52199-0220	
TOTAL AREA	70.99 ha.
PROPOSED RESIDENTIAL LOT AREA	19.00 ha.
PROPOSED ROAD ALLOWANCE AREA	3.97 ha.
REMAINING COMMON AREA	48.02 ha.
PIN# 52200-0327	
TOTAL AREA	16.09 ha.
PROPOSED RESIDENTIAL LOT AREA	2.15 ha.
PROPOSED ROAD ALLOWANCE AREA	0.18 ha.
REMAINING COMMON AREA	13.76 ha.
PIN# 52199-0221	
TOTAL AREA	31.7 ha.
PROPOSED BLOCK 1 - NATURAL SPRING AREA	2.03 ha.
PROPOSED RESIDENTIAL LOT AREA	8.60 ha.
PROPOSED ROAD ALLOWANCE AREA	1.18 ha.
REMAINING COMMON AREA	16.4 ha.
PIN# 52200-0335	
TOTAL AREA	0.045 ha.
PROPOSED RESIDENTIAL LOT AREA	0.00 ha.
REMAING COMMON AREA	0.045 ha.

EXP Services Inc.
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GENERAL NOTES:
1. ALL DIMENSIONS ARE IN METERS (m) UNLESS NOTED OTHERWISE.
2. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL ABOVE AND BELOW GROUND UTILITIES AND SERVICES PRIOR TO CONSTRUCTION. UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE ONLY. CONTRACTOR TO INFORM ENGINEER OF ANY DISCREPANCY.

LEGEND

- EX. ASPHALT ROADWAY
- WETLAND
- ROCK BARREN
- 30m BUFFER AREA
- 15m STREAM SETBACK
- STREAM
- EX. TRAIL
- SITE PROPERTY LINE
- LOT PROPERTY LINE
- PROPOSED ROADWAY CENTRELINE
- PROPOSED EDGE OF ROADWAY
- PROPOSED DITCH
- PROPOSED ROAD ALLOWANCE
- CAVITY TREE

NOTE

PROPERTY BOUNDARIES ARE APPROXIMATE AND ARE PROVIDED FOR REFERENCE PURPOSES ONLY.

NOTE

ALL LOTS SHOWN PROVIDE MINIMUM 30m FRONTAGE AND MINIMUM 0.4 HECTARE AREA.

No.	Revision	By:	Date
4	ISSUED FOR CLIENT REVIEW	BM	OCT. 11 22
3	ISSUED FOR CLIENT REVIEW	BM	SEPT.27 22
2	ISSUED FOR CLIENT REVIEW	BM	SEPT.16 22
1	ISSUED FOR DRONE SURVEY	RJ	JUNE 03 22

ISSUED FOR CLIENT REVIEW

Professional Seal

PRELIMINARY

Drawn By:	BM	Scale:	1:2500 (ARCH D)
Checked By:	LR	Date:	OCT. 11, 2022
Approved By:	CLC	Date:	JULY 22, 2022

Date Printed: 5/23/18

File Name: Base 9951 Rosseau Springs October 11, 2022 - 50 Lot Site - Plan-Combined Survey

Project Title

ROSSEAU SPRINGS SUBDIVISION

ROSSEAU, ONTARIO

Dwg. Title

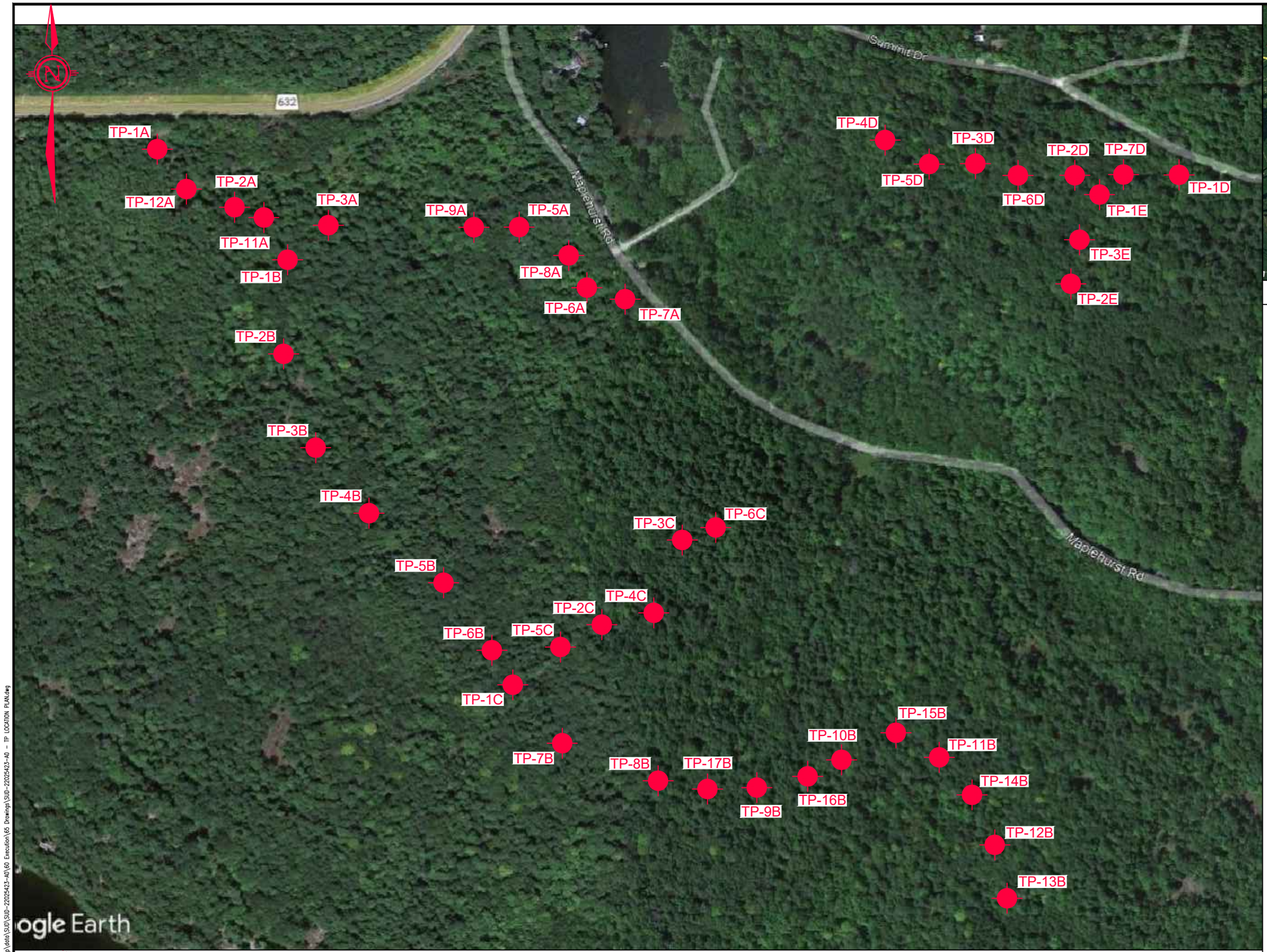
CONCEPTUAL SUBDIVISION PLAN (50 LOTS)

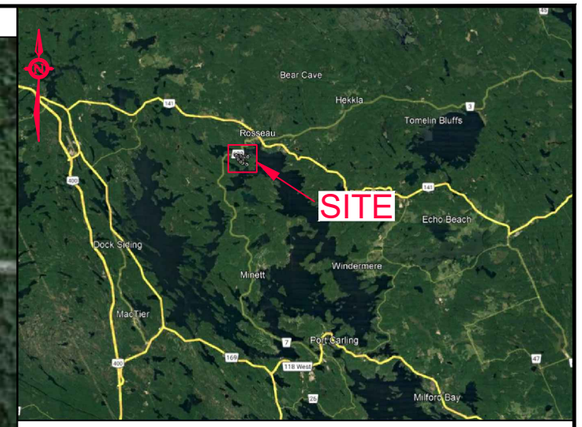
Project No. NON-21019951

Dwg. No. SITE PLAN

Rev. No. 3

E:\NTB\NON-21019951-A\60 Execution\65 Drawings\Pin Mapping





KEYPLAN - N.T.S.

LEGEND

EXP TEST PIT

– NOTES –

1) The boundaries and soil types have been established only at Test Hole locations. Between Test Holes, they are assumed and may be subject to considerable error.
2) Do not use Test Hole elevations for design purposes.
3) Soil samples will be retained in storage for 3 month and then destroyed unless client advises that an extended time period is required.
4) Quantities should not be established from the information provided at the Test Hole locations.
5) This drawing forms part of the report, project number as referenced, and should be used only in conjunction with this report.

EXP Services Inc.
Sudbury Branch
t: +1.705.674.4401 | f: +1.705.674.5583
885 Regent Street
Sudbury, ON P3E 5M4
Canada
www.exp.com

REVISIONS

No.	DESCRIPTION	DATE

CLIENT: ROSSEAU SPRINGS LIMITED

PROJECT: PROPOSED ROSSEAU SPRINGS RESIDENTIAL DEVELOPMENT
ROSSEAU, ON

PROJECT NO.: SUD-22025423-A0

TITLE: TEST PIT LOCATION PLAN

DATE: NOVEMBER 2022 | SCALE: NTS | DWG NO.: 4

Appendix B – Well and Test Pit Logs

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☑ Imperial

Tag#:A364133 (or Print Below) A364133

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
REM	STEELE / KENOZHA BAY COMPANY	rem@kenozhabay.ca	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
546 HWY 632	ROSSEAU	ONTARIO	P0C 1J0	7052746302017

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
21 ABC MAPLEHURST	SEGUIN	PT LOT 6-7	5

County/District/Municipality	City/Town/Village	Province	Postal Code
PARRY SOUND DISTRICT	ROSSEAU	Ontario	P0C 1J0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	605211	5011202		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	WITH BOULDERS		0'	18'
GREY/PINK	GRANITE		HARD	18'	180'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	22'	BENSEAL AND QUICKCRETE	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	STEEL	.219	0'	22'

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Hole Diameter Depth To	Hole Diameter (cm/in)
142' (m/ft) ☐ Gas	☐ Fresh ☑ Untested ☐ Other, specify	0'	22'	10½"
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify	22'	180'	6"
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify			

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 100'

Pumping rate (l/min / GPM): 10 GPM

Duration of pumping: 1 hrs + – min

Final water level end of pumping (m/ft): 9' 4"

If flowing give rate (l/min / GPM): 3GPM

Recommended pump depth (m/ft): 100'

Recommended pump rate (l/min / GPM): 10 + GPM

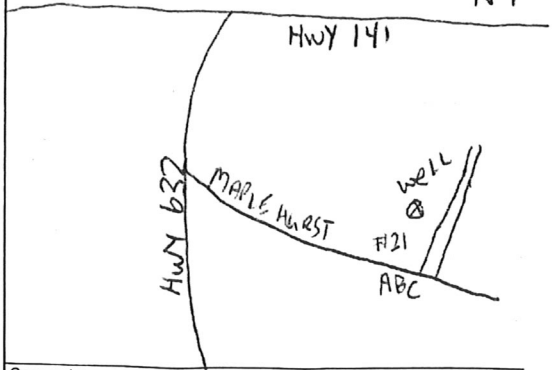
Well production (l/min / GPM): 30 GPM

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		+ 2'		
1	6"		1	5' 5"
2	2' 3"		2	2' 2"
3	3' 5"		3	1'
4	4' 6"		4	9"
5	5' 9"		5	4"
10	6' 11"		10	1"
15	8' 2"		15	+ 4"
20	9'		20	+ 6"
25	9' 2"		25	+ 8"
30	9' 4"		30	+ 10"
40	9' 4"		40	+ 1' 3"
50	9' 4"		50	+ 1' 7"
60	9' 4"		60	+ 1' 11"

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 3RD WELL DRILLED FOR STUDY

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
CONRAD WELL DRILLING LTD.	7361

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
P.O. Box 59	PARRY SOUND	ONTARIO	P2A 2X2	conradwelldrilling@gmail.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7053789578	CONRAD, PAUL	3030	Paul Conrad	2022/12/21

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2022/12/21	2022/12/09

Ministry Use Only

Audit No. Z331989

Received

0506E (2018/12) — Well Owner's Copy

Ontario — Ministry of the Environment, Conservation and Parks

Tag#:A364138 (or Print Below) A364138

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☐ Metric ☑ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
REM	STEELE / KENOZHA BAY COMPANY	rem@kenozhabay.ca	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
546 HWY 632	ROSSEAU	ONTARIO	P0C1J0	7057463027

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
LITTLE MORGAN BAY RD.	SEGUIN	PILOT 6-8	4

County/District/Municipality	City/Town/Village	Province	Postal Code
PARRY SOUND DISTRICT	ROSSEAU	Ontario	P0C1J0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	605530	5061043	42R14741	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GREY/BROWN	CLAY			0'	1'6"
GREY/PINK	GRANITE		HARD	1'6"	360'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0'	20'	BENSEAL AND QUICKGROUT	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	STEEL	.219	0'	20'

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0'	20'	10½"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	20'	360'	
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

*HYDROFRACKED

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 300'

Pumping rate (l/min / GPM): 7 GPM

Duration of pumping: 1 hrs + — min

Final water level end of pumping (m/ft): 228'6"

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 300'

Recommended pump rate (l/min / GPM): 7 GPM

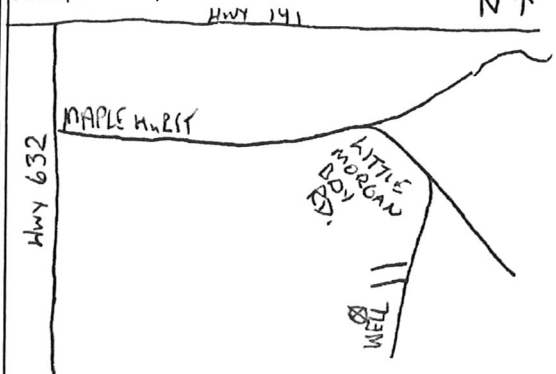
Well production (l/min / GPM): 4 GPM

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	86'6"		[illegible]
1	88'4"	1	226'
2	90'10"	2	223'6"
3	92'	3	221'
4	95'1"	4	218'7"
5	97'3"	5	216'1"
10	108'8"	10	203'7"
15	120'1"	15	191'4"
20	131'6"	20	179'
25	142'11"	25	166'9"
30	155'4"	30	154'3"
40	180'3"	40	141'11"
50	204'2"	50	129'6"
60	228'6"	60	117'3"

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 2ND WELL DRILLED FOR STUDY

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
CONRAD WELL DRILLING LTD.	7167

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
P.O. Box 59	PARRY SOUND	ONTARIO	P2A2X2	conradwelldrilling@gmail.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7653789578	CONRAD, PAUL	3013	Paul Conrad	2021/12/21

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2021/12/21	2021/12/17

Ministry Use Only

Audit No. Z331990

Received

0506E (2018/12)

Well Owner's Copy

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☑ Imperial

Tag#:A364139 (or Print Below) A364139

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
REM	STEELE - KENOZHA BAY COMPANY	rem@kenozhabay.ca	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
546 HWY 632	ROSSEAU	ONTARIO	P0C1J0	7057463027

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
219 HWY 632	SEGUIN	PT LOT 6-8	5

County/District/Municipality	City/Town/Village	Province	Postal Code
PARRY SOUND DISTRICT	ROSSEAU	Ontario	P0C1J0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	604723	5011220		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GREY/PINK	GRANITE		HARD	0'	360'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0'	20'	BENSEAL AND QUICKGROUT	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	STEEL	.219	0'	20'

Construction Record - Screen

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

Status of Well

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

Water Details

HYDROFRACTURED

Water found at Depth (m/ft)	Kind of Water	Hole Depth From	Hole Depth To	Hole Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0'	20'	10½"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	20'	360'	6"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
CONRAD WELL DRILLING LTD.	7136

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
P.O. Box 59	PARRY SOUND	ONTARIO	P2A2X2	conradwelldrilling@

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7053789578	CONRAD, PAUL	3030	Paul Conrad	2022/11/21

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 200'

Pumping rate (l/min / GPM): 7 GPM

Duration of pumping: 1 hrs + — min

Final water level end of pumping (m/ft): 46' 2"

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 200'

Recommended pump rate (l/min / GPM): 7-10 GPM

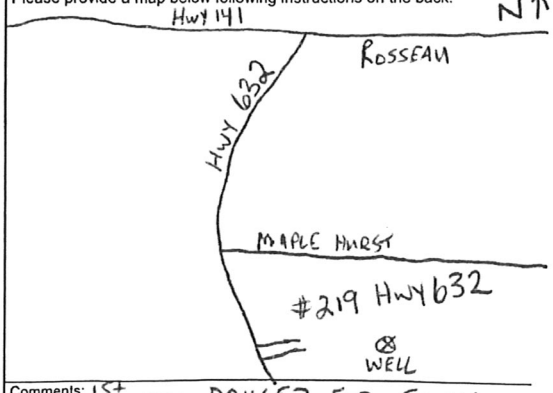
Well production (l/min / GPM): 8 GPM

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	9' 6"		46' 2"
1	10' 2"	1	40' 4"
2	11'	2	36' 3"
3	11' 8"	3	32'
4	12' 4"	4	27' 11"
5	12' 11"	5	25' 3"
10	15' 9"	10	17' 4"
15	18' 7"	15	15' 2"
20	21' 4"	20	12' 8"
25	24' 1"	25	10' 5"
30	32' 3"	30	9' 9"
40	37' 7"	40	9' 6"
50	42' 11"	50	9' 6"
60	46' 2"	60	9' 6"

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 1st WELL DRILLED FOR STUDY

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☑ Yes ☐ No	2022/11/21	Audit No. Z331991
	Date Work Completed: 2022/11/20	Received

Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A283144

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
# 181 Hwy # 632	Seguin		

County/District/Municipality	City/Town/Village	Province	Postal Code
Parry Sound		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	605273	5011722		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand	stoney		0	8
Black	Granite		bedrock	8	185
Grey	Granite		bedrock	185	300

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	20	E-Z Seal Bentonite	3 bag's

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	Steel	.219	0	20

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
N/A				

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	300	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason: End of test

Pump intake set at (m/ft): 250

Pumping rate (l/min / GPM): 10

Duration of pumping: 1 hrs + 30 min

Final water level end of pumping (m/ft): 180

If flowing give rate (l/min / GPM): N/A

Recommended pump depth (m/ft): 200

Recommended pump rate (l/min / GPM): 10

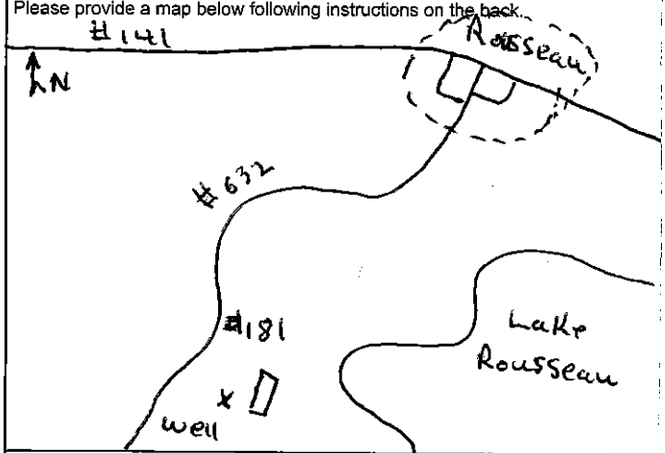
Well production (l/min / GPM): 15

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	18.5		180
1	24.8	1	173.8
2	29.9	2	167.6
3	34	3	161.4
4	38.1	4	155.2
5	42.2	5	149
10	53.7	10	125
15	65.2	15	101
20	76.7	20	77
25	88.2	25	53
30	99.7	30	33.5
40	122.7	40	21.2
50	145.7	50	18.5
60	168.7	60	18.5

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Vinson well Drilling	5224

Business Address (Street Number/Name)	Municipality
3674 Line 8N	Oro-Medonte

Province	Postal Code	Business E-mail Address
ON	L0K 1E0	dave@vinsonwelldrilling.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7058352268	Dave Vinson

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1916	Dave Vinson	2020 07 30

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	2020 06 22	Audit No. Z309705
	Date Work Completed: 2020 06 22	JUL 16 2020 Received

0506E (2014/11)

Ministry's Copy

Ontario Ministry of the Environment

Well Tag Number (Plate #) A 055556

A055556

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): PARRY SOUND | Township: SEGUIN | Lot: PT 6 | Concession: 4

RR#/Street Number/Name: #11 MISTY MOREN DR. | City/Town/Village: | Site/Compartment/Block/Tract etc.:

GPS Reading: NAD 83 | Zone 17 | Easting 606047 | Northing 5010625 | Unit Make/Model: I FINDER | Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
Light Black	Granite			0	93

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	6.2	27
6.2	93	15

Water Record

Water found at 55 Metres / Kind of Water

☐ ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

☐ ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

☐ ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

After test of well yield, water was ☑ Clear and sediment free ☐ Other, specify ___

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
16.5	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	477	0	6.2
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☑ Open hole		6.2	93

Test of Well Yield

Pumping test method: Airlift

Pump intake set at - (metres): 92

Pumping rate - (litres/min): 68

Duration of pumping: 3 hrs + ___ min

Final water level end of pumping: 92 metres

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 94 metres

Recommended pump rate: (litres/min)

If flowing give rate - (litres/min)

If pumping discontinued, give reason.

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level	40		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.2	Bentonite	0.18

Method of Construction

☐ Cable Tool ☑ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

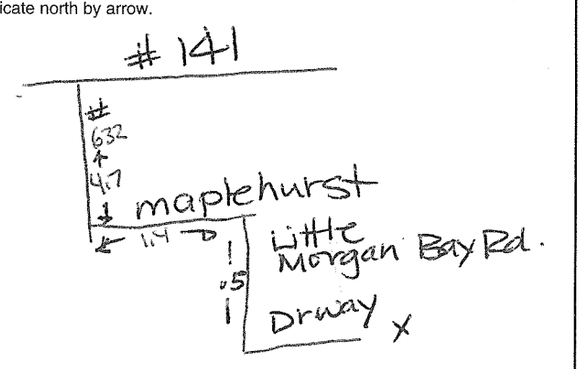
☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☑ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 66524

Date Well Completed: YYYY 2006 MM 08 DD 23

Was the well owner's information package delivered? ☐ Yes ☑ No

Date Delivered: YYYY 2006 MM 08 DD 30

Well Contractor/Technician Information

Name of Well Contractor: Rough Terrain Well Drilling | Well Contractor's Licence No.: 6986

Business Address (street name, number, city etc.): 859 #141 RR#1 Rosseau, On P0C 1J0

Name of Well Technician (last name, first name): Curtis, Stephen | Well Technician's Licence No.:

Signature of Technician/Contractor: X [signature] | Date Submitted: YYYY 2007 MM 05 DD 14

Ministry Use Only

Data Source	Contractor 6986
Date Received YYYY JUN MM 14 DD 2007	Date of Inspection YYYY MM DD
Remarks	Well Record Number

0506E (08/2006)

Ministry's Copy

Cette formule est disponible en français

Ontario

Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. (Place Sticker and/or Print Below)

Tag#:A278838

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
3 Winchester Drive	Seguin		

County/District/Municipality	City/Town/Village	Province	Postal Code
	Rosseau	Ontario	P0C 1J0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	606070	5011488		

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
BROWN	GRAVEL			0	4
GREY	GRANITE			4	185

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	BENTONITE.	4.8

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
6¼	STEEL	.188	+2	20

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth	Kind of Water	
180 (m/ft) ☐ Gas	☒ Fresh ☐ Untested ☐ Other, *specify*	
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	8 3/4
20	180	6

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 80

Pumping rate (l/min / GPM): 5

Duration of pumping: 1 hrs + ____ min

Final water level end of pumping (m/ft): 47.5

If flowing give rate (l/min / GPM): —

Recommended pump depth (m/ft): 80

Recommended pump rate (l/min / GPM): 5

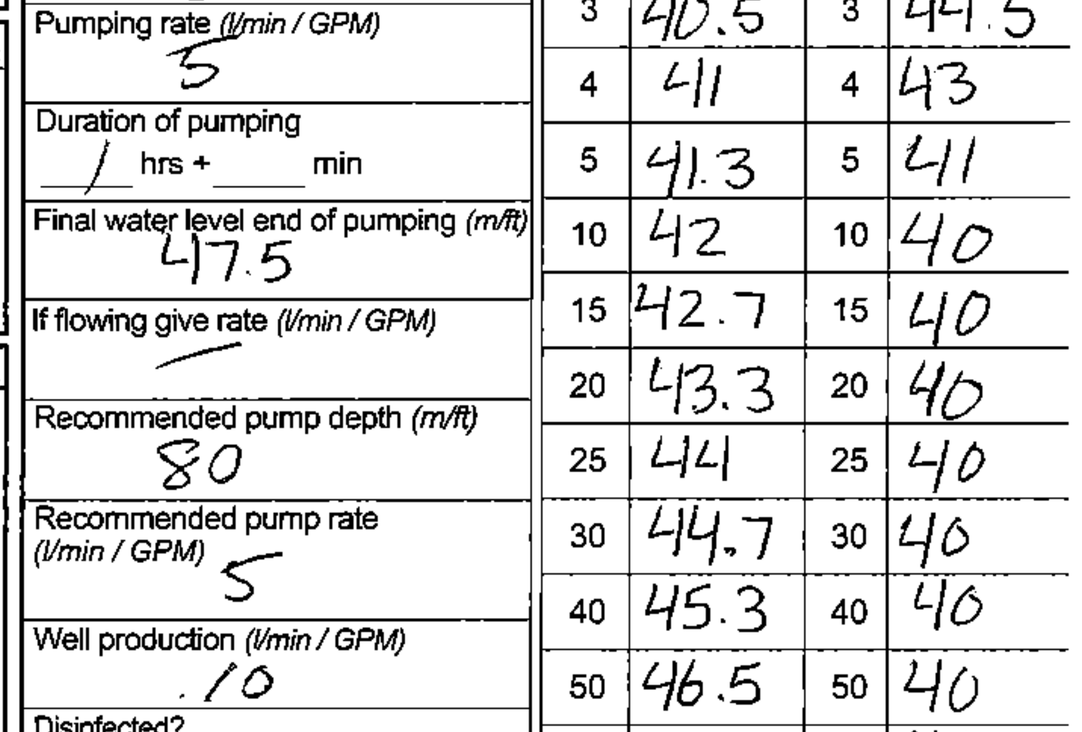
Well production (l/min / GPM): .10

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	40		47.5
1	40	1	47.5
2	40.3	2	46
3	40.5	3	44.5
4	41	4	43
5	41.3	5	41
10	42	10	40
15	42.7	15	40
20	43.3	20	40
25	44	25	40
30	44.7	30	40
40	45.3	40	40
50	46.5	50	40
60	47.5	60	40

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

FREE CHLORINE RES. 50-100 PPM

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Ransome Well Drilling	7160

Business Address (Street Number/Name)	Municipality
Box 454	Burks Falls

Province	Postal Code	Business E-mail Address
ON	P0A1C0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7053829355	Baker, Roger Adam

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2815	Roger Baker	2019/10/01

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	2019/10/06	2019/10/06

Ministry Use Only

Audit No. Z327221

Received JAN 21 2020

0506E (2018/12)

Ministry's Copy

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): A018197

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

PARRY SOUND DIST. | HUMPHREY | PT 1 | 4

RR#/Street Number/Name: 59 LITTLE MORGAN BAY RD. | City/Town/Village | Site/Compartment/Block/Tract etc.: 42R-4249 PTS. 3+7

GPS Reading | NAD: 83 | Zone: 17T | Easting: 0605394 | Northing: 5010356 | Unit Make/Model: GARMIN E-TREX | Mode of Operation: ☐ Undifferentiated ☐ Averaged ☒ Differentiated, specify 27'

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
BROWN	SAND & GRAVEL			0	2.4
GREY	ROCK			2.4	97.5

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	6.1	22.23
6.1	97.5	16

Water Record

Water found at Metres	Kind of Water		
45 m	☒ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:

After test of well yield, water was: ☒ Clear and sediment free ☐ Other, specify

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
16	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.5	+40cm	6.1
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☒ Open hole		6.1	97.5

Test of Well Yield

Pumping test method: ☐ Shallow ☒ Deep

Pump intake set at (metres): 91.4

Pumping rate - (litres/min): 20

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 77 metres

Recommended pump type.

Recommended pump depth: 91.4 metres

Recommended pump rate: 20 (litres/min)

If flowing give rate - (litres/min):

If pumping discontinued, give reason:

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level				
1	6.1		1	49.
2	7.2		2	48.5
3	8.2		3	48
4	9.2		4	47.5
5	10.2		5	47
10	14.5		10	44.5
15	18.2		15	42
20	21.8		20	39.5
25	25.2		25	37
30	29		30	35
40	35.5		40	30.8
50	43		50	27
60	49		60	22.8

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - From	Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.1	BENTONITE	

Method of Construction

☐ Cable Tool ☒ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: MARSHALL WELL DRILLING | Well Contractor's Licence No.: 3678

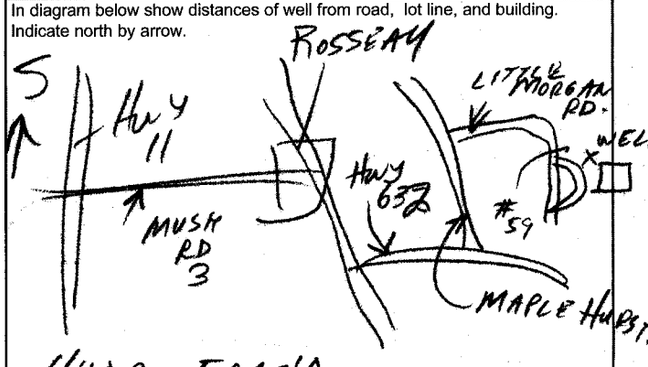
Business Address (street name, number, city etc.): HWY 11 EMSDALE ONT. P0A-1J0

Name of Well Technician (last name, first name): BAKER ROGER | Well Technician's Licence No.: T-2815

Signature of Technician/Contractor: X [signature] | Date Submitted YYYY MM DD: 2004 10 15

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



HYDRO FRAC'D.

Audit No.: Z 18345 | Date Well Completed YYYY MM DD: 2004 09 16

Was the well owner's information package delivered? ☒ Yes ☐ No | Date Delivered YYYY MM DD: 2004 09 16

Ministry Use Only

Data Source	Contractor
	3678
Date Received YYYY MM DD: APR 07 2005	Date of Inspection YYYY MM DD
Remarks	Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 | 4806438 | MUNICIP 48023 | CON. CON 04

COUNTY OR DISTRICT	TOWNSHIP	CON	LOT
[redacted]	Humphrey	4	8

[redacted] 21 Western Ave. Schomberg, Ont. LOG 1TO

DATE COMPLETED: DA 05 M 07 91

RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brn	Sand Fill	Boulders		0	9
Pk	Granite			9	65
Gry.Blk	"			65	120

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
105	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	20
5 7/8	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		20	120
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

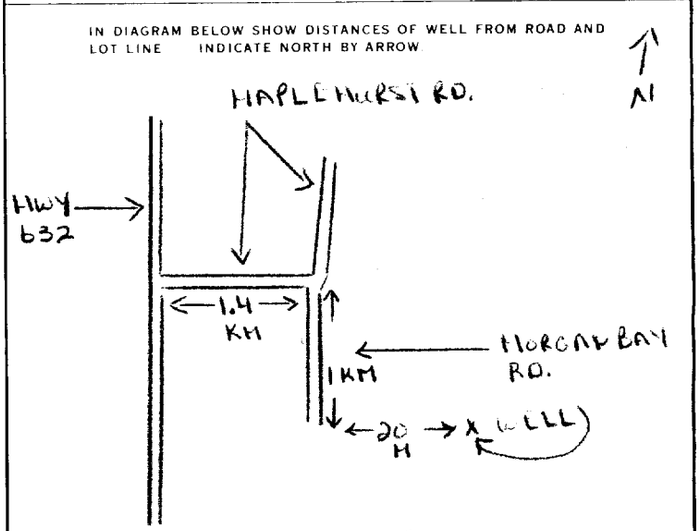
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
Air ☐ PUMP ☒ BAILER at 120	50 GPM	1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
4 FEET	FEET	1 ☐ PUMPING 2 ☐ RECOVERY	FEET	30 FEET	25 FEET	22 FEET

IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	FEET	1 ☐ CLEAR 2 ☒ CLOUDY	☐ SHALLOW ☒ DEEP	60 FEET	As Req. GPM

LOCATION OF WELL

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



DRILLERS REMARKS: 096008

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: BETTRAY WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 1366
ADDRESS: Box 9, Rosseau, Ont. POC 1JO
NAME OF WELL TECHNICIAN: L. Trodden
WELL TECHNICIAN'S LICENCE NUMBER:
SIGNATURE OF TECHNICIAN/CONTRACTOR: L. Trodden
SUBMISSION DATE: DAY 27 MO 04 YR 92

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 1366 | DATE RECEIVED MAY 01 1992
DATE OF INSPECTION | INSPECTOR
REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

Well Tag No. **Tag#: A137771**

A137771

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: [X] Metric [ ] Imperial

Page _____ of _____

Well Owner's Information

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
113 Little Morgan Bay Rd	Humphrey	Pt 8&9	5

County/District/Municipality	City/Town/Village	Province	Postal Code
Parry Sound		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	0604870	5010397	Plan 194 Lot 13	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Grey	Gravel			0	1.2
Grey	Bedrock			1.2	121.9

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	6.1	Bentonite.	

Method of Construction

[ ] Cable Tool [ ] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[X] Air percussion
[ ] Other, specify _____

Well Use

[ ] Public [ ] Commercial [ ] Not used
[X] Domestic [ ] Municipal [ ] Dewatering
[ ] Livestock [ ] Test Hole [ ] Monitoring
[ ] Irrigation [ ] Cooling & Air Conditioning
[ ] Industrial
[ ] Other, specify _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
16	Steel	.15	+40cm	6.1
16	Open Hole		6.1	121.9

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	
[ ] Gas	[X] Fresh [ ] Untested	[ ] Other, specify Hydro Frac'd
Water found at Depth (m/ft) [ ] Gas	Kind of Water: [ ] Fresh [ ] Untested	[ ] Other, specify _____
Water found at Depth (m/ft) [ ] Gas	Kind of Water: [ ] Fresh [ ] Untested	[ ] Other, specify _____

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	6.1	22.23
6.1	121.9	16

Results of Well Yield Testing

After test of well yield, water was:
[X] Clear and sand free
[ ] Other, specify _____

If pumping discontinued, give reason:

Pump intake set at (m/ft): 118.9

Pumping rate (l/min / GPM): 20

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 59.1

If flowing give rate (l/min / GPM): /

Recommended pump depth (m/ft): 118.9

Recommended pump rate (l/min / GPM): 20

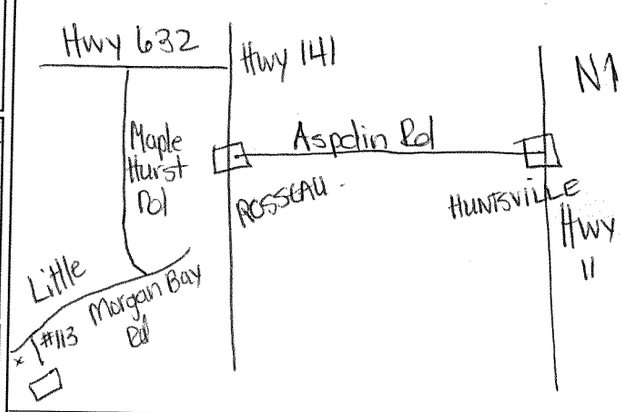
Well production (l/min / GPM): 7 1/2

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	18.3		59.1
1	19.3	1	58.9
2	20.5	2	58.5
3	21.4	3	57.8
4	22.5	4	57.3
5	23.1	5	56.6
10	27.2	10	54.0
15	31.1	15	51.3
20	34.0	20	49.1
25	38.1	25	46.4
30	42.0	30	44.1
40	49.0	40	40.0
50	55.5	50	36.0
60	59.1	60	32.1

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Marshall Well Drilling	7508

Business Address (Street Number/Name)	Municipality
33 Star Lake Road	Emsdale

Province	Postal Code	Business E-mail Address
Ont	P0A1J0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7056367774	Marshall Amy (Jamie)

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3154	Amy Marshall	2013 05 24

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
[X] Yes [ ] No	2013 04 29	Audit No. Z157802
	Date Work Completed: 2013 04 25	Received JUN 17 2013

Ministry's Copy

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 (1 2) **4808740** Municipality 48023 (10 14) Con. CON (15 22 23 24) 05

County or District: Parry Sound
Township/Borough/City/Town/Village: Seguin
Con block tract survey, etc.: 5+6
Lot: 9 (25-27)
Address: [redacted] 36 Oakfield St.
Date completed: 01 day 10 month 00 year

21 (1 2) UTM (10) Northing (12 17) (18 24) RC (25) Elevation (26) RC (30) Basin Code (31) ii iii iv (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Br	Top Soil			0	1
Lt. Br	Sand + Boulders			1	4
Bl/Gr	Granite			4	320

31 (10 14 15 21) 32 (32 43 54 65 75 80)

41 WATER RECORD

Water found at - feet	Kind of water				
Un known (10-13)	1 [X] Fresh 2 [ ] Salty	3 [ ] Sulphur 4 [ ] Minerals 5 [ ] Gas	(14)		
Hydro Frac (15-18)	1 [ ] Fresh 2 [ ] Salty	3 [ ] Sulphur 4 [ ] Minerals 5 [ ] Gas	(19)		
(20-23)	1 [ ] Fresh 2 [ ] Salty	3 [ ] Sulphur 4 [ ] Minerals 5 [ ] Gas	(24)		
(25-28)	1 [ ] Fresh 2 [ ] Salty	3 [ ] Sulphur 4 [ ] Minerals 5 [ ] Gas	(29)		
(30-33)	1 [ ] Fresh 2 [ ] Salty	3 [ ] Sulphur 4 [ ] Minerals 5 [ ] Gas	(34)		(60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
5 (10-11)	1 [X] Steel (12) 2 [ ] Galvanized 3 [ ] Concrete 4 [ ] Open hole 5 [ ] Plastic	.188	0	20 (13-16)
5 (17-18)	1 [ ] Steel (19) 2 [ ] Galvanized 3 [ ] Concrete 4 [X] Open hole 5 [ ] Plastic		20	320 (20-23)
(24-25)	1 [ ] Steel (26) 2 [ ] Galvanized 3 [ ] Concrete 4 [ ] Open hole 5 [ ] Plastic			(27-30)

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet
Material and type	Depth at top of screen (41-44) feet	(30)

61 PLUGGING & SEALING RECORD

[ ] Annular space [ ] Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0 (45-48)	20 (49-52)	Bentonite
(18-21)	(22-25)	
(26-29)	(30-33)	(80)

PUMPING TEST

AIR

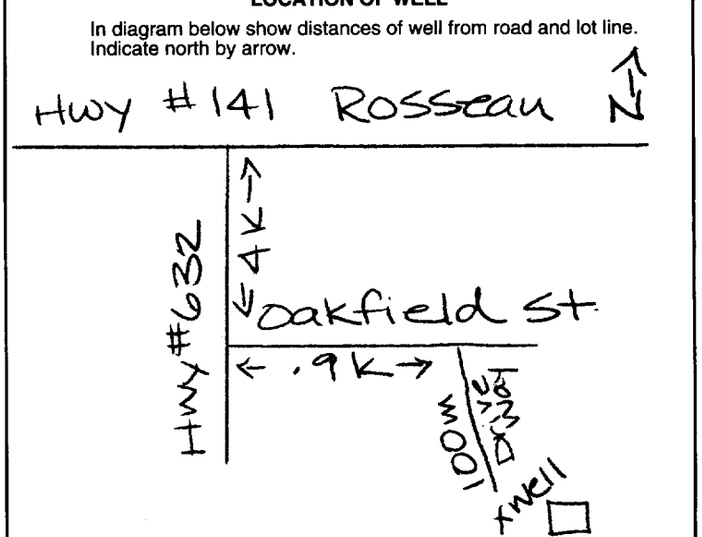
Pumping test method (10): [ ] Pump 2 [ ] Bailer
Pumping rate (11-14): 2 GPM
Duration of pumping (15-16): 3 Hours (17-18): 0 Mins

Static level	Water level end of pumping	Water levels during (25): 1 [ ] Pumping 2 [ ] Recovery			
36 (19-21) feet	(22-24) feet	15 minutes (26-28) feet	30 minutes (29-31) feet	45 minutes (32-34) feet	60 minutes (35-37) feet

If flowing give rate (38-41): GPM
Pump intake set at: feet
Water at end of test (42): [ ] Clear [ ] Cloudy
Recommended pump type: [ ] Shallow [X] Deep
Recommended pump setting (43-45): 240 feet
Recommended pump rate (46-49): GPM
(50-53)

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



229715

FINAL STATUS OF WELL (54)

1 [X] Water supply 2 [ ] Observation well 3 [ ] Test hole 4 [ ] Recharge well 5 [ ] Abandoned, insufficient supply 6 [ ] Abandoned, poor quality 7 [ ] Abandoned (Other) 8 [ ] Dewatering 9 [ ] Unfinished 10 [ ] Replacement well

WATER USE (55-56)

1 [X] Domestic 2 [ ] Stock 3 [ ] Irrigation 4 [ ] Industrial 5 [ ] Commercial 6 [ ] Municipal 7 [ ] Public supply 8 [ ] Cooling & air conditioning 9 [ ] Not use 10 [ ] Other

METHOD OF CONSTRUCTION (57)

1 [ ] Cable tool 2 [ ] Rotary (conventional) 3 [ ] Rotary (reverse) 4 [X] Rotary (air) 5 [ ] Air percussion 6 [ ] Boring 7 [ ] Diamond 8 [ ] Jetting 9 [ ] Driving 10 [ ] Digging 11 [ ] Other

Name of Well Contractor: Rough Terrain Well Dr. — Well Contractor's Licence No.: 6986
Address: Rosseau, On P0C 1J0
Name of Well Technician: Steve Curtis — Well Technician's Licence No.:
Signature of Technician/Contractor: — Submission date: 23 day 02 mo 01 yr

MINISTRY USE ONLY
Data source (58) — Contractor (59-62): 6986 — Date received (63-68): MAR 02 2001 (80)
Date of inspection — Inspector
Remarks

CSS.ES1

0506 (07/00) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Log of Test Pit TP-1A

Project No. SUD-22025423-A0 | Figure No. B-2

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0				
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH ON SUSPECTED BEDROCK						

N Value: 20 40 60 80

Shear Strength: 50 100 kPa

Combustible Vapour Reading (ppm): 25 50 75

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
CANADA
t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-2A

Project No. SUD-22025423-A0 Figure No. B-3

Project: Proposed Rosseau Springs Residential Development Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G

Penetrometer

Field Vane Test S

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		BEDROCK AT SURFACE			20 40 60 80 / 50 100	25 50 75 / 10 20 30		

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-3A

Project No. SUD-22025423-A0 | Figure No. B-4

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 100 mm thick		0
		SAND, some silt, brown, moist		
		TEST PIT TERMINATED AT ~ 0.6 m DEPTH DUE TO LIMITED ACCESS FOR EXCAVATOR TO AREA		

N Value (20, 40, 60, 80)

Shear Strength kPa (50, 100)

Combustible Vapour Reading (ppm) (25, 50, 75)

Natural Moisture Content % Atterberg Limits (% Dry Weight) (10, 20, 30)

SAMPLES | Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-5A

Project No. SUD-22025423-A0 | Figure No. B-5

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		BEDROCK AT SURFACE			20 40 60 80 / 50 100	25 50 75 / 10 20 30		

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-6A

Project No. SUD-22025423-A0 | Figure No. B-6

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		SANDY TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SILT, some sand, some boulders, brown to grey, moist					G	
				1				
		sand layer below ~ 1.4 m depth						
		TEST PIT TERMINATED AT ~ 1.6 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-7A

Project No. SUD-22025423-A0 | Figure No. B-7

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 300 mm thick		0
		SILTY SAND, some gravel, some boulders, very moist some clay, some silt, trace boulders below ~ 0.6 m depth		
		some boulders, brown to grey, moist below ~ 1.5 m depth		1
				2
		TEST PIT TERMINATED AT ~ 2.6 m DEPTH ON SUSPECTED BEDROCK		

N Value
20 40 60 80
Shear Strength kPa
50 100

Combustible Vapour Reading (ppm)
25 50 75
Natural Moisture Content %
Atterberg Limits (% Dry Weight)
10 20 30

SAMPLES: G, G

Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-8A

Project No. SUD-22025423-A0 | Figure No. B-8

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 100 mm thick		0
		SILTY SAND, brown, moist		
		TEST PIT TERMINATED AT ~ 0.3 m DEPTH ON SUSPECTED BEDROCK		

N Value (20, 40, 60, 80)

Shear Strength kPa (50, 100)

Combustible Vapour Reading (ppm) (25, 50, 75)

Natural Moisture Content % Atterberg Limits (% Dry Weight) (10, 20, 30)

SAMPLES | Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-9A

Project No. SUD-22025423-A0 | Figure No. B-9

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH 0	N Value 20 40 60 80 / Shear Strength 50 100 kPa	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Sample Number
		SAND, some silt, trace gravel, dark brown, wet to moist						
		TEST PIT TERMINATED AT ~ 0.5 m DEPTH DUE TO LIMITED ACCESS FOR SHOVEL						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-11A

Project No. SUD-22025423-A0 | Figure No. B-10

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-12A

Project No. SUD-22025423-A0 | Figure No. B-11

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SILT, dark brown, wet						
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist		1		×	G	S2
		TEST PIT TERMINATED AT ~ 1.2 m DEPTH ON SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-1B

Project No. SUD-22025423-A0 | Figure No. B-12

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-2B

Project No. SUD-22025423-A0 | Figure No. B-13

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 300 mm thick		0
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist to wet		
		TEST PIT TERMINATED AT ~ 0.9 m DEPTH DUE TO SUSPECTED BEDROCK		

N Value (20, 40, 60, 80)

Shear Strength kPa (50, 100)

Combustible Vapour Reading (ppm) (25, 50, 75)

Natural Moisture Content % Atterberg Limits (% Dry Weight) (10, 20, 30)

SAMPLES | Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-3B

Project No. SUD-22025423-A0 | Figure No. B-14

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-4B

Project No. SUD-22025423-A0 | Figure No. B-15

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-5B

Project No. SUD-22025423-A0 | Figure No. B-16

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-6B

Project No. SUD-22025423-A0 | Figure No. B-17

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist				×	G	
		TEST PIT TERMINATED AT ~ 1.0 m DEPTH DUE TO SUSPECTED BEDROCK		1				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-7B

Project No. SUD-22025423-A0 | Figure No. B-18

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test (S)

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0	N Value: 20 40 60 80; Shear Strength: 50 100 kPa	Combustible Vapour Reading (ppm): 25 50 75; Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30		
		TEST PIT TERMINATED AT ~ 0.3 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-8B

Project No. SUD-22025423-A0 | Figure No. B-19

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, some boulders and cobbles, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-9B

Project No. SUD-22025423-A0 | Figure No. B-20

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, some boulders, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.6 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-10B

Project No. SUD-22025423-A0 | Figure No. B-21

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 300 mm thick		0
		SAND, some gravel, some boulders, dark brown, moist		
		TEST PIT TERMINATED AT ~ 0.5 m DEPTH DUE TO SUSPECTED BEDROCK		

N Value 20 40 60 80

Shear Strength 50 100 kPa

Combustible Vapour Reading (ppm) 25 50 75

Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

SAMPLES | Sample Number

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-11B

Project No. SUD-22025423-A0 | Figure No. B-22

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SAND, some gravel, some boulders, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.5 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-12B

Project No. SUD-22025423-A0 | Figure No. B-23

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 350 mm thick		0				
		SAND, some gravel, some boulders, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.7 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-13B

Project No. SUD-22025423-A0 | Figure No. B-24

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, some boulders, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.2 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-14B

Project No. SUD-22025423-A0 | Figure No. B-25

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH 0	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 200 mm thick						
		SAND, trace silt, trace boulders and cobbles, brown to grey, moist to wet				×	G	
		TEST PIT TERMINATED AT ~ 0.5 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-15B

Project No. SUD-22025423-A0 Figure No. B-26

Project: Proposed Rosseau Springs Residential Development Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 300 mm thick		0
		SAND, some gravel, some boulders, brown to grey, moist		
		TEST PIT TERMINATED AT ~ 0.6 m DEPTH DUE TO SUSPECTED BEDROCK		

N Value: 20 40 60 80
Shear Strength: 50 100 kPa

Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES | Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-16B

Project No. SUD-22025423-A0 | Figure No. B-27

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 26, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL, ~ 300 mm thick		0
		SAND, some gravel, some boulders, brown to grey, moist		
		TEST PIT TERMINATED AT ~ 0.7 m DEPTH DUE TO SUSPECTED BEDROCK		

N Value (20, 40, 60, 80)

Shear Strength kPa (50, 100)

Combustible Vapour Reading (ppm) (25, 50, 75)

Natural Moisture Content % Atterberg Limits (% Dry Weight) (10, 20, 30)

SAMPLES | Sample Number

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-17B

Project No. SUD-22025423-A0 Figure No. B-28

Project: Proposed Rosseau Springs Residential Development Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, some boulders, brown to grey, moist					G	
		TEST PIT TERMINATED AT ~ 1.1 m DEPTH DUE TO SUSPECTED BEDROCK		1				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-1C

Project No. SUD-22025423-A0 | Figure No. B-29

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 100 mm thick		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30		
		TEST PIT TERMINATED AT ~ 0.1 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-2C

Project No. SUD-22025423-A0 | Figure No. B-30

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SAND, some silt, trace gravel, trace boulders and cobbles, brown to grey, moist to wet		1			G	
		TEST PIT TERMINATED AT ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-3C

Project No. SUD-22025423-A0 | Figure No. B-31

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / 10 20 30		
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist						
		TEST PIT TERMINATED AT ~ 0.9 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-4C

Project No. SUD-22025423-A0 | Figure No. B-32

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.2 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-5C

Project No. SUD-22025423-A0 | Figure No. B-33

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0				
		SAND, some gravel, trace boulders and cobbles, brown to grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.5 m DEPTH DUE TO SUSPECTED BEDROCK						

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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-6C

Project No. SUD-22025423-A0 Figure No. B-34

Project: Proposed Rosseau Springs Residential Development Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 25, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G

Penetrometer

Field Vane Test S

Combustible Vapour Reading □

Natural Moisture ×

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	SAMPLES	Sample Number
		BEDROCK AT SURFACE						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

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f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-1D

Project No. SUD-22025423-A0 | Figure No. B-35

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 300 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SAND, some silt, some gravel, trace boulders and cobbles, brown some silt, light brown, dry to moist below ~ 0.6 m depth		1		×	G	
				2				
		TEST PIT TERMINATED AT ~ 2.5 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
CANADA
t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-2D

Project No. SUD-22025423-A0 | Figure No. B-36

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 200 mm thick		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SAND, some gravel, trace boulders and cobbles, brown to grey, dry to moist		1				
		TEST PIT TERMINATED AT ~ 2.0 m DEPTH DUE TO RESISTANCE ON SUSPECTED BEDROCK		2				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
CANADA
t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-3D

Project No. SUD-22025423-A0 | Figure No. B-37

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, ~ 200 mm thick		0	N Value: 20 40 60 80; Shear Strength: 50 100 kPa	Combustible Vapour Reading (ppm): 25 50 75; Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30		
		SAND, some gravel, trace boulders and cobbles, brown to grey, dry to moist		1				
				2				
		TEST PIT TERMINATED AT ~ 3.0 m DEPTH DUE TO RESISTANCE ON SUPSECTED BEDROCK		3				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
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t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-4D

Project No. SUD-22025423-A0 | Figure No. B-38

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		SAND, with topsoil, some silt, some gravel, some boulders and cobble, dark brown, wet		0	N Value: 20 40 60 80; Shear Strength kPa: 50 100	25 50 75; 10 20 30	G	
		TEST PIT TERMINATED AT ~ 0.5 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
CANADA
t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-5D

Project No. SUD-22025423-A0 | Figure No. B-39

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample | Penetrometer | Field Vane Test

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		SILT AND SAND, some topsoil at surface, grey, moist		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30	G	
		SAND, some gravel, some silt, trace boulders and cobbles, grey, moist		1			G	
		TEST PIT TERMINATED AT ~ 2.1 m DEPTH		2				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-6D

Project No. SUD-22025423-A0 | Figure No. B-40

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, some sand		0	20 40 60 80 / 50 100	25 50 75 / 10 20 30		
		SAND, some gravel, trace boulders, grey, moist		1		×	G	
				2				
		TEST PIT TERMINATED AT ~ 3.0 m DEPTH		3				

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
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t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-7D

Project No. SUD-22025423-A0 | Figure No. B-41

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, some sand		0				
		SAND, some gravel, trace boulders, grey, moist		1		×	G	
		TEST PIT TERMINATED AT ~ 1.2 m DEPTH ON SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
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t: +1.705.674.9681
f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-1E

Project No. SUD-22025423-A0 | Figure No. B-42

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, some silt		0	20 40 60 80 / Shear Strength 50 100 kPa	25 50 75 / 10 20 30		
		SAND, some gravel, some silt, brown, moist					G	
		TEST PIT TERMINATED AT ~ 0.7 m DEPTH DUE TO SUSPECTED BEDROCK						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
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Sudbury, ON P3E 5M4
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t: +1.705.674.9681
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Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-2E

Project No. SUD-22025423-A0 | Figure No. B-43

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample

Penetrometer

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % Atterberg Limits (% Dry Weight)	SAMPLES	Sample Number
		TOPSOIL, some silt		0	N Value 20 40 60 80; Shear Strength 50 100 kPa	Combustible Vapour Reading (ppm) 25 50 75; Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30		
		TEST PIT TERMINATED AT ~ 0.3 m DEPTH DUE TO NO ACCESS FOR EXCAVATOR						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
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f: +1.705.674.5583

Test Pit data requires interpretation assistance from EXP before use by others.

See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Log of Test Pit TP-3E

Project No. SUD-22025423-A0 | Figure No. B-44

Project: Proposed Rosseau Springs Residential Development | Sheet No. 1 of 1

Location: Rosseau, ON

Date Excavated: October 24, 2022

Excavator Type: Excavator

Datum: Local (Non-Geodetic)

Grab Sample G
Penetrometer
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure ⊕

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength kPa (20 40 60 80 / 50 100)	Combustible Vapour Reading (ppm) (25 50 75) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Sample Number
		TOPSOIL, some silt		0				
		SAND, some gravel, trace boulder, trace cobbles, brown to grey, moist				×	G	
		TEST PIT TERMINATED AT ~ 0.8 m DEPTH						

TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22

EXP Services Inc.
885 Regent Street
Sudbury, ON P3E 5M4
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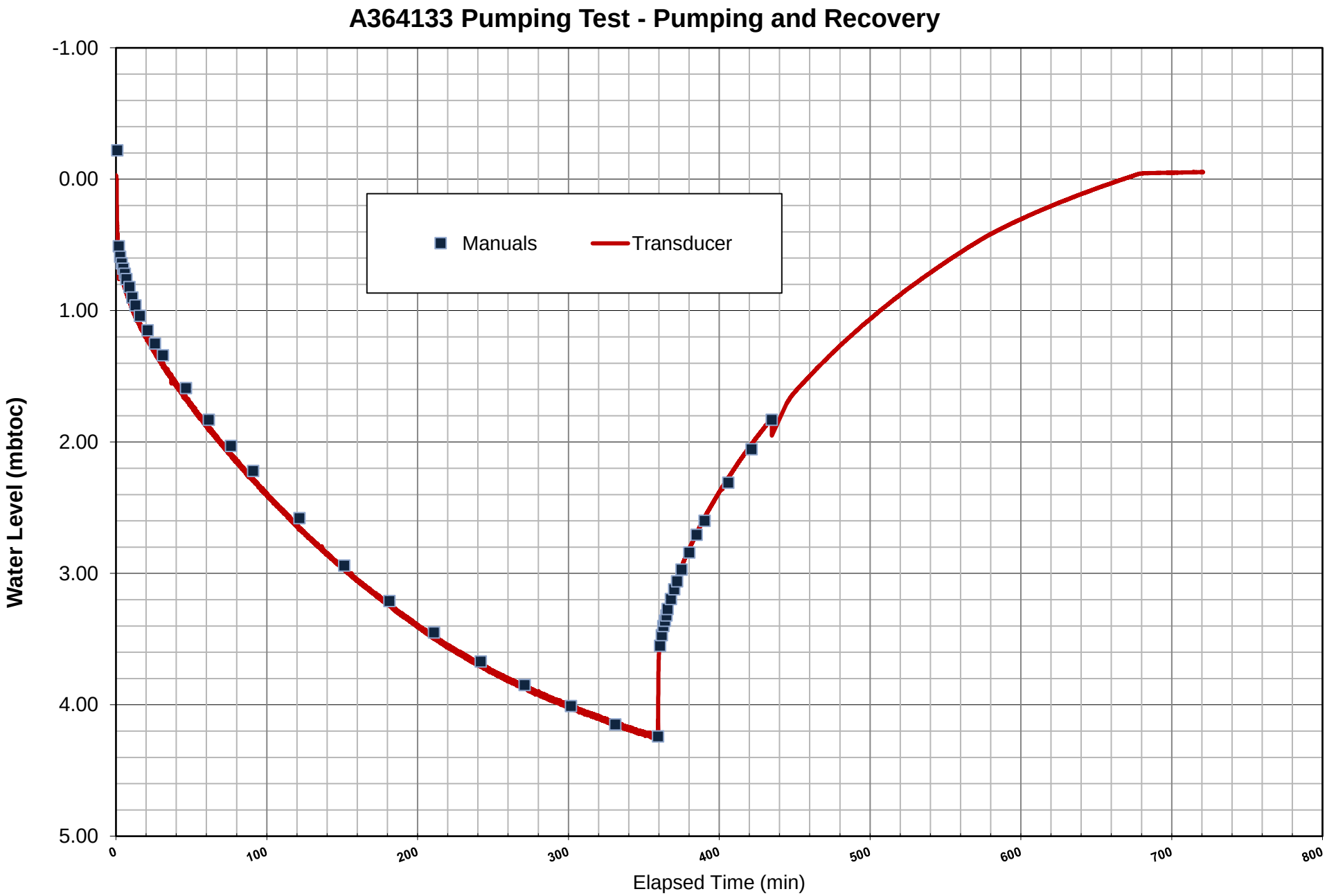
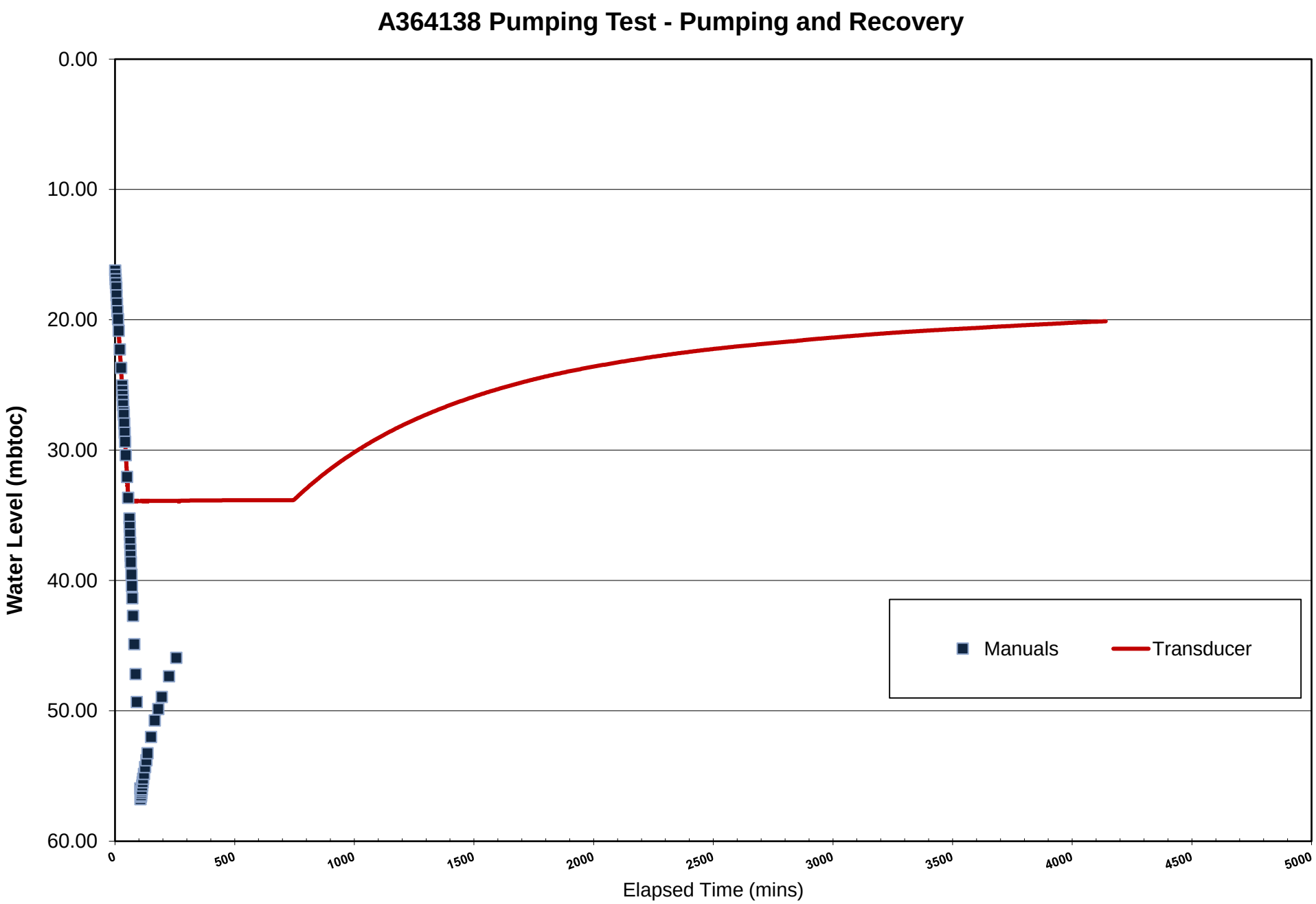
Test Pit data requires interpretation assistance from EXP before use by others.

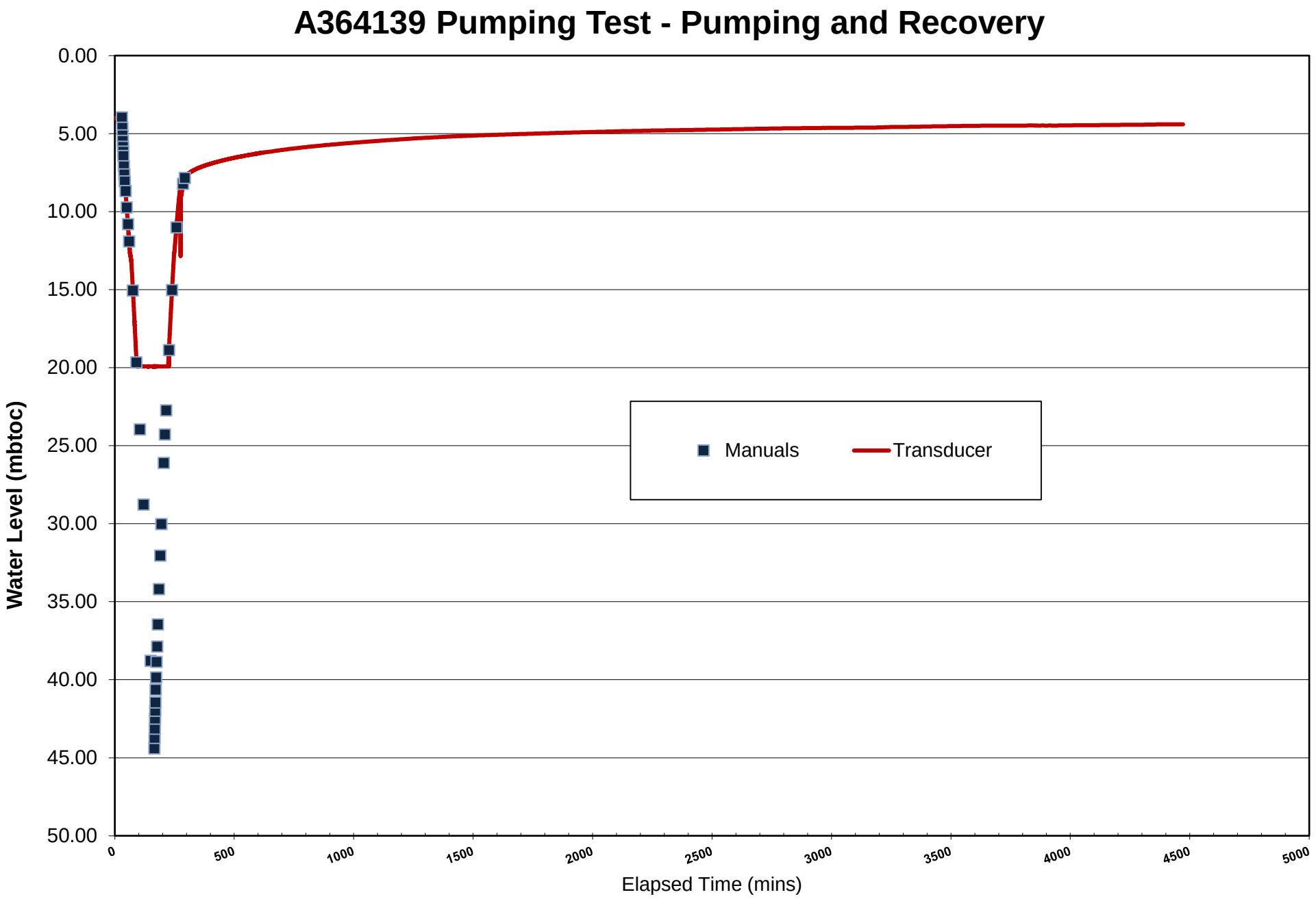
See Figures B-1A and B-1B for Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	Open

Appendix C – Raw Data and Certificates of Analysis


A364133 Pumping Test - Pumping and Recovery
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
Water Level (mbtoc)
Manuals
Transducer
0
100
200
300
400
500
600
700
800
Elapsed Time (min)


A364138 Pumping Test - Pumping and Recovery
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Water Level (mbtoc)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Elapsed Time (mins)
Manuals
Transducer


A364139 Pumping Test - Pumping and Recovery
Water Level (mbtoc)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Elapsed Time (mins)
Manuals
Transducer

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

Project : SUD-22025423-A0

02-June-2023

EXP Services Inc.
Attn : Jamie Batten

885 Reagent Street
Sudbury, Ontario
P3E 5M4, Canada

Phone: 705-674-9681
Fax:705-674-5583

Date Rec. : 01 June 2023
LR Report: **CA13015-JUN23**
Reference: SUD-22025423-A0, Jamie Batten

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	5: A364133
Sample Date & Time				31-May-23
Temp Upon Receipt [°C]	***	***	***	***
Ecoli [cfu/100mL]	01-Jun-23	13:21	02-Jun-23	0
Total Coliform [cfu/100mL]	01-Jun-23	13:21	02-Jun-23	0
Fecal Coliform [cfu/100mL]	01-Jun-23	13:21	02-Jun-23	0
Turbidity [NTU]	01-Jun-23	21:27	02-Jun-23	0.15

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

OnLine LIMS

0003354452

FINAL REPORT

CA15208-MAY23 R

SUD-22025423-AO

Prepared for

EXP Services Inc

FINAL REPORT

CA15208-MAY23 R

First Page

CLIENT DETAILS

Client	EXP Services Inc
Address	885 Regent Street Sudbury, Ontario P3E 5M4. Canada
Contact	Jamie Batten
Telephone	705-674-9681
Facsimile	705-674-5583
Email	Jamie.Batten@exp.com
Project	SUD-22025423-AO
Order Number	
Samples	Solution (6)

LABORATORY DETAILS

Project Specialist	Jill Campbell, B.Sc.,GISAS
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	2165
Facsimile	705-652-6365
Email	jill.campbell@sgs.com
SGS Reference	CA15208-MAY23
Received	05/19/2023
Approved	05/29/2023
Report Number	CA15208-MAY23 R
Date Reported	05/29/2023

COMMENTS

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
MDL - SGS Method Detection Limit

Temperature of Sample upon Receipt: 5 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes
Chain of Custody Number: 029043

NDOGT - No Data: Overgrown with Target Bacteria
NDOGN - No Data: Overgrown with Non Target Bacteria
UAL - Unreliable: Sample Age Exceeds Normal Limit

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

FINAL REPORT

CA15208-MAY23 R

Client: EXP Services Inc
Project: SUD-22025423-AO
Project Manager: Jamie Batten
Samplers: JB & JN

MATRIX: WATER

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

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

				Sample Number	8	9	10	11	12	13
				Sample Name	A364133	A364139	20 ROS	39 ROS	A364138	DUP
				Sample Matrix	Solution	Solution	Solution	Solution	Solution	Solution
				Sample Date	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry										
Conductivity	uS/cm	2			239	177	1480	344	188	218
Alkalinity	mg/L as CaCO3	2	500		71	80	27	115	63	84
Colour	TCU	3	5		< 3	55	< 3	< 3	< 3	46
Turbidity	NTU	0.10	5	1	4.6	28	0.20	< 0.10	17	27
Total Dissolved Solids	mg/L	30	500		157	111	1070	214	126	134
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04	0.11	0.12	< 0.04	< 0.04	0.13
Dissolved Organic Carbon	mg/L	1	5		< 1	5	< 1	< 1	2	5
Metals and Inorganics										
Sulphate	mg/L	0.04	500		47	9.4	480	29	26	9.5
Nitrite (as N)	as N mg/L	0.003		1	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL
Nitrate (as N)	as N mg/L	0.006		10	0.006#<MDL	0.006#<MDL	0.006#<MDL	0.006#<MDL	0.327	0.006#<MDL
Nitrate + Nitrite (as N)	as N mg/L	0.006			0.006#<MDL	0.006#<MDL	0.006#<MDL	0.006#<MDL	0.327	0.006#<MDL
Hardness	mg/L as CaCO3	0.05	100		104	79.2	548	116	86.5	78.0
Calcium	mg/L	0.01			34.4	25.0	198	37.2	29.4	24.6
Iron	ug/L	7	300		1252	9208	23	8	859	8866
Sodium	mg/L	0.01	200	20	13.4	3.97	110	25.9	1.96	3.83
Magnesium	mg/L	0.001			4.44	4.08	13.2	5.67	3.17	4.04
Manganese	µg/L	0.01	50		47.7	709	51.9	22.6	53.4	713

Client: EXP Services Inc
Project: SUD-22025423-AO
Project Manager: Jamie Batten
Samplers: JB & JN

MATRIX: WATER

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

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

				Sample Number	8	9	10	11	12	13
				Sample Name	A364133	A364139	20 ROS	39 ROS	A364138	DUP
				Sample Matrix	Solution	Solution	Solution	Solution	Solution	Solution
				Sample Date	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Microbiology										
Total Coliform	cfu/100mL	0		0	#NDOGN#UAL	0	30	0	#NDOGT	0
E. Coli	cfu/100mL	0		0	#NDOGN#UAL	0	0	0	#NDOGT	0
Fecal Coliform	cfu/100mL	0			0##UAL	0	0	0	0	0
Total Coliform Background	cfu/100mL	0			#NDOGN#UAL	68	61	0	#NDOGT	87
Other (ORP)										
pH	No unit	5	8.5		7.89	6.92	7.30	8.04	7.28	6.86
Chloride	mg/L	0.04	250		1.9	1.1	210	23	0.76	1.1

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
A364133					
Turbidity	SM 2130	NTU	4.6		1
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	104	100	
Iron	SM 3030/EPA 200.8	ug/L	1252	300	
A364139					
Colour	SM 2120	TCU	55	5	
Turbidity	SM 2130	NTU	28	5	1
Iron	SM 3030/EPA 200.8	ug/L	9208	300	
Manganese	SM 3030/EPA 200.8	µg/L	709	50	
20 ROS					
Total Coliform	OMOE MICROMFDC-E3407A	cfu/100mL	30		0
Total Dissolved Solids	SM 2540C	mg/L	1070	500	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	548	100	
Manganese	SM 3030/EPA 200.8	µg/L	51.9	50	
Sodium	SM 3030/EPA 200.8	mg/L	110		20
39 ROS					
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	116	100	
Sodium	SM 3030/EPA 200.8	mg/L	25.9		20
A364138					
Turbidity	SM 2130	NTU	17	5	1
Iron	SM 3030/EPA 200.8	ug/L	859	300	
Manganese	SM 3030/EPA 200.8	µg/L	53.4	50	
DUP					
Colour	SM 2120	TCU	46	5	
Turbidity	SM 2130	NTU	27	5	1
Iron	SM 3030/EPA 200.8	ug/L	8866	300	
Manganese	SM 3030/EPA 200.8	µg/L	713	50	

QC SUMMARY

Alkalinity

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0542-MAY23	mg/L as CaCO3	2	< 2	4	20	102	80	120	NA		

Ammonia by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0238-MAY23	mg/L	0.04	<0.04	ND	10	103	90	110	93	75	125

QC SUMMARY

Anions by IC

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0538-MAY23	mg/L	0.006	<0.006	NA		NA			NA		
Nitrite (as N)	DIO0538-MAY23	mg/L	0.003	<0.003	ND	20	103	90	110	ND	75	125
Nitrate (as N)	DIO0538-MAY23	mg/L	0.006	<0.006	0	20	105	90	110	99	75	125
Chloride	DIO0619-MAY23	mg/L	0.04	<0.04	3	20	101	90	110	100	75	125
Sulphate	DIO0619-MAY23	mg/L	0.04	<0.04	1	20	100	90	110	91	75	125
Chloride	DIO0670-MAY23	mg/L	0.04	<0.04	1	20	98	90	110	100	75	125

Carbon by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0272-MAY23	mg/L	1	<1	3	10	99	90	110	101	75	125

QC SUMMARY

Colour

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0554-MAY23	TCU	3	< 3	ND	10	105	80	120	NA		

Conductivity

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0542-MAY23	uS/cm	2	< 2	2	20	99	90	110	NA		

QC SUMMARY

Metals in aqueous samples - ICP-MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Calcium	EMS0195-MAY23	mg/L	0.01	< 0.01	2	20	102	90	110	100	70	130
Iron	EMS0195-MAY23	ug/L	7	< 7	0	20	100	90	110	100	70	130
Magnesium	EMS0195-MAY23	mg/L	0.001	< 0.001	2	20	102	90	110	95	70	130
Manganese	EMS0195-MAY23	ug/L	0.01	< 0.01	0	20	104	90	110	106	70	130
Sodium	EMS0195-MAY23	mg/L	0.01	< 0.01	2	20	103	90	110	103	70	130

Microbiology

Method: OMOE MICROMFDC-E3407A | Internal ref.: ME-CA-IENVIMIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Coliform Background	BAC9354-MAY23	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9354-MAY23	cfu/100mL	-	ACCEPTED	ACCEPTED							
Fecal Coliform	BAC9354-MAY23	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9354-MAY23	cfu/100mL	-	ACCEPTED	ACCEPTED							

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0542-MAY23	No unit	5	NA	0		100			NA		

Solids Analysis

Method: SM 2540C I Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Total Dissolved Solids	EWL0581-MAY23	mg/L	30	<30	0	20	97	90	110	NA		
Total Dissolved Solids	EWL0602-MAY23	mg/L	30	<30	1	20	98	90	110	NA		

Turbidity

Method: SM 2130 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Turbidity	EWL0508-MAY23	NTU	0.10	< 0.10	ND	10	99	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.
Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.
LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.
Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.
RL: Reporting limit
RPD: Relative percent difference
AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.
Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.
Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

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

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

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

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

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 029043 Page _____ of _____

Laboratory Information Section - Lab use only

Received By: Katelyn Medland
Received By (signature): Kmedland
Received Date: 05 / 19 / 23 (mm/dd/yy)
Received Time: 10 : 00 (hr : min)
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 4 , 5 , 6
LAB LIMS #: CA1S208-May23

REPORT INFORMATION

Company: EXP Services
Contact: Jamie Batten
Address: 885 Regent street Sudbury, ON
Phone: 647 409 6464
Fax:
Email: jamie.batten@exp.com

INVOICE INFORMATION

☐ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #: 2023 586
Project #: SUD-22025423-A0
P.O. #:
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

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

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

Specify Due Date:

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

REGULATIONS

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

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

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX
1	A364133	5/17/23	10:00	9	Water
2	A364139		13:00		
3	20 BOS		14:00		
4	39 BOS		15:00		
5	A364138		18:00		
6	DUP				
7					
8					
9					
10					
11					
12					

M & I: Field Filtered (Y/N); Metals & Inorganics (incl CrVI, CN, Hg pH,(BI(HWS),EC,SAR-soil) (CrVI, Na-water); Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI; ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn
SVOC: PAHs only; SVOCs all incl PAHs, ABNs, CPs
PCB: PCBs Total ☐ Aroclor ☐
PHC: F1-F4 + BTEX; F1-F4 only no BTEX
VOC: VOCs all incl BTEX; BTEX only
Pest: Pesticides Organochlorine or specify other
Other (please specify): ✓EC,TC,EC FC; ✓Turbidity, Anion, Metals(total); ✓General 2; ✓NH3+NH4, DOC; Sewer Use: Specify pkg:; Water Characterization Pkg ☐ General ☐ Extended
SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN
TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.
COMMENTS:

Observations/Comments/Special Instructions

Sampled By (NAME): JB + JN
Signature:
Date: 05 / 17 / 23 (mm/dd/yy)

Relinquished by (NAME): JB
Signature:
Date: 05 / 18 / 23 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS