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 <u>not</u> 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 m² 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 | 2 | 3 | 4 |
|---|--------------------------------------|---------------------------------|---------------------------------|----------------------------------|
| | Entire Property | Small Lot (0.41 ha) | Large Lot (0.62 ha) | Waterfront lot (4.8 ha) |
| Number Houses Effluent Volume per House (L/day) Nitrate Concentration in Effluent (mg/L) Nitrate Mass in Effluent per House (g/day) Recharge Area (m ²) | 50 1,600 40 64 1,160,000 | 1 1,600 40 64 4,100 | 1 1,600 40 64 6,200 | 1 1,600 40 64 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) Volume Recharge (m ³ /yr) | 29,200 406,000 | 584 1,435 | 584 2,170 | 584 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.

| 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 |

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

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 m² 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 0.076 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: | 1 | 2 | 3 | 4 |
|---|--|--|---|---|
| Average Distance of Septic Bed from Waterbody | < 100 m | 100 - 200 m | 200 - 300 m | > 300 m |
| Number Houses or Lots Effluent Volume per House (L/day/house) Phosphorus Concentration in Effluent (mg/L) Adjusted Phosphorus Concentration in Effluent (mg/L) Phosphorus Mass in Effluent per House (g/day/house) Recharge Area (m ²) | 50 1,600 9 9 14 1,160,000 | 50 1,600 9 6 10 1,160,000 | 50 1,600 9 3 5 1,160,000 | 50 1,600 9 0 0 1,160,000 |
| Recharge Rate (m/yr) Total Mass Nitrate (g/yr) | 0.35 262,800 | 0.35 175,200 | 0.35 87,600 | 0.35 0 |
| Volume Effluent (m ³ /yr) Volume Recharge (m ³ /yr) | 29,200 406,000 | 29,200 406,000 | 29,200 406,000 | 29,200 406,000 |
| Total Volume Water (m³/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: | 1 | 2 | 3 | 4 | 5 |
|---|-----------|-----------|-----------|-----------|-----------|
| (Distance of Septic Bed from Waterbody) | • | _ | • | • | • |
| 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 |
| λ (along $ = \mathbf{f}$ | 00.000 | 00.000 | 00.000 | 00.000 | 00.000 |
| 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 (m³/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 |
| Notos | | | | | |

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 haso, collectively, an area of 1,160,000 m² 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 Effluent Volume per House (L/day) UIA Concentration in Effluent (mg/L) UIA Mass in Effluent per House (g/day) Recharge Area (m ²) Recharge Rate (m/yr) | 50 1,600 0.027 0.043 1,160,000 0.35 |
| Total Mass UIA (g/yr) | 788 |
| Volume Effluent (m³/yr) Volume Recharge (m³/yr) | 29,200 406,000 |
| 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 rate of 7 gpm yielded 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 rate of 7 gpm yielded approximately 1.42 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 AA364138 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< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td></td></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.003 <mdl< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.003 <mdl< td=""><td>0.003 <mdl< td=""><td>0.003 <mdl< td=""><td></td></mdl<></td></mdl<></td></mdl<> | 0.003 <mdl< td=""><td>0.003 <mdl< td=""><td></td></mdl<></td></mdl<> | 0.003 <mdl< td=""><td></td></mdl<> | |
| Nitrate (as N) | as N mg/L | 10 | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.327</td><td></td></mdl<> | 0.327 | |
| Nitrate + Nitrite (as N) | as N mg/L | | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.006 <mdl< td=""><td>0.327</td><td></td></mdl<></td></mdl<> | 0.006 <mdl< td=""><td>0.327</td><td></td></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 | |
| рН | 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 (m²/day), Q is pumping rate (m³/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/∆s = 0.183*89.9/0.71 = | T = $0.183Q/\Delta s = 0.183*15.4/2.0 = 1.41$ | T = 0.183Q/∆s = 0.183*32.7/2.8 = 2.14 |
| 23.17 m²/day | m ² /day | m²/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 | SC = Q/H = 10.7/40.22 = 0.27 L/min per | SC = Q/H = 22.7/39.78= 0.57 L/min per |
| m of drawdown | m of drawdown | 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:

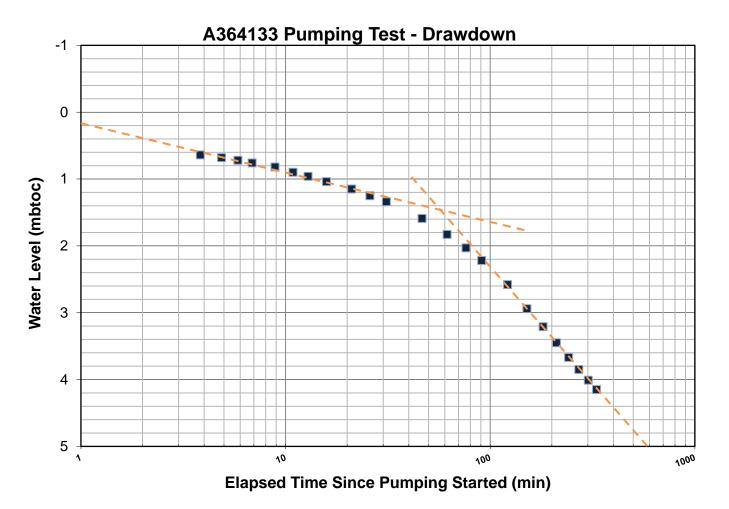
| A364133 | A364138 | A364139 |
|-------------|-------------|-------------|
| 337.2 L/min | 19.71 L/min | 31.35 L/min |

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 |



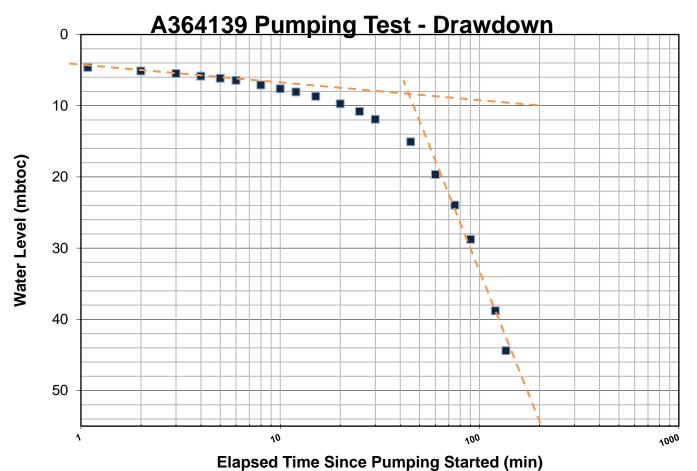
Figure 6.4 Drawdown data from the A364133 well pumping test





*exp.

Figure 6.5 Drawdown data from the A364139 well pumping test



17

*exp

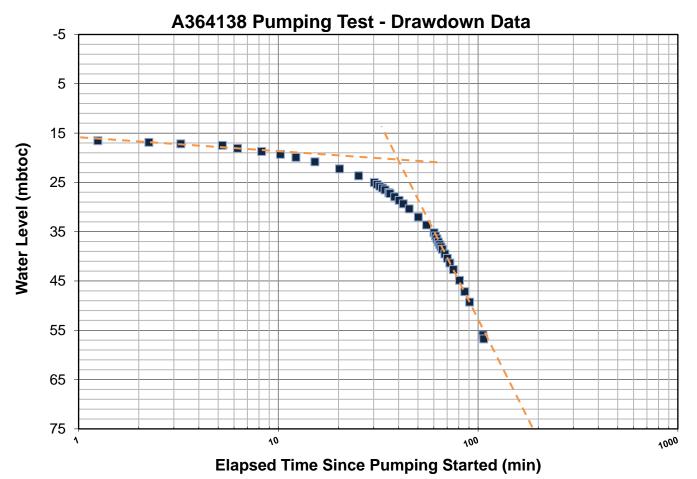


Figure 6.6 Drawdown data from the A364138 well pumping test

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 m². The 1-hour recovery for each well can be calculated using A^*H/t , where A = cross sectional area (m²), 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:

- 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 <u>must</u> 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.

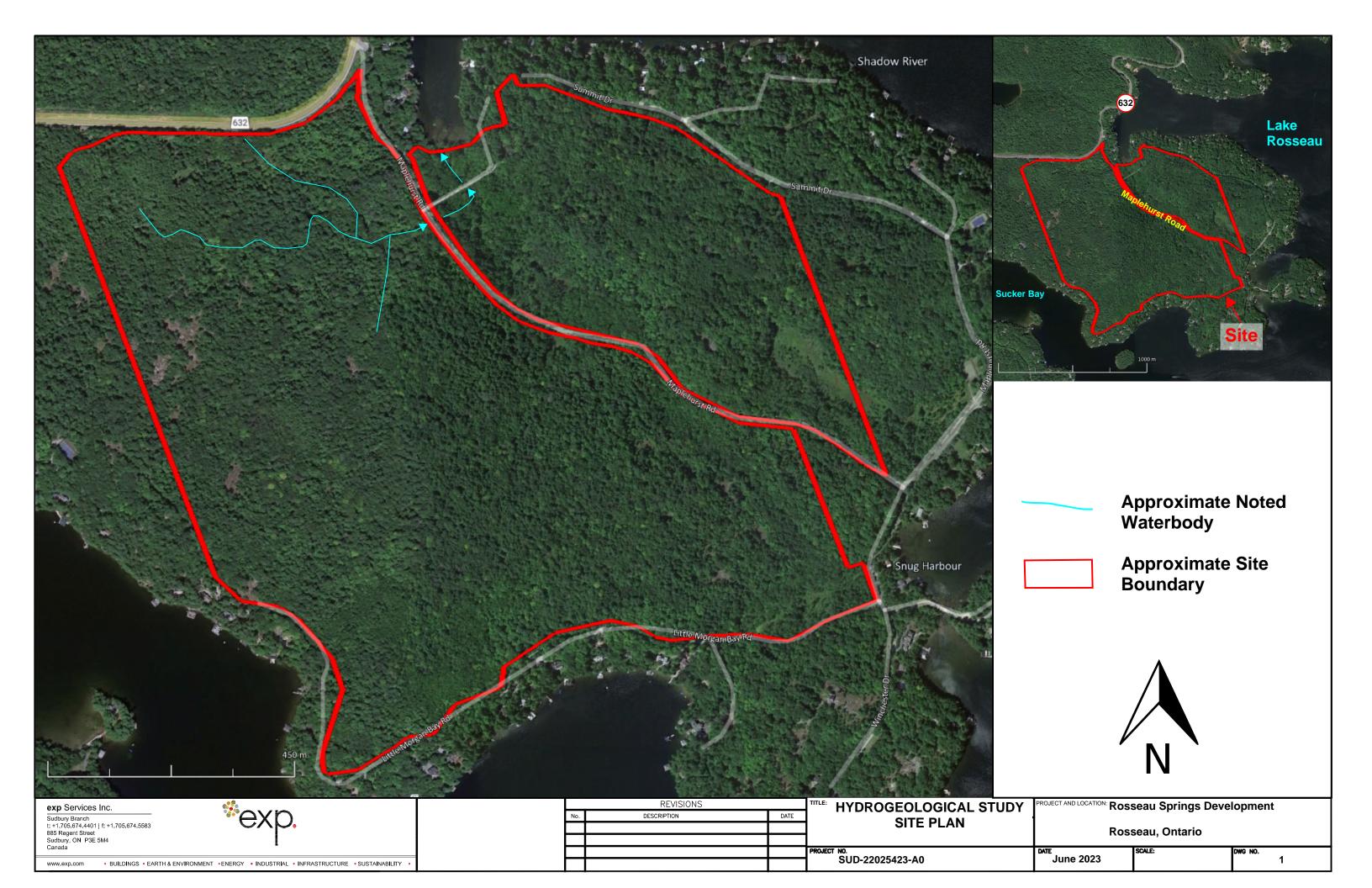
Jamie Batten, GIT. Hydrogeologist, Earth & Environmental Northeastern Ontario

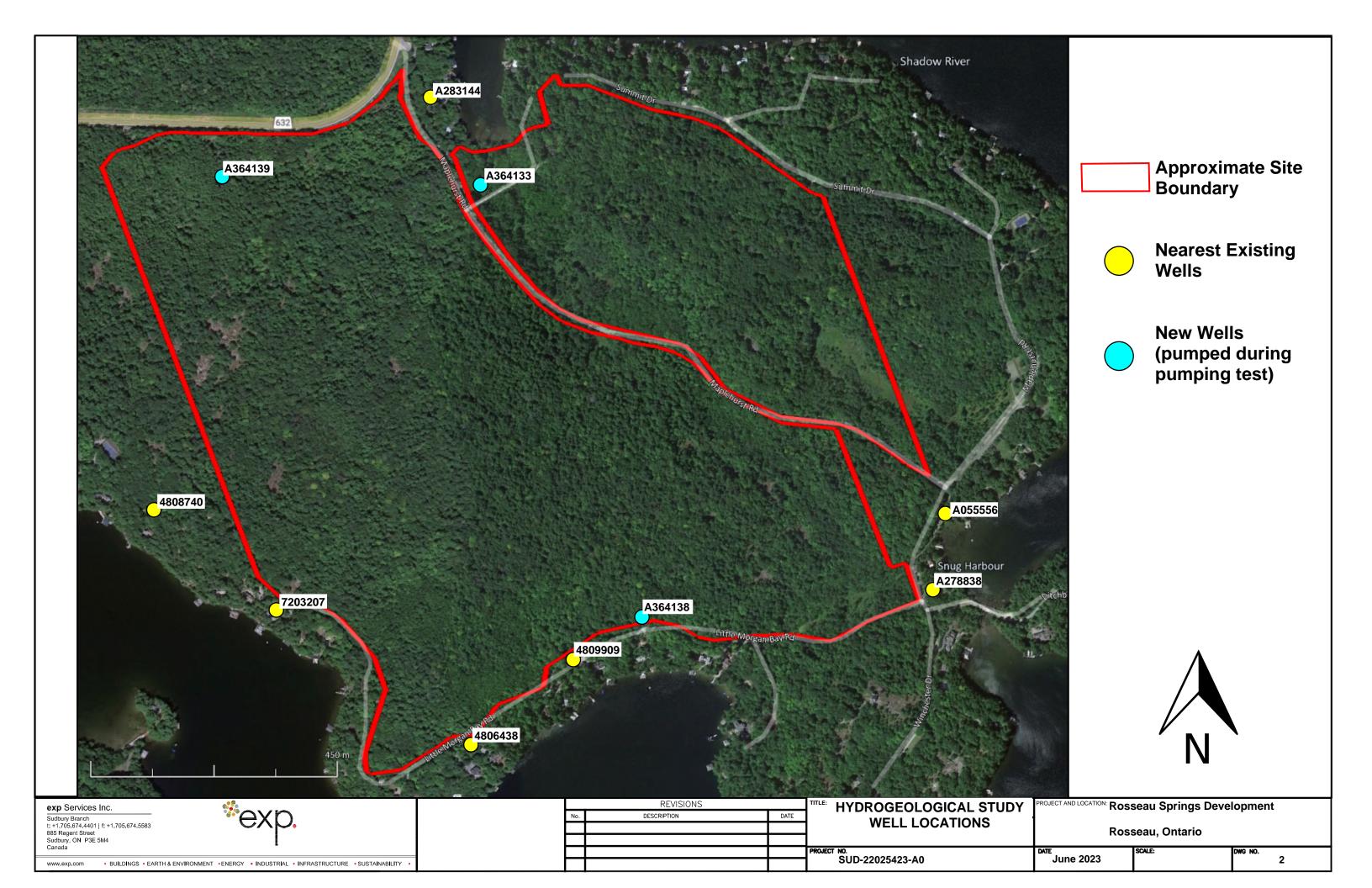
FOR: Delwar Ahmed, P. Geo. Sr. Reviewer/Hydrogeolog/st, E & E

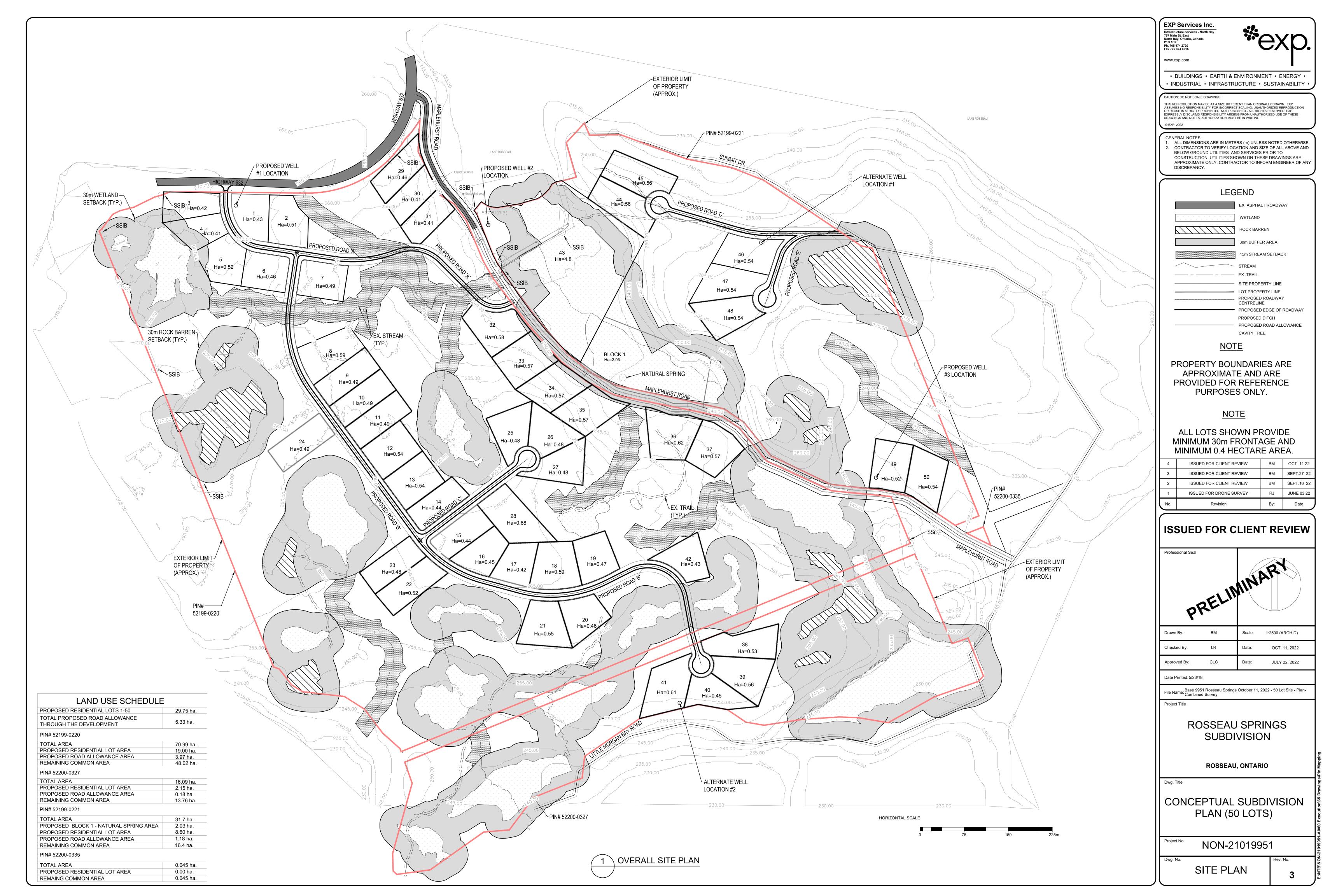


Appendix A – Drawings









| TP-1A TP-2A TP-3A TP-3A TP-3A TP-3B TP-3B | TP-5A TP-8A TP-6A TP-7A | TP-40 TP-50 TP-50 TP-60 TP-70 | TP-10 KEYPLAN - N.T.S. LEGEND EXP TEST PIT |
|--|-------------------------------|---|---|
| TP-5B TP-6B TP-1 | | TP-15B | - 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.+1.705.674.4011 [t.+1.705.674.5583 885 Regent Street Sudbury.ON P3E 5M4 Canada | REVISI No. DESCRIPTION | ONS CLIENT ROSSEAU SPINGS LIMITED PROJECT PROPOSED ROSSEAU SPRINGS RESIDENTIAL ROSSEAU, ON PROJECT NO. | DEVELOPMENT |
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Appendix B – Well and Test Pit Logs



| Measurements recorded in: | (1,1,2,2,2,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3, | A364133 | 3 Ontario Water Resour Page of | |
|---|---|--|---|----------------------------------|
| First Name / Organiza | ENOZHA BAY (Ompan Municipality KOSSFAU | Province Postal Code | Cq Well Cons by Well On Telephone No. (inc. area D 76 574636 | wner a code) |
| Address of Well Location (Street Number/Name) 21 ABC MAPLE HURST County/District/Municipality PARRY SOUND DISTRICT UTM Coordinates Zone Easting NAD 8 3 1 17605211175011 | Township SEGUIN City/Town/Village ROSSEAN Municipal Plan and Suble | t Number Oth, | Concession 5 | |
| 60.0010 | Other Materials BOULDERS | General Description | | 8' |
| GREY/PINK GRANIT | E | HARD | 18, 1 | 80 |
| | | | | |
| Annular Space Depth Set at (m/#) From To (Material and Type) O 22' BENJEAL AND | | | Draw Down Recover the Water Level Time Water (m/R) (m/R) (m) (m) $(m)e^{1} + 2 (m) (m)$ | ery er Level nvft) 2 '' |
| | Well Use Commercial Not used Municipal Dewatering Test Hole Monitoring Cooling & Air Conditioning Supply Stubly | Pumping rate (l/min / GPM) 3 10 60 PM 1 hrs + _ min 5 Final water level end of pumping (m/ti) 1 ff flowing give rate (l/min / GPM) | 6'11" 10 1 | 11 11 11 |
| Construction Record - Casing Inside Diameter (carVin) Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Wall Thickness (carVin) De From 6'' STEEL ,219 0' | Status of Well apth (m/t) Water Supply To Replacement Well | 3 GPM 20 Recommended pump depth (m/tl) 25 IOO' 25 Recommended pump rate (Vmin / GPM) 30 IO + GPM 40 Well production (Vmin / GPM) 50 | $\begin{array}{c} 5 & 9' \\ 0 & 9' \\ 0 & 9' \\ 4'' \\ 0 & 9' \\ 4'' \\ 0 & 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 $ | 3" 10" '3" |
| Construction Record - Screen Outside Diameter (m/n) Material (Plastic, Galvanized, Steel) Slot No. De From | Construction) Abandoned, Insufficient Supply Abandoned, Poor Water Quality Characterization Abandoned, characterization | Disinfected? Z Yes No Map of Well Lc Please provide a map below following ins | pocation | ' <u> "</u> N↑ |
| Water Details | Other, specify Hole Diameter | | HWY 141 | |
| Water found at Depth Kind of Water: Fresh Untest JJ2 '(m/R) Gas Other, specify | $ \begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \hline \\ ed \end{array} \\ \hline \\ ed \end{array} \begin{array}{c} \hline \\ 22 \end{array} \begin{array}{c} 122 \end{array} \end{array} \begin{array}{c} 122 \end{array} \begin{array}{c} 122 \end{array} \begin{array}{c} 122 \end{array} \begin{array}{c} 122 \end{array} \end{array} \begin{array}{c} 122 \end{array} \begin{array}{c} 122 \end{array} \end{array} \begin{array}{c} 122 \end{array} \begin{array}{c} 122 \end{array} \end{array} \end{array} \end{array} \begin{array}{c} 122 \end{array} \end{array} \end{array} \end{array} \end{array} \begin{array}{c} 122 \end{array} \end{array}$ | CEA MARIE AU | HEST FIZI ABC | / |
| Well Contractor and Well Technic Business Name of Well Contractor CONCAR WELL DRILLING LTD, Business Address (Street Number/Name) P.O., Boy 59 Dervinge Leostal Code Business E-mail A | Well Contractor's Licence No. 7367 Municipality 74RRY SUNNT | Comments: 3RD WELL DRILL | | |
| Busiliess Entrain Coor Factoria Contract we Busiliess Entrain Web Bus. Telephone No. (inc. area code) Name of Well Technician 17/0/5/37/18/9/57/8 CONRAD, Well Technician S Licence No. Signature of Technician and/or S | (Last Name, First Name) | Well owner's information package delivered Date Package Delivered 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 | Ministry Use Onl Audit No. Z3319 | |

| | Juner's Infor | mation | | | | | | | | | | |
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| First Na | | mation | Last Name | / Organiza | tion (| and the survey of the survey of the | E-ma | il Address | <u> </u> | Col Bol Col | | Constructed ell Owner |
| R | EM Address (Street | Number/N | STEE | LE / | KENOZ | HA BAY COMPA | NY Fer Provin | n@ Kenozha | I Codo | Telephon | No. (inc. | area code) |
| | Address (Street | 632 | ame) | | | ROSSEAU | 1 | IARIO PIO | CUT | 0705 | 746 | 3021 |
| Well L | ocation | 624 | | | . An aire a dhaoine | NUSSEAN | | landari veri riteri | and the second | Concessi | namen desa | un hausaha |
| | s of Well Location | | | | | Township | , | Lot | 1_9 | | 4 | |
| County/ | District/Municipa | MOR | LGAN E | say k | D | SEGUI- City/Town/Village | J | r1107 | -6-9 Pio | ovince ntario | | Code |
| 0 | 6 | | DISTR | ICT | | ROSSEAN Municipal Plan and Sub | | | Oth | | FO | CITIC |
| UTM Co | oordinates Zone | | 1 | Northing | | | lot Number | | | | | |
| Overbu | D 8 3 1 | rock Mate | rials/Aban | donment : | Sealing Re | HOR HTH cord (see instructions on t | he back of this | s form) | 1.1/20 | | Dep | th (<i>m/ft</i>) |
| | al Colour | | nmon Mater | | | Other Materials | | General Desc | cription | | From | 11/1 |
| 68 | EY/BROW | s. | | CLAN | | | | | | | 0 | 16 |
| | | | | <u> </u> | | | | | | | 1'7" | 210' |
| GREY | 1/ PINK | (| GRANI | TE | | | HA | RD | | | 16 | 200 |
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| | | | | | | | | | | | | |
| | | | | | | | | Deculto | of Well Vi | eld Testing | | |
| Death | Set at (m/ft) | 6 | | ar Space ealant Used | | Volume Placed | After test o | f well yield, water was | s: [| Draw Down | Re | ecovery Water Level |
| From | То | | (Material | | | (m³/ft³) | Clear | and sand free | Tim (min | | (min) | (m/ft) |
| _0` | 20' | BENS | EAL A | IND (| Dircke | ROUT | | discontinued, give re | ason: Leve | | 1 | MAR. |
| Ŭ | | | | | | | | | 1 | 88'4' | 1 1 7 | 221. |
| | | | | | | | Pump intak | ke set at (m/ft) | 2 | ad'h' | 2 2 | 123'6" |
| | | | | | | | | | | | | |
| | | | | | | | 300 |) | 3 | 021 | 3 2 | 21 |
| Me | ethod of Cons | truction | neersiger - Ar Billion | a contra de la contr | Well U | | Pumping ra | ate (Vmin / GPM) | 3 | 92' | | 21' |
| Cable 1 | Tool | Diamon | | ublic omestic | Well U | ercial Not used | Duration of | pumping | | 92' 95'1'' 95'1'' | 3 2 | 21' |
| Cable Cable Rotary | Tool (Conventional) (Reverse) | Diamone | | omestic vestock | Comme Municip | ercial Not used bal Dewatering le Monitoring | Duration of | te (Vmin / GPM) | 4 | 115 | 3 2 4 5 | 21' 218'7'' 218'7'' 216'1'' |
| Cable 1 | Tool (Conventional) (Reverse) | Diamon | | omestic vestock igation dustrial | Comme Municip Test Ho | ercial Dewatering al Dewatering le Monitoring & Air Conditioning | Duration of hrs Final water | PPPA = min s + - min evel end of pumping = min | 4 5 9 (m/ft) 10 | 108'8' | 3) 4 5 10 | 21 218'7'' 216'1'' 203'7'' |
| Cable Cable Rotary | Tool (Conventional) (Reverse) sussion specify | Diamone Jetting Driving Digging | | omestic vestock igation dustrial her, specify | Comme Municip | Arcial Not used hal Dewatering le Monitoring & Air Conditioning STUDY | Duration of hrs Final water | pumping s + min level end of pumping | 4 5 (m/ft) 10 1 15 | 108'8' 108'8' 120'1" | 3) 4 5 10 15 | 21' 218'7'' 216'1'' 203'7'' 191'4'' |
| Cable | Tool (Conventional) (Reverse) sussion specify Constr | Diamone | | omestic vestock igation dustrial her, specify sing | Comme Municip Test Ho | Air Conditioning Air Conditioning Study Status of Well Water Supply | Final water | PPPA = min s + - min evel end of pumping = min | 4 5 (m/tt) 10 1 1 15 (m/tt) 20 (ft) | 108'8' 120'1" 131'6' | 3 4 5 10 15 1 20 | 21' 218'7'' 216'1'' 203'7'' 191'4'' 79' |
| Cable T Cable T Rotary (Boring Air perce Other, sy Inside | Tool (Conventional) (Reverse) sussion specify Constr | Diamone | | omestic vestock igation dustrial her, specify sing | Comme Municip Test Ho Cooling | Air Conditioning | Duration of Final water If flowing gr Recommer 2 | pumping s+min level end of pumping yt' | 4 5 9 (m/tt) 10 1 1 5 15 20 (m/tt) 25 | 17 5 108'8' 120'1'' 131'6' 142'11 | 3 4 5 10 15 1 1 20 1 25 | 21' 218'7'' 216'1'' 203'7'' 191'4'' |
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| | | y of the Environment, Vation and Parks Metric V Imperial | Tag#:A | 364139 | A364139 | Regulation | V 903 Ontario V Pag | ater Reso | ecord |
|--|----------------------------------|--|---|--|--|----------------------|---------------------------|-----------------------|--|
| Well Owner's I | nformation | August 1 | | | |] | | Charles . | |
| First Name | | Last Name / Organization | het in frikgen an (open stoff for open store) | and and the second second | E-mail Address | a tunin curindiadar" | (debied institution) (128 | Well C | Constructed |
| KEM Mailing Address (SI | | STEELE - KENO | ZHA BAY | COMPAN | Y rem@Keno | | | | II Owner |
| 546 Hw | | ne) | Municipal | | Province | Postal Code | JO7015 | e No. (inc. | area code) |
| Well Location | 1 0 5 0 | | Ross | FAU | ONTARIO | FOCT | 20103 | 190 | JPP I |
| Address of Well Loo | ation (Street Nun | mber/Name) | Township | | and the second second | Lot | Concess | ion 🖌 | and the second |
| 219 Hw | | | | EGUIN | | PTLOT 6- | 8 | S | |
| County/District/Mur | | | City/Town | Village | | | Province | Postal | |
| UTM Coordinates Z | DUND L | DISTRICT | | SSEAU | | | Ontario Other | PPL | 0411- |
| NAD 8 3 | 176047 | 72350112 | | Plan and Sublo | ot Number | | Other | | |
| | Bedrock Mater | ials/Abandonment Sealin | | nstructions on th | e back of this form) | | | | |
| General Colour | Most Com | mon Material | Other Mater | | Gene | ral Description | | Dept From | h (<i>m/ft</i>) To |
| GREY/PIN | K | GRANITE | | | HARD | | | O' | 360' |
| | | OKANTIS | | | inco | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | 241 | | | | | |
| Depth Set at (m/ft | <u> </u> | Annular Space | | | | | Draw Down | | covery |
| From To | | Type of Sealant Used (Material and Type) | Volu | ume Placed (m ³ /ft ³) | After test of well yield, Clear and sand fi | | | vel Time V | |
| 0' 20' | RENSO | EAL AND QUI | CKGROU | | Other, specify | | (min) (m/ft) | (min) | (m/ft) |
| | DEND | THE HAD CAN | LORUN | 1 | If pumping discontinue | d, give reason: | Static 9'6' | 4 | 62 |
| | | | | | | | 1 10'2' | 1 1 | 10'4" |
| | | | | | Pump intake set at (m/ | ft) | 2 11' | 2 2 | 1'2" |
| | | | | | 200' | | | | 16 2 |
| Method of C | Construction | V | Vell Use | | Pumping rate (Vmin / G | PM) | 3 11 8 | 3 4 | 52 |
| Cable Tool | Diamond | | Commercial | Not used | 7 GPM Duration of pumping | | 4 12 4 | 4 0 | 711 |
| Rotary (Convention Rotary (Reverse) | al) Driving | | Municipal Test Hole | Dewatering Monitoring | hrs + - n | nin | 5 12'11 | 1 5 | 15'3" |
| | | | Cooling & Air Cond | | Final water level end o | f pumping (m/ft) | 10 15 9 | 10 / | 7'4' |
| Air percussion | | ☐ Industrial ☐ Other, specify Sul | NY FEASAB | ITY STUDY | 46'2" | | 15 1 | a 1 | |
| Other, specify | | | | | If flowing give rate (Vmi | n/GPM) | 15 8 | 15 | 5 2 |
| | onstruction Re | | | us of Well | Recommended pump | depth (m/ft) | 20 21 4 | 20 | 12'8 |
| Diameter (Galvani | ole OR Material zed, Fibreglass, | Thickness | | acement Well | 200' | deput (<i>miny</i> | 25 74'1 | " 25 | 10'5" |
| -111 - | e, Plastic, Steel) | (crivin) | Test | | Recommended pump | rate | 30 27 3 | " 30 < | a' a'' |
| 6 STE | EL | .219 0 2 | | narge Well atering Well | (Vmin / GPM) 7-1 | OGPM | 200 2 | | |
| | | | D Obs | ervation and/or | Well production (Vmin / | | 40 37 7 | 40 40 | 16 |
| | | | Mon | itoring Hole ation | 8 GPM | | 50 42'11 | 50 0 | 9'6" |
| | | | (Cor | struction) | Disinfected? | | 60 416'2 | 1 60 | 9'1" |
| | | | Abar Insu | ficient Supply | | Manafill | 102 | | 1 10 |
| | onstruction Re | | | ndoned, Poor er Quality | Please provide a mag | | ell Location | n the back. | 1.4 |
| Outside Diameter (Plastic C | Material Salvanized, Steel) | Slot No. From | To Abar | ndoned, other, | | Hwy 141 | | | NT |
| (cm/in) | | | spec | afy . | | | R | SSEAM | |
| | | | Othe | r, specify | | 3 | 7 | | |
| | | | | | | .V | | | |
| HYUROFRACTU | REDWater Deta | ails | Hole Dian | neter | | 5/ | | | |
| Water found at Depth | Kind of Water: | Fresh Untested | Depth (<i>m/ft)</i> From To | Diameter (cm/in) | | 1 | | | |
| (<i>m/ft</i>) 🗌 Ga | S Other, spec | cify | 2 20' | 105 | | | | | |
| | | Fresh Untested | 1 20 | 1 11 | | | MAPLE HURS | 2 | |
| (m/ft) Ga | S Other, spec | Fresh Untested | 0 360 | 6 | | - | | and the second second | |
| | is Other, spec | | | | | | #219 | HWYD | 32 |
| | | r and Well Technician Inf | ormation | | | \ | | | |
| Business Name of W | | | Well Contract | or's Licence No. | | Ł | - (| 8 VELL | |
| CONRAD V | VELL DRIL | | 13 | 67 | Commonia: 151 | | h h | | - |
| Business Address (S | treet Number/Na | | Municipality | | Comments: 15+ WC | LL DRIL | EP FOR | STUD | γ |
| P.O. Box | 59 Postal Code | Business E-mail Address | | IOUND | | | | | |
| Province | DIDIADIVI | 1 conraduelldrill | ing@ | | Well owner's Date Pa | ackage Delivered | d Mini | stry Use | Only |
| DNTARIO Bus, Telephone No. (| nc. area code) Na | me of Well Technician (Last | Name, First Nam | e) | information package | 12 11 12 12 | Audit No. | 2321 | 991 |
| 765278 | 9570 | LOURAD , TA | 1L | | I delivered | ork Completed | | 001 | UDT |
| Well Technician's Licer | nce No. Signature | of Technician and/or Contrac | tor Date Submit | u o aik | | 221120 | | | |
| 3 0 3 | 0 Tau | land | | wner's Copy | | a la la 1910 | | 's Printer for (| Ontario 2018 |
| | | | | | • | | | | |



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

Well Record

1

Regulation 903 Ontario Water Resources Act Page of

Measurements recorded in: 🔲 Metric 🕱 Imperial

| Address of Well La 単181 H | ocation (Street Number/Name) | | Lot Concession | | | | |
|----------------------------------|---|---|--|--|---|---|---------------------------|
| County/District/Mu | | | | Province | Posta | Code | |
| Party Son UTM Coordinates | ind Jong Easting | lorthing | Municipal Plan and Sublo | t Number | Ontario Other | | |
| | 176051735 | = | 1 . | | Other | | |
| Overburden and General Colour | Bedrock Materials/Abano Most Common Materia | ตะแตะระเทศตกระท่งที่มีสร้ายที่คณีที่มีการ รับก็หมู่มีก | and an | an a | | l Der | oth (<i>m/<u>ft</u>)</i> |
| <u>^</u> | C 1 | | Other Materials | General Descript | lon | From | |
| Brown | Sand | Stor | ney | L. Jacott | | 0 8 | 8 |
| <u>Hack</u> Grey | <u>Granite</u> Granite | | | bedrock bedrock | | 8 185 | 300 |
| (Freq | UNAN | | | | | <u>ເອລ</u> | |
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| | manananan kanti | 1979 (Jacob Walance and Statistics of Statistics and Statistics of Statistics of Statistics of Statistics of St | พระการในกร้างการสราชให้สายและสรายให้สายการกิดสายระบบการกอบเปล่ | ເຫລັດແຫ່ນແຫກນຳສາກກຳນັກກຳລັດແຫລະແຫກນີ້ແມ່ນີ້ ເມິ່ງໃຫ້ແຕ່ກາງໃຫ້ສະຫານແຫ່ນສາກກຳນັກ | | - | |
| Depth Set at (m | t/ft) Type of Se | r Space alant Used | Volume Placed | After test of well yield, water was: | Well Vield Testin Draw Down | n-sta-support de la sup | есоvегу |
| | (matorial c | | (m ³ /ft ³) | Clear and sand free Other, specify | Time Water Le (min) (m/ft) | evel Time (min) | Water Level (m/ft) |
| <u>0</u> 2 | 0 E-Z Seal 1 | lentonite | 3 bag's | If pumping discontinued, give reas | on: Level 18.5 | | 180 |
| | | | | End of best | 1 24,8 | , 1 | 1738 |
| | | | | Pump intake set at (<i>m/ft</i>) | 2 29.9 | न् 2 | 167.6 |
| Method o | f Censtruction | Well | | Pumping rate (I/min / GPM) | 3 34 | 3 | 161.4 |
| Cable Tool | Diamond P | ublic 🗌 Comr | mercial Not used | Duration of pumping | 4 38.1 | 4 | 155.2 |
| Rotary (Convent | · _ • _ | omestic 🔄 Munic vestock 🔄 Test I | | hrs +_ <u>30</u> min | 5 42. | Z 5 | 149 |
| Boring | | rigation 🗌 Coolin dustrial | ng & Air Canditioning | Final water level end of pumping (n 1 80 | ^{v/ft)} 10 53. | 7 10 | 125 |
| Other, specify | | ther, specify | | If flowing give rate (I/min / GPM) | 15 65.7 | 1 15 | 101 |
| Inside Oper | Construction Record - Ca | Depth (m/ft) | Status of Well | N/A Recommended pump depth (m/ft) | 20 76. | 7 20 | 77 |
| (cm/in) Conc | vanized, Fibreglass, Thickness crete, Plastic, Steel) (cm/in) | From To | Replacement Well Test Hole | 200 | ²⁵ 88. | 2 25 | 53 |
| 6" | steel ,219 | 0 20 | Recharge Well | Recommended pump rate (I/min / GPM) | 30 99 . | 7 30 | 33.5 |
| | | | Dewatering Well Observation and/or | Well production (Vmin / GPM) | 40 (22. | 7 40 | 21,2 |
| | | | Monitoring Hole | iS Disinfected? | 50 14S | 7 50 | 18.5 |
| | | | (Construction) Abandoned, Insufficient Supply | Yes No | 60 168. | 7 60 | 18.5 |
| Outside | Construction Record - Sc | I | Insufficient Supply Abandoned, Poor Water Quality | Map of Please provide a map below follo | Well Location | | |
| Diana di L | Material c, Galvanized, Steel) Slot No. | Depth (<i>m/ft)</i> From To | Abandoned, other, specify | HILLSE PIOURE & Map below follo | | A | Seau, |
| NA | | | | In | 1 | \square | |
| | | | Other, specify | | , | 7 | _ / ` |
| | | | Hole Diameter | \$ 632 | _ / | | |
| 3 <i>00</i> (<i>m/ft</i>) □ | pth Kind of Water: Fresh Gas Other, specify | Untested Da | | ×. | \sim | | |
| | pth Kind of Water: Fresh | | 200 6" | | <i>t</i> | $\left(\right)$ | |
| | Gas Other, specify pth Kind of Water: Fresh | | | | | - i | |
| (m/ft) | | | _ | al 18 | | | rake issean |
| Business Name of | | The off Hardward and California and California and California (California and California and California and Cal | ation Well Contractor's Licence No. | | | | ~ seau |
| Unson Add | Well Anilling (Street Number/Name) | | 5 2 2 4 | wei | \sum | | |
| | | | o Ro-Meclonte | Comments: | | | |
| | | s E-mail Address | | | and the second se | Angla Margana and Angla Ang | |
| Jus. Telephone No. | (inc. area code) Name of Well | <u> ひら </u> | <u>Wellanillingicov</u> e, First Name) | Well owner's Date Package Delix information | Audit No | istry Use Z2∩ | 9705 |
| 705830 | 51268 Dane | Conson | 1 | package delivered 2 0 2 0 0 0 ♥ Yes Date Work Complet | ed | | |
| | ence No. Signature of Technici | | Date Submitted えりえりのダろの | ■ No 240 240 01 | | JUL 16 | 2020 |
| 0506E (2014/11) | | | Ministry's Copy | <u></u> | | Contraction matrix | r Ontario, 2014 |

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| | Hole D | iame | ter | | | | Constru | ction Rec | ord | | 7 | Taa | | /ell Yield | | |
| Depth | Me | etres | Diamete | | Inside | | | Wall | Depth | Metres | Pumping test r | | | w Down | Re | covery |
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| 0 | | 3 | 15 | - | | | Ca | asing | | | . Pump intake s (metres) | et at - 2. | Static Level | 40 | | |
| 6,2 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | 12 | | | Steel Fit | | 1: 11 | | 1 1 | Pumping rate - (litres/min) | 4 | 1 | | 1 | |
| | Water | | | | 16,5 | Plastic Co Galvanized | ncrete | 477 | 0 | 6.2 | Duration of pur | nping | 2 | | 2 | |
| Water four at <u>60</u> Met | (111111) | | of Water | _ | [| Steel Fit | | | | | hrs + Final water lev | elend | | | 3 | |
| Gas | s | resh Salty | Sulphu | | | Plastic Co Galvanized | ncrete | | | | of pumping | metres | | | | |
| Other: | F | resh Salty | Sulphur | | [| Plastic Co | oreglass ncrete | | | | Recommended type. Shallow Recommended | | 4 | | 4 | |
| Other: | · · <u>·</u> | · · · | Sulphu | - | | Galvanized | | Screen | <u> </u> | | depth. <u>14</u> Recommended | | 10 | | 10 | |
| Gas Other: | s | Salty | Mineral | | Outside | Steel | | Slot No. | | | rate. (litres/mir | 1) | 15 | | 10 15 | |
| After test | of well | | water was | | diam | Plastic Co | ncrete | | - | | If flowing give r (litres/mir | | 20 25 | | 20 25 | |
| Clear : | | | free | | | Galvanized | No Cool | | | | If pumping disco ued, give reaso | , ntin- | 30 | | 30 | |
| Chlorinate | | | No | | | Open hole | NO Casi | ng or Scr | 612 | 00 | | | 40 50 | | 40 50 | |
| | | | | | | | / | | | 93 | | | 60 | | 60 | |
| Depth set | at - Met | res M | | | (bentonite sl | urry, neat ceme | Annular spanner spanner (Annular spanner) Annular spanner (Annular spanner) | Volum | bandonment | In diagram belov | v show distances o | ation of well fr | | | and buil | ding. |
| From | то 61 | | Be | V | tor | lite | | | c metres) | Indicate north by | arrow. #141 | | | | | |
| | | | | | | | | | | * | £ 32 | | | | | |
| | | | | Me | ethod of C | onstruction | | | | | maph | ehu | <i>irs</i> | + | | |
| Cable T | (conven | | Rotan Air pe | rcu | | Dian | ng | |] Digging] Other | ŀ | t maph | T K | HIT | gan E | Bay I | Zd . |
| Domest Stock | | | Indust | ierc ipal | ial | Publ | ic Supply used ing & air col | |] Other | Audit No. | 66524 | Date | e Well | Completed | ~ | |
| Water S Observa | ation we | əli 🗌 | Abandoned | veli d, in d, po | sufficient sup | Dew Dev | nished atering acement we | | oned, (Other) | | ner's information d? Yes V | No | e Delive | 2000 | YYY | MM DD 18 23 MM DD 18 30 |
| Name of W ROU Business A | an | M | | Ì | nWe | nician Info | ling | | | Data Source Date Received | Minist | Cor D Date | tractor | 986 | | MM DD |
| Name of W | | | | | 2#F('F | 2055E | Well Te | echnician's L | | Remarks | JUN 14 20 | 07 | | d Number | 2 | MM DD |
| Signature c | # Fech | HCTAP | ontractor | | • | | Date Sul | omitted YYYY | MM DR | | | | | | | |

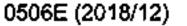
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ZCOTH CALL

Cette formule est disponible en français

| Conserver | vation and Parks | $T_{2}^{g N_{C}} \xrightarrow{P_{i}} P_{ace Sti}^{ker ar}$ Tag#:A2788 | | n 903 Ontario Wat | ell Record Fer Resources Act |
|---|--|--|---|---|---|
| Measurements recorded in: 🗌 N | Aetric Amperial | | | Page | 0 |
| | | | | | |
| | | | | | |
| Address of Well Location (Street Num 3 Winchester | nber/Name) | Township | Lot | Concession | |
| County/District/Municipality | | City/Towo//illage ROSSEOC | l | Province Ontario | Postal Code POCJO |
| | 0705010482 | | | Other | en de manda a la transmissión de la |
| Overburden and Bedrock Materi General Colour Most Comm | sa anang ang ag ang <u>ng gang si ang panang si sang si sang si</u> sa kasa. | cord (see instructions on the Other Materials | e back of this form) General Descriptio | n | Depth (<i>m/ft</i>) From <u>To</u> |
| BROWN GRAVEL | | | | | 0 4 |
| GREY GRANTE | | | | | 7 100 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Depth Set at (<i>m/ft</i>) | Annular Space Type of Sealant Used | Volume Placed | After test of well yield, water was: | Draw Down | Recovery |
| From To O 20 BEN | <u>(Material and Type)</u> TONITE. | (m³/ft³) 4_8 | Clear and sand free | (min) (m/ft) | Time Water Level (min) (m/ft) |
| | | | If pumping discontinued, give reason | Level 40 | 1 47.5 |
| | | | Pump intake set at (m/ft) | 2 40.3 | 2 46 |
| Method of Construction | Well Public Com | and a second | Pumping rate (I/min / GPM) | 3 <u>40.5</u> 4 41 | 3 44.5 |
| Cable 100 Diamond Diamond Conventional Diamond Diamon | Domestic Muni | icipal 🗌 Dewatering | Duration of pumping | 5 41.3 | 5 41 |
| Boring Digging Air percussion Other, specify | Irrigation Cool Industrial Other, specify | ing & Air Conditioning | Final water level end of pumping (m/f | 10 72 | 10 40 |
| Construction R | ecord - Casing | Status of Well | If flowing give rate (I/min / GPM) | 15 42.7 20 43.3 | 15 40 20 40 |
| Inside Open Hole OR Material Diameter (Galvanized, Fibreglass, (cm/in) Concrete, Plastic, Steel) | Wali Depth (<i>m/ft)</i> Thickness (cm/in) From To | Vater Supply | Recommended pump depth (m/ft) | 25 44 | 25 40 |
| 69 STEEL | -188 +2 20 | Recharge Well Dewatering Well | (<i>Vmin / GPM</i>) | 30 444.7 40 45.3 | 30 40 40 40 |
| | | Observation and/or Monitoring Hole Alteration | Well production (<i>l/min / GPM</i>) | 50 46.5 | 50 40 |
| | | (Construction) Abandoned, Insufficient Supply | Disinfected? | 60 47.5 | 60 40 |
| Outside Material Diameter (Diameter Cohranizad Steel) | Slot No. Depth (<i>m/ft</i>) | Abandoned, Poor Water Quality | Please provide a map below follow | Vell Location ing instructions on t んいらら EA い | he back. |
| (Cm/in) (Plastic, Galvanized, Steel) | From To | specify | | | |
| | | Other, specify | Hwy b32 | \ | |
| Water Det Water found at Depth Kind of Water | : Tresh Untested D | Hole DiameterDepth (m/ft)DiameternTo(cm/in) | HWY GAPIEHUPS | | |
| $\frac{180}{180} (m/ft) \square Gas \square Other, spece Water found at Depth Kind of Water$ | r: Fresh Untested | 30 834 | | Co at | |
| | : Fresh Untested | 5 180 6 | LITÉL MORI | AN | nP |
| a dan baran sa kana na kang bana kana kana kana kana kana kana kana | or and Well Technician Inforn | er an an de la constance de la | | - WINCHEST | ERPM |
| Business Name of Well Contractor <u>Consorme</u> Business Address (Street Number/Na | Drilling | Well Contractor's Licence No. 7 1 6 0 Municipality | Comments: | | |
| Business Address (Street Number/Na Box 454 Province Postal Code | Business E-mail Address | BurksFalls | FREE CHORINE | RES. 50 | -100 PPM |
| Bus. Telephone No. (inc. area code) Na | Ø | ne, First Name) | Well owner's Date Package Delive | red | try Use Only 327221 |
| 7053829355 Well Technician's Licence No. Signature | Baker, Roae | T ADAM | package delivered Yes Date Work Complete | d d | AN 212020 |









| (P) (P) | ntario | Ministry of the Environment | Well Tag Number (Plac | ce sticker and print number below | 1 | Well Record |
|---|--|--|--|---|--|--|
| \bigcirc | , ' · · · · | | AOIE | 3197 | | page of |
| For us All Sec Questi All me | tions must be ions regarding tre measurem | ce of Ontario only. The completed in full to av | his document is a perm oid delays in processin tion can be directed to d to 1/10 th of a metre | nanent legal document ng. Further instructions the Water Well Mana | t. Please retain for future refer and explanations are available gement Coordinator at 416-23 Ministry Use Only | on the back of this form. |
| Well Own | APR 9 Number/Name LITTLE | Sourp More CAN | DIST. BAY RD. | MUN City/Town/Village | Iode of Operation: Undifferentia | ted Averaged |
| | erburden and | Bedrock Materials | | GARMIN | E-TREX Differentiated | I, specify |
| General Cold | our Most com | non material | Other Materials | Ge | neral Description | Depth Metres From To |
| ROWN | SA Ro | DY GRA CH | VEC | | | 0 2,4 2,4 97.5 |
| | | | | | · · · · · · · · · · · · · · · · · · · | |
| Но | le Diameter | | Construction Rec | ord | Test of W | ell Yield |
| Depth From | Metres Diame To Centime | | terial Wall thickness centimetres | Depth Metres From To | Pump intake set at Static | v Down Recovery Vater Level Time Water Level Metres min Metres |
| 6,/ Xa | ater Record | - 16 Plastic Galvani | | +40cm 6.1 | Pumping rate - 1 (litres/min) 20 | 6.1 1 49. 1.2 2 48.5- |
| Water found at Metres Gas Other: | Fresh Sulp | hur Plastic | Fibreglass | | of pumping metres Recommended pump 4 type. Shallow XDeep | 8, Z 3 48 9, Z 4 47, 5 |
| Gas Other: Gas Other: | Salty Mine | hur jana Galvani hur jana Galvani hur jana Galvani hur jana Galvani hur jana Galvani hur jana Galvani hur jana Galvani | Fibreglass Slot No. | | rate. (litres/min) 15 | 10, 2 5 47 4, 5, 10 44, 5 8, 2 15 42 21, 8 20 39, 5 |
| | | 35 Plastic Galvani | No Casing or Scr | 1 1 07 | (litres/min) 25 2 If pumping discontinued, give reason 40 2 50 | 5, Z 25 37 9 30 35 5, S 40 30.8 73 50 27 |
| | 1 | Sealing Record | Annular space | bil 1/. | Location of Well | 19 60 22.8 |
| Depth set at - From | | d type (bentonite slurry, neat | cement slumy) etc Volur | ne Placed In diagram | below show distances of well from road | l, lot line, and building. |
| 0 | .1 B | EN TONITE | | 5/ | Huy Josse | LITHORE M |
| Cable Too | | | tion | Digging Other | MUSH RD 3 | *59 DI |
| Contraction Contr | verse) Bo | ring Water Use Iustrial mmercial | Driving | | DRO FRAC'D. | MAPLE Hu |
| Vater Sup Observatio | oply | ned, insufficient supply ned, poor quality | Unfinished Aband Dewatering Replacement well | oned, (Other) Was the we package de | LI owner's information livered? Yes No | 2004 09 16 |
| Name of Well MARS Business Add Hw J | Contractor | Contractor/Technician ELC DRILL number, city etc.) SDACE ON | ac Well Contractor's 3678 UT. POA- | Date Receiv | APR 0 7 2005 te of Ins | |
| Name of Well Signature of T | Technician (last na Fechnician/Contract | ne, filst name) NOGER | Well Technician's | 10 15 | Well Record Cette formule | d Number est disponible en français |
| 0506E (09/03) | | | | | | · · · · · · · · · · · · · · · · · · · |

| Minis of the | - | . <u>-</u> | | | | | Water Resou | | C O | RU |
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| Ontario Envir | ronment | ACES PROVIDED | | | 4 8064 | | MUNICIP | CON. | | i na |
| COUNTY OR DISTRICT | | T BOX WHERE APPLICAT | |] | | | 4802 | 14 15 | | LOT 25-27 |
| Decreme Const | | Lhamphrony | | | | 4 | | DATE COMP | LETED | 8 48-53 |
| | | 21 | | Ave. | Schonbe | rg, On | t. LOG 1TO | DA 05 | <u></u> м 07 _ | <u> </u> |
| 6. 1 1 2 | M 10 12 | 17 18 | | 25 | 26 | 30 | 31 | | | |
| | LOC | G OF OVERBUR | | EDROC | K MATERI | | | | DEPTH | H · FEET |
| GENERAL COLOUR | COMMON MATERIAL | Boulders | R MATERIALS | | | GENEI | RAL DESCRIPTION | | FROM O | 10 9 |
| Brn Plt | Sand Fill Granite | Bounders | · · · · · · · · · · · · · · · · · · · | | | <u>. </u> | | | 9 | 65 |
| Gry.Blk | * | | <u>,</u> | | | | | | 65 | 120 |
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| 31 444 | <u>│ </u> | └── ────────────────────────────────── | | | | | | | | |
| | | 51 CASIN | G & OPEN H | OLE R | ECORD | | 54 IS OF OPENING OT NO I | 31-33 DIAME | TER 34-38 | 75 I LENGTH 39-41 |
| WATER FOUND AT - FEET 10-13 | KIND OF WATER | INSIDE DIAM MATERI INCHES | AL THICKNESS INCHES | | EPTH - FEET | U S MAI | TERIAL AND TYPE | | INCHES DEPTH TO TOP OF SCREEN | 41-44 3 |
| 105 2 | FRESH 3 [] SULPHUR SALTY 4 [] MINERALS 6 [] GAS | 61 10-11 1 KSTEEL 2 GALVAN 3 CONCRE | TE | 5 O. | 20 ¹³⁻¹ | | · | | | FEET |
| 2 |] FRESH 3 □SULPHUR ¹⁹] SALTY 4 □ MINERALS 6 □GAS | 4 □ OPEN H 5 □ PLASTIC | 19 | | 20-2 | 1 | SET AT - FEET | MG & SEAL | | MENT GROUT |
| 2 | FRESH 3 [] SULPHUR 24 3 SALTY 6 [] GAS 4 C] MINERALS 6 [] GAS 29 | 5 7/82 GALVAN 3 CONCRE 4 MOPEN H 5 PLASTIC | OLE | 20 | 120 | FROM | 10-13 14-17 | | | |
| 2 [] | SALTY 6 GAS | 24-25 1 STEEL 2 GALVAN 3 CONCRE | 26 IZED | | 27-3 | 1 | 18-21 22-25 | | | , |
| |] FRESH 3 LISULPHUR 34 60 A [] MINERALS] SALTY 6 [] GAS | 4 DOPEN H | OLE | | | | 30-33 | | | |
| 71 AIr Bate] | | 11-14 DURATI | ON OF PUMPING | 17-18 | | | LOCATION | OF WEL | L | |
| STATIC | WATER LEVEL 25 | VELS DURING | I DUMPING | | | LINE IN | LOW SHOW DISTAN NDICATE NORTH BY | ARROW | FROM ROAD | AND 1 |
| | 22-24 15 MINUTES 26-20 | 30 29-31 | 32-34 25 FEET 22 | 35-37 | | 1. | HAPLEN | ursi ro. | | NI. |
| 9 4 FEET IF FLOWING GIVE RATE A RECOMMENDED PUT | FEET FEET FEET SOLUTION FEET FEET | ET AT WATER | AT END OF TEST | 42 | | | | | | |
| RECOMMENDED PUT | PUMP | 43-45 RECOMI PUMPIN | MENDED NG | 46-49 | HWY | > | | | | |
| SO-53 | V R DEEP SETTING 60 | FEET RATE | As Req. | GPM | 632 | | <u>↓</u>]] | | | |
| FINAL | 1 X WATER SUPPLY 2 OBSERVATION WELL | | D, INSUFFICIENT SI D POOR QUALITY | JPPLY | | i< | | | | A Post |
| STATUS OF WELL | 3 🗍 TEST HOLE 4 🗌 RECHARGE WELL | 7 UNFINISHE | | | | | IN | с т | - Hoko RD. | ny ban |
| S' WATER | 5-56 1 DOMESTIC 2 STOCK 3 D IRRIGATION | 5 COMMERCIAL 6 MUNICIPAL 7 DUBLIC SUPPLY | 4 | | | | ↓ _* | -20 ->) | LUCL | -) |
| USE | | COOLING OR AL | | | | | | н | | / |
| METHOD | 57 I CABLE TOOL 2 ROTARY (CONVENT) | 6 🗌 BC | | | | | | | | |
| OF | 3 🗋 ROTARY (REVERSE) ON 4 🗋 ROTARY (AIR) | 3t 🗋 🗴 - | TTING RIVING | | | | | | 0.9 | 96008 |
| NAME OF WELL | | | GGING OTHE | CTOR'S | DRILLERS REM | ARKS | | -62 DATE RECEIVE | | 63-64 |
| e BETTRA | Y WELL DRILLING | | 1366 NUME | SER | DATE OF IN | | 1366 | MAY | | 92 |
| | Rosseau, Ont. | FOC LUO | WELL TECHNI | CIAN'S | | | | | | |
| C L. Tro | dden | SUBMISSION | LICENCE NUM | BER | OFFICE | | | | | |
| | - TERMICIAN CONTRACTOR | DAY 27 | | _{YR} 92 | P | | | - | | SS.ES |
| MINISTE | RY OF THE ENVIRO | | | | | | | FC | ORM NO. 0506 | i (11∕86) FOF |

| Ontario | | linistry of ne Environn | nent |
|-----------------------|-----|----------------------------|------------|
| Measurements recorded | in: | 🗙 Metric | 🗌 Imperial |

Well Owner's Information

Well Tag No. Tag#: A137771

A137771

Well Record

Regulation 903 Ontario Water Resources Act Page___ ___ of __

| Well Location Address of Well Location (Street Number/Name) | wnship | Lot | Concess | sion | |
|--|---|--|---|--|---|
| <u>113 Little Morgan Bay Rd</u> County/District/Municipality Parry Sound | Wilsinp Humphre y/Town/Village unicipal Plan and Su | ey Pt B&c | | | Code |
| Overburden and Bedrock Materials/Abandonment Sealing Record | | | | Dept From 0 112 | th (<i>m</i> / <i>ft</i>) To <i>1</i> 2/; ⁶ |
| Annular Space Depth Set at (m/ft) Type of Sealant Used From To (Material and Type) O 6 il Beintoinite | Volume Placed (m³/ft³) | Results of We After test of well yield, water was: M Clear and sand free Other, specify If pumping discontinued, give reason: Pump intake set at (m/ft) 18 ; 9 | Il Yield Testin Draw Down Time Water Le (min) Static Level 1812 1 19.2 2 2015 | Vel Time V (min) | 10000000000000000000000000000000000000 |
| Diameter (Gaivanized, Hibreglass, Thickness | Dewatering | Pumping rate (<i>l/min / GPM</i>) 2 Duration of pumping hrs + Omin Final water level end of pumping (<i>m/ft</i>) 59 If flowing give rate (<i>l/min / GPM</i>) Recommended pump depth (<i>m/ft</i>) | 3 211- 4 22.5 5 23.1 10 27.2 15 31.1 20 34.0 | 5 4 5 4 10 5 15 0 15 0 20 1 | 57.8 57.3 56.6 54.0 51.3 49.1 |
| Outside Construction Record - Screen Outside Material Outside Material Diameter Opent flore | Test Hole Recharge Well Dewatering Well Observation and/or Monitoring Hole Alteration (Construction) Abandoned, Insufficient Supply Abandoned, Poor Water Quality | Recommended pump rate (//min / GPM) 20 Well production (//min / GPM) 7/2 Disinfected? Yes No Map of Wel Please provide a map below following in | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | 30 L 40 L 50 3 60 3 | $\frac{16}{14}$ $\frac{14}{1}$ $\frac{10}{0}$ $\frac{36}{0}$ $\frac{36}{0}$ |
| Water Details Hole Water found at Depth Kind of Water: Mercested Depth (m. | Abandoned, other, specify Other, specify Diameter To (cm/in) | | pdin Pol | Ē | Г <i>И</i> |
| Water found at Depth Kind of Water: Fresh Untested 0 6 1 12 Water found at Depth Gas Other, specify 6 1 12 Water found at Depth Kind of Water: Fresh Untested 6 1 12 Water found at Depth Kind of Water: Fresh Untested 6 1 12 Water found at Depth Kind of Water: Fresh Untested 6 1 12 Water found at Depth Gas Other, specify 6 1 12 Well Contractor and Well Technician Information Well Contractor Well Contractor 1 5 Usiness Address (Street Number/Name) Municipae 1 5 | 1 22,23 1 9 16 atractor's Licence No. 5 0 8 ality | Little Margen Bay * [#113 Ed Comments: | ł | HUNTSVIL | Le Hwy II |
| Postal Code Business E-mail Address Postal Code Business E-mail Address Sor P D A I T O Js. Telephone No. (inc. area code) Name of Well Technician (Last Name, First N D S U 3 6 11 11 7 14 Marshall Address Bell Technician's Licence No. Signature of Technician and/or Contractor Date Sub B 4 5 4 Marshall Address | Name) Mie) mitted B 0 5 2 4 linistry's Copy | Well owner's information package delivered 2 018042 Date Package Delivered 2 018042 Date Work Completed X Yes No 2 013042 | Audit No. | ry Use Or L 5 7 8 7 2013 | 02 |

| Ontario Ministry of the Environment | | Th | e Ontario Water WATER WE | Resources Act |
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| Print only in spaces provided. Mark correct box with a checkmark, where applicab | le. 11 | 4808740 | | |
| Harry Sound | Township/Borough/City/T | wn/Village N IKFIELD St | Con block tract surv 5+6 Date completed | 01 10 00 |
| | | RC Elevation RC | Basin Code ii | |
| 1 2 10 12 | OVERBURDEN AND BEDRO | CK MATERIALS (see instruct | | Depth - feet |
| General colour Most common material | Other materials | Genera | al description | From To |
| Br Top Soil | Iden | | | |
| | ulders | | | 4320 |
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| 32 10 14 15 21 10 14 15 21 51 | CASING & OPEN HOLE R | | of opening 31-33 Diamet | ler 34-38 Length 39-40 |
| Water found Kind of water linside diam | Material Wall thickness inches | Depth - feet | | inches feet |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | 1 DS-Steel 12 2 Galvanized | From To Materia | al and type | Depth at top of screen 30. 41-44 |
| Hydro 1 - Fresh 3 - Sulphur 19 4 - Minerals | 3 Concrete 4 Open hole 5 Plastic | | PLUGGING & SEALI | |
| 20-23 1 Eresh 3 Sulphur 24 | 1 Steel | 20 320 Depth set | Annular space | Abandonment |
| 2 □ Sairy 6 □ Gas | 3 Concrete 4 X Open hole 5 Plastic | From | To Material and type | (Cement grout, bentonite, etc.) |
| 2 □ Salty 4 □ Minerals 24-25 6 □ Gas 24-25 | 1 Concrete Concrete Concrete | 27-30 | 22-25 | |
| 2 □ Salty 6 □ Gas | 4 Open hole 5 Plastic | 26-29 | 30-33 80 | |
| A Remping test method 10 Pumping rate 2 11-1 | | L(| OCATION OF WELL | |
| Natar Israel 25 | 1 □ Pumping 2 □ Recovery | In diagram below she Indicate north by arre | ow distances of well from | n road and lot line. |
| S 19-21 22-24 15 minutes 26-28 30 minutes 29-24 15 minutes 26-28 15 minute | 31 45 minutes 60 minutes 32-34 35-37 | HWY #141 | PASS | The All |
| Feet feet <th< td=""><td>eet feet feet feet 42</td><td>HWY</td><td></td><td></td></th<> | eet feet feet feet 42 | HWY | | |
| GPM fe Recommended purgp type Recommended 43- | Det Clear Cloudy 45 Recommended 46-49 | | | |
| □ Shallow Deep pump setting Deep | pump rate GPM | X X | | |
| FINAL STATUS OF WELL 54 | | W #632 | | |
| 1/DWater supply 5 Abandoned, insufficient 2 Observation well 6 Abandoned, poor qualit 3 Test hole 7 Abandoned (Other) | | # | cakfield | |
| 4 Recharge well B Dewatering | | 34 | ·9K> | 18 |
| WAT5R USE 55-56 1 St Domestic 5 Commercial 2 Stock 6 Municipal | 9 🗌 Not use | } | 31 | 72 |
| 3 Inrigation 7 Public supply 4 Industrial 8 Cooling & air conditioni | | | Õ | 15.01 |
| METHOD OF CONSTRUCTION 57 | | | | $t_{t_{r}}$ |
| ¹ □ Cable tool ⁵ □ Air percussion ² □ Rotary (conventional) ⁶ □ Boring ³ □ Rotary (reverse) ⁷ □ Diamond | 9 Driving 10 Digging 11 Other | | | |
| 3 ☐ Rotary (reverse) 7 ☐ Diarnond 4 ☐ Rotary (air) 8 ☐ Jetting | | | | 229715 |
| Name of Well Contractor Rough Ferrain Dr | Well Contractor's Licence No. | Data 58 Contractor | 986 ⁵⁹⁻⁶² Date M | |
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2 - MINISTRY OF THE ENVIRONMENT COPY

| | Log | g of ' | Test Pit | TP-1 | A | | | |
|---|---|-----------|--|-------------|--|---|------------------|------------------|
| Project No. | <u>SUD-22025423-A</u> 0 | 7 | | | | Figure No. | B | 3-2 |
| Project: Location: | Proposed Rosseau Spring Rosseau, ON | is Reside | ential Developm | nent | | Sheet No. | <u> 1 </u> | of <u>1</u> |
| Date Excavated Excavator Type: Datum: | Cotober 25, 2022 Excavator Local (Non-Geodetic) | | - Grab Sample Penetrometer - Field Vane Test | C ▲ S | Combustible Natural Moi Plastic and Undrained [¬] % Strain at | Liquid Limit Friaxial at | ⊂ × ⊕ | - |
| G M B | Soil Description | ELEV. | N Value 20 40 6 | 60 80 | 25 Natural M | Vapour Reading (pp 50 75 Moisture Content % | A M P | Sample Number |

| | G W L | M B O L | Soil Description | ELEV. m | E P T H | | Shea | 20 ar St | rengt | 40 |) | 6 | 0 | 8 | 0 kF | Pa - | A | 2 Natu tterb | 5 Jral N erg L | 5 Noistu imits | ire Co (% Di | nten v W | t % eiaht) | | MPLES | Sample Number |
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| | | | ~ 0.1 m DEPTH ON SUSPECTED BEDROCK | | | Ħ | | | | | | | | | | | | | | | | | | | | |
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| 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.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Ópén |

| | Log of 7 | Fest Pit 7 | ГР-2 / | A | | | |
|--|---|--|---------------|--|----------------------------|-------------|----|
| Project No. | SUD-22025423-A0 | | | | Figure No. | B-3 | 3 |
| Project: | Proposed Rosseau Springs Reside | ential Developmen | t | | Sheet No. | _1_ of | _1 |
| Location: | Rosseau, ON | | | | | | |
| Date Excavated: Excavator Type: Datum: | October 26, 2022 Excavator Local (Non-Geodetic) | Grab Sample Penetrometer Field Vane Test | | Combustible Natural Mois Plastic and L Undrained T % Strain at F | Liquid Limit riaxial at | × ₽ ₽ | |

| | S | S | | | П | N Value | | | Combustible Vapour Reading (ppm) | | | | | n) S | | | | | | | | | | | | |
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| G W L | Ň | У И | Soil Description | ELEV. | Ĕ | | 20 40 60 80 | | 25 50 75 Natural Moisture Content % Atterberg Limits (% Dry Weight) | | | | | <u> </u> į | Ì | Sample | | | | | | | | | | |
| L | SYNEC L | 3 | Soli Description | m | DEPTH | S | Shea | | rengt | h | , | | 00 | | | Pa | / | Attert | berg | Limits | s (% D | ry W | eight) | n) SAZELUS | | Number |
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| TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22 | | | | | - | \mathbb{H} | + | + | | + | + | + | + | | $\left \cdot \right $ | ++ | \mathbb{H} | ++ | $\left \cdot \right $ | + | | $\left \right $ | | $\left + \right $ | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Pr | oject | No. | SUD-22025423-A0 | | Test Pit TP-3A | | | | | | | | | Figure NoE | | | | B- | 4 | | |
|-------------|---------|-----------|---------------------------|------------|----------------|-------|------------------|-------|------------------|-------|-----|-----------|-----|------------|-------------------------|------------------------|-----------------|----------------|--------------|--------|------------------|
| Pr | oject: | | Proposed Rosseau Spr | ings Res | ide | entia | al D | eve | elo | pm | nen | t | | | | She | et No | D. | 1 | of | 1 |
| Lo | catio | n: | Rosseau, ON | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Con | nbustible | Vapou | r Read | dina | ſ | | |
| Da | ate Ex | cavated: | October 26, 2022 | | | Gra | ab Sar | nple | | | | G | | Nati | ural Mois | sture | | | 2 | - X | |
| Ex | cava | tor Type: | Excavator | | | Per | netron Id Var | neter | | | | ▲ ¶ | | Und | stic and I Irained T | riaxial a | | | ⊕ | Ð | |
| Da | atum: | | Local (Non-Geodetic) | | | - Fie | iu var | eie | sı | | | 5 | | 70 2 | Strain at I | allure | | | | | |
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| G W L | SYMBOL | | Soil Description | ELEV. m | DEPTH | Shea | 20 Ir Strer | ngth | 10 | 6 | 30 | 8 | kPa | At | Natural N terberg L | loisture (imits (% | Conter Dry W | nt % eight) | | | Sample Number |
| - | | | IL, ~ 100 mm thick | ~ | 0 | | | | 50 | | | 10 | | | 10 | 20 | 3 | 0 | | 3 | |
| | | SAND, | some silt, brown, moist | | | | | | $\left \right $ | | | \square | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Ópén |

| | Log of [| Fest Pit 7 | ГР-5 | 5A | | | |
|--|---|--|------|------------|-----------------------------|-------------|----|
| Project No. | <u>SUD-22025423-A</u> 0 | | | | Figure No. | B-5 | 5 |
| Project: | Proposed Rosseau Springs Reside | ntial Developmen | t | | Sheet No. | _1_ of | _1 |
| Location: | Rosseau, ON | | | | | | |
| Date Excavated: Excavator Type: Datum: | October 26, 2022 Excavator Local (Non-Geodetic) | Grab Sample Penetrometer Field Vane Test | | Natural Mo | Liquid Limit Triaxial at | × ₩ ⊕ | |

| G W L | SYMBOL | Soil Description | ELEV. | Sh | 20 Stre | ngth | 40 | ilue 6 | 0 | 80 100 | kP | a | Na Atter | 25 itural berg | Moi: Lim | 50 sture its (° | e Co % Dr | 7 nten y W | 5 t % eight | SAMPLES | Sample Number |
|--|--|--------------------|------------|----|------------|------|----|---------------|---|-----------|----|---|-------------|----------------------|-------------|-----------------------|--------------|------------------|-------------------|----------|------------------|
| TESTPIT (GEO) SUD-22025423-40 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22 「その | ON THE REPORT OF | BEDROCK AT SURFACE | ELEV. m | | | | 40 | | | | | | Na Atter | 25 | Moi: Lim | 50 | e Co % Dr | 7 | 5 t % eight | SAMP_LES | Sample Number |
| TESTPIT (GEO) SUD-22025423-A0 | | | | | | | | | | | | | | | | | | | | | |



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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 | Drý | Ópén |

| Project No. | SUD-22025423-A0 | og of | | | | | | | | | | | | | | igure | | | | 3-6 |
|-------------------------|--|----------|--------------|----------|-------------------|-----------|------|-----------|-----|----|-----|-----|------|--------------|---------|---------------------------|--------------|-------|----------|--------------|
| Project: | Proposed Rosseau Spri | ings Res | ide | enti | al D |)e\ | /elc | ppr | me | nt | | | | | - 5 | Sheet | No. | | 1 | of |
| ocation: | Rosseau, ON | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Con | nbust | ible V | apour F | Readir | ıg | |] |
| Date Excavated: | October 26, 2022 | | | G | rab Sa | ımpl | е | | | I | G | | | | /loistu | re uid Lim | it | L | × | |
| Excavator Type: | Excavator | | | - | enetroi eld Va | | | | | 4 | | | Und | raine | | xial at | n. | | Ð | <u> </u> |
| Datum: | Local (Non-Geodetic) | | | | ciu va | | 1631 | | | | S | | /0 0 | uain | arra | luie | | | | |
| s | | | | | | | N | Valu | Je | | | | Com | | ble Va | pour Re | | (ppm) | S | |
| S V V B - O | Soil Description | ELEV. | DEPT | Che | 20 ear Stre | nati | 40 | , and | 60 | | 80 | kPa | 1 | 25 Natura | al Mois | 50 sture Co ts (% D | 75 Intent | % | SAMPLES | Samp Numb |
| L | TOPOOL 400 mm this | | Т Н о· | SILE | | ingu | 50 | | | | 100 | кга | ~ | 10 | y Linii | 20 | 30 | | Ē | |
| | TOPSOIL, ~ 100 mm thick me sand, some boulders, | ~ | - | | | | | | | | | | | | | \checkmark | | | | |
| | o grey, moist | _ | | | | | | | | | | | | | | | | | G | 1 |
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| sand lay | /er below ~ 1.4 m depth | _ | | | | | | | | | | | | | | | | | _ | |
| TEST P | IT TERMINATED AT | | | | | | | | | | | | | | | | | | _ | |
| ~ 1.6 m BEDRO | DEPTH ON SUSPECTED | | | | | | | | | | | | | | | | | | _ | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Ďrý | Ópén |

| Project No. | SUD-22025423-A0 | - | | Fest Pit | | A | Figure No | · | B | 8-7 |
|---|---|------------|---------|---|------------------|---------------------------|---|----------|-------------|--------------|
| Project: Location: | Proposed Rosseau Spring Rosseau, ON | gs Resi | de | ential Developme | nt | | Sheet No | 1 | _ (| of |
| | October 26, 2022 | | | - Grab Sample Penetrometer Field Vane Test | G ▲ ♥ | Natural Mo Plastic and | d Liquid Limit I Triaxial at | ing I | □ × → | |
| G S M B C L | Soil Description | ELEV. m | DEPTH o | N Value 20 40 60 Shear Strength 50 | 80 kPa 100 | 25 Natural | le Vapour Reading 50 75 I Moisture Content I Limits (% Dry We ↓ 20 30 | % | SAZPLIN | Samp Numb |
| SILTY S - boulder some cl below ~ - - - - - TEST F | IL, ~ 300 mm thick SAND, some gravel, some s, very moist - lay, some silt, trace boulders 0.6 m depth - oulders, brown to grey, moist - 1.5 m depth - PIT TERMINATED AT DEPTH ON SUSPECTED OCK | | 2 | | | | * | | G | |
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TESTPIT (GEO) SUD-22025423-*exp

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

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| Project I | No. | SUD-22025423-A0 | og of | | | | | | | | | | | | | | | Fi | gur | e N | lo. | _ | | B-8 | 3 |
|------------------------|---------|---|---------|-------|-----|--------------|------------|-------|-----|------|-----------|----------|-----|-----|----|-------|-------------------|-------|-----------------------|-------|---------------------|-----------|---------------|-----|-------|
| Project: | | Proposed Rosseau Sprir | ngs Res | ide | ent | tial | D | ev | elo | pr | ne | ent | | | | | | s | hee | et N | о. | _ | 1 | of | _1 |
| Locatior | 1: | Rosseau, ON | | | | | | | | | | | | | | | | | | | | | | | |
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| G M W B L O L | | Soil Description | m | DEPTH | SI | hear | 20 Stre | ngth | 40 | | 60 | | 80 | kPa | 1 | Atter | tural I berg I | imits | ure C 5 (% I 20 | Dry V | ent % Veig 30 | ht) |) SA | N | umber |
| | | OIL, ~ 100 mm thick | ~ | 0- | | | | | 50 | | | | 100 | | | | 10 | | | | 30 | \square | | | |
| | | SAND, brown, moist PIT TERMINATED AT | | | | | | | | | | | | | | | | | | | | | | + | |
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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) |
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| | Log of 7 | Cest Pit I | [P-9] | 4 | | | |
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| Project No. | SUD-22025423-A0 | | _ | | igure No. | B-9 |) |
| Project: Location: | Proposed Rosseau Springs Reside Rosseau, ON | ntial Developmen | t | | Sheet No. | of | _1 |
| | October 26, 2022 | Grab Sample | | Combustible V Natural Moistu Plastic and Lic | | □ × ⊷ | |
| Excavator Type: Datum: | Local (Non-Geodetic) | Penetrometer Field Vane Test | | Undrained Tria % Strain at Fa | | \oplus | |
| S | | N Value | 0 | | pour Reading (p | pm) S A | |

| | | s | | / | ₽ | | | | N۷ | /alue | | | | Co | mbus 2 | stible Va | apou 50 | ur Rea | iding (| ppm) | SAMPLES | |
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| G W L | / | S Y B O L | Soil Description | ELEV. | DEPTH | | 20 |) | 40 | 6 | 60 | 80 | | | Nat | 5 ural Mo erg Lim | istur | re Cor | ntent 9 | 6 | P | Sample Number |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Ρ | roject No. | SUD-22025423-A0 | 8 | | | | Figure No. | B- | 10 |
| | roject: ocation: | Proposed Rosseau Sprin Rosseau, ON | gs Resid | lential Developm | ent | | Sheet No. | _ <u>1</u> of | f <u>1</u> |
| E | ate Excavated: xcavator Type: atum: | October 25, 2022 Excavator Local (Non-Geodetic) | | Grab Sample Penetrometer Field Vane Test | | Natural Mo Plastic and | d Liquid Limit I Triaxial at | a □ × ⊕ | |
| G W L | SY M B C L | Soil Description | ELEV. | N Value 20 40 60 Shear Strength 50 |) 80 kPa 100 | 25 Natural | e Vapour Reading (p 50 75 I Moisture Content % I Limits (% Dry Weig 20 30 | | Sample Number |

| V 50 100 10 20 30 31 TOPSOIL TOPSOIL 100 | | G W L | М В О L | Soil Description | ELEV. m | EPTH | S | hea | 20 ar St |) treng | 40 th |) | 6 | 0 | 8 | 80 | kPa | - | At | Nati terb | ural I erg I | Mois Limit | ture s (% | Cont Dry | ent % Weig | , ht) | PLES | Sample Number |
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| TEST PIT TERMINATED AT ~ 0.1 m DEPTH ON SUSPECTED BEDROCK | | | | | | | | | | | |) | | | 1 | | | | | | | | | | | , | E S | |
| ~ 0.1 m DEPTH ON SUSPECTED BEDROCK | | | $\sim \sim \sim$ | TOPSOIL, ~ 100 mm thick | | - | | $\left \right $ | | | | + | + | $\left \right $ | + | + | | | | | | + | + | | | | + | |
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| IEEEEEEEU (ECO) SUD 20022422401- KOSSEAU SERVICO GEO CO-L NEW COC) 112422 | | | | | |] | | | | | | | | | | | | | | | | | | | | | _ | |
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| IESTITI (GEO) SID 200242230 - ROSSEADI SPRING GEO GEJ NEW GEJ 11/24/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | _ | |
| IEERITI (GEO) SUD 22026423-04 - ROSEENU SERVICO GEO GAL NEW COT 11/24/25 | | | | | | | | | | | _ | | | | | | | | | | | | | | | | _ | |
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| TESTEIT (GEO) SUD-22025423-A0- ROSSEAU SPRING GEO GEO LAW GOT 11/24 | 122 | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| | roject roject: | | SUD-22025423-A0 Proposed Rosseau Sprin | ngs Res | sid | ential D | evelo | pmer | nt | | Figure I Sheet I | - | | <mark>3-1</mark> _ of | |
|---|-------------------|--------------------------------|--|------------|-------|---------------------------------------|-------|-------------|------------------|-------------------------|---|----|---------|-----------------------|------------------|
| L | ocatio | n: | Rosseau, ON | | | | | | | | | | | | |
| E | | tor Type: | October 25, 2022 Excavator Local (Non-Geodetic) | | | - Grab Sar Penetron - Field Var | eter | | | Natural M Plastic an | d Liquid Limit I Triaxial at | • | | □ × ← | |
| G W L | S≻MBOL | | Soil Description | ELEV. m | DUPTH | 20 Shear Strer | 40 | Value 60 | 80 kPa 100 | 25 | le Vapour Read 50 I Moisture Con I Limits (% Dry 20 | 75 | m) i | | Sample Number |
| | | SILT, da SAND, s and cob | IL, ~ 100 mm thick ark brown, wet some gravel, trace boulders obles, brown to grey, moist | | 1 | | | | | | × . | | | , R | S2 |
| IESIPII (GEO) SUD-22028423-AU - KUSSEAU SPRING GEO.GPJ NEW.GDI 11/24/22 | | | DEPTH ON SUSPECTED | | | | | | | | | | | | |



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

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| Project No. | SUD-22025423-A0 | 8 | _ | | | | | Figure No |) | B-′ | 12 | |
| Project: Location: | <u>Proposed Rosseau Sprir</u> Rosseau, ON | ngs Res | ide | ential Developi | men | t | | Sheet No | 1 | of | f | <u> </u> |
| Excavator T | ated: October 25, 2022 ype: Excavator | | | Grab Sample Penetrometer Field Vane Test | | G ▲ | Combustible Natural Mois Plastic and L Undrained Tu % Strain at F | iquid Limit iaxial at | ling I−−- | □ × → | | |
| Datum: | Local (Non-Geodetic) | | | | | 0 | | | | | | |
| G Y M B | Soil Description | ELEV. | DEP | N Valu 20 40 | ые 60 | 80 | Combustible \ 25 Natural M | apour Reading 50 75 | 5 | S A M P | Sampl | e |

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| Ň | G V | SYM BOL | Soil Description | ELEV. | DUPHE | | | 20 | | 40 |) | (| 60 | | 80 | | | ١ | Vatu | ral N | loistu | ire Co (% Di | nten | t % | | 5 | Sample Number |
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| | F | <u>`````</u> | TOPSOIL, ~ 100 mm thick | | - | | | | | + | ++ | | | \square | ++ | | + | | | ++- | | ++- | | ++- | | + | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| | | | Lo | g of | | Fest Pit | TP-2 | 2 B | | | |
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| Ρ | roject | t No. | SUD-22025423-A0 | 8 | | | | | Figure No. | B- 1 | 3 |
| Ρ | roject | t: | Proposed Rosseau Sprir | ngs Res | ide | ential Developm | nent | | Sheet No. | 1_ of | _1_ |
| L | ocatio | on: | Rosseau, ON | | | | | | | | |
| E | | ator Type: | Cotober 25, 2022 Excavator Local (Non-Geodetic) | | | Grab Sample Penetrometer Field Vane Test | G ▲ \$ | Natural Mo Plastic and | d Liquid Limit Triaxial at | ⊂ × ⊕ | |
| G W L | SYM BOL | | Soil Description | ELEV. m | DEPTH 0 | N Value 20 40 0 Shear Strength 50 | 60 80 kPa 100 | 25 Natural | e Vapour Reading (pp 50 75 Moisture Content % Limits (% Dry Weight) 20 30 | | Sample lumber |
| | ;;;; ;;;; | TOPSC | DIL, ~ 300 mm thick | | | | | | | | |
| | <u>× ×</u> | | some gravel, trace boulders bbles, brown to grey, moist to | | | | | | | | |
| | | ~ 0.9 m | PIT TERMINATED AT DEPTH DUE TO ECTED BEDROCK | | 아파 아 | | | | | | |



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) |
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| Upon Completion | Drý | Öpen |

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| | | | Lo | g of | • • | Fest Pit | TP-3 | B B | | | | |
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| Pı | roject I | No. | SUD-22025423-A0 | 0 | | | | | Figure I | No | B-' | 14 |
| | roject: ocatior | | Proposed Rosseau Spring Rosseau, ON | gs Resi | ide | ential Developme | ent | | Sheet N | No | <u>1</u> of | f <u>1</u> |
| E | | | October 25, 2022 Excavator Local (Non-Geodetic) | | | Grab Sample Penetrometer Field Vane Test | ⊡ ▲ | Natural M Plastic ar Undraine % Strain | nd Liquid Limit d Triaxial at at Failure | F | × ⊕ | |
| G W L | SYMBO- | | Soil Description | ELEV. m | | N Value 20 40 60 Shear Strength | 80 kPa | 25 Natura Atterber | ble Vapour Read 50 al Moisture Cont g Limits (% Dry | 75 tent % Weight) | M M | Sample Number |

| | G W L | M B | Soil Description | ELEV. m | E P T H | | | 20 | | 40 | | 60 | 8 | 30 | | | Nat | ural | Mois | ture C s (% E | onter | | F | | Sample Number |
|---|-------------|------------------|-------------------------|------------|------------------|------------------|------|---------------------------------------|-------------|-----|-------------|-----|-----|------------------|-----|---|-------------|-----------|-----------|------------------|-------------|-----------|-------------|---|------------------|
| | - | Ы В С L | | | | 3 | snea | r Stren | | 50 | | | 1 | 00 | kPa | , | | lo 10 | | s (% L 20 | זע עול 3 | |))) | | |
| f | | ~~~~ | TOPSOIL, ~ 100 mm thick | | 0- | | | | | | | | | Ĥ | | | - H | Í | \square | Ī | щ | - | | + | |
| | | | TEST PIT TERMINATED AT | | | | | | | | | | | | | | | | | | | | | | |
| | | | ~ 0.1 m DEPTH DUE TO | | | | | | | | | | | | | | | | | | | | | | |
| | | | SUSPECTED BEDROCK | | | | | | | | | | | | | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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Test Pit data requires interpretation assistance from EXP before use by others.

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

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

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| Project No. | <u>SUD-22025423-A</u> 0 | | | Figure No. | B-18 |
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| Date Excavated: Excavator Type: Datum: | October 25, 2022 Excavator Local (Non-Geodetic) | Grab Sample Penetrometer Field Vane Test | Natural I G Plastic a Undraine | tible Vapour Reading Moisture nd Liquid Limit ed Triaxial at at Failure | × ⊕ |
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| TOPSOIL, ~ 300 mm thick 0 < | | <u>м</u> ́ | Soil Description | | F | | | 2 | 0 | 4 | 40 | | 60 |) | 8 | 0 | | - | | Nati | ural | Mois | sture | - Cor | nten | 11 % | | P | Sample |
| TOPSOIL, ~ 300 mm thick 0 <th></th> <th>B</th> <th></th> <th>m</th> <th>ΞĪ</th> <th>5</th> <th>Shea</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>k</th> <th>Pa</th> <th></th> <th>At</th> <th>tterb</th> <th>berg</th> <th>Limi</th> <th>ts (%</th> <th>% Dr</th> <th>y W</th> <th>eight</th> <th>)</th> <th>ΪĹ</th> <th>Number</th> | | B | | m | ΞĪ | 5 | Shea | | | | | | | | | k | Pa | | At | tterb | berg | Limi | ts (% | % Dr | y W | eight |) | ΪĹ | Number |
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| TEST PIT TERMINATED AT ~ 0.3 m DEPTH DUE TO SUSPECTED BEDROCK | - | ~~~ | TOPSOIL ~ 300 mm thick | - | 0 | | | | | ΤÌ | ŤT | | | | ΠÌ | | | | | гi | Ť | | 1 | | ΤŤ | | | | |
| TEST PIT TERMINATED AT ~ 0.3 m DEPTH DUE TO SUSPECTED BEDROCK | È | $\sim \sim$ | TOFSOIL , ~ 300 min thick | | | | | | | | | | | | | | | T | | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Proje | ect: | Proposed Rosseau Sprin | ngs Res | ide | er | ntial D | e١ | /elc | pr | ne | nt | | | | | s | heet I | No. | 1 | (| of 1 |
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| Date | Excavated | October 25, 2022 | | | - | | | | | | | | | | nbustib ural Mo | | ipour Re e | ading | | | |
| | | Excavator | | | - | Grab Sar Penetron | | | | | | G | | Plas | tic and | d Liqu | iid Limit | | ⊢ | | |
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| G I W I | S Y M B O | Soil Description | ELEV. m | DEPTH | | 20 Shoor Street | o arti | 40 | | 60 | | 80 | kPa | N | 25 Natural | Moist | 50 ture Cont | 75 ent % | | SAMPLES | Sample Number |
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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.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

| roject No. | SUD-22025423-A0 | Log of Test Pit TP-9B 025423-A0 ed Rosseau Springs Residential Development | | | | | | | | | | | | igure I | - | - | | 3-20 | |
|---|---|--|-------------|-------|---------------------------|-------|-----------|-------|-----|----|-----|-------------------------------|-----------------------------|--|-------------------------|---|-------------|----------|--|
| roject: ocation: | Rosseau, ON | igs Res | IGE | entia | ai L | Je | /eic | рп | nen | [| | | _ 5 | Sheet I | NO | 1 | _ (|) TC | |
| ate Excavated: xcavator Type: atum: | October 25, 2022 | | | Pe | ab Sa enetro eld Va | mete | ər | | | | | Natural Plastic Undrain | Moistur | uid Limit kial at | eading F | 0 | □ × ~ | | |
| SY MBO- | Soil Description | ELEV. m | DEPTH | She | 20 ar Str | ength | <u>40</u> | Value | 60 | 80 | kPa | 2: Natu Atterb | 5 ural Mois erg Limit | oour Read 50 ture Cont s (% Dry | 75 tent % Weight) | | SAMPLES | Sa Nu | |
| TOPSO | IL, ~ 300 mm thick | - | 0- | | | | 50 | | | 10 | 0 | 10 | | 20 | 30 | | S | | |
| SAND, s brown to | some gravel, some boulders, o grey, moist - | _ | 1 1 1 | | | | | | | | | | * | | | | G | | |
| ~ 1.6 m | PIT TERMINATED AT DEPTH DUE TO CTED BEDROCK | | | | | | | | | | | | | | | | | | |

NIT VA ¢ Č A0-122 TESTPIT (GEO) SUD-220254



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.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

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| Pi | oject | | 0 | | | | | | Figure | e No. | | B-2 | 21 |
| Pi | oject | Proposed Rosseau Spri | ngs Resi | ide | ential Develop | ment | | | Shee | t No. | _1 | _ of | 1 |
| Lo | ocatio | n: Rosseau, ON | | | | | | | | | | | |
| E | | ccavated: October 26, 2022 tor Type: Excavator Local (Non-Geodetic) | | | Grab Sample Penetrometer Field Vane Test | C ▲ S | | Combustibl Natural Moi Plastic and Undrained % Strain at | isture Liquid Lir Triaxial at | nit | ⊢⊕ | □ × | |
| G W L | SYMBOL | Soil Description | ELEV. m | DEPTH o | N Val 20 40 Shear Strength 50 | ue 60 80 ki 100 | Pa | Combustible 25 Natural I Atterberg I 10 | 50 Moisture C | 75 ontent % | | PI | Sample Number |
| | | TOPSOIL, ~ 300 mm thick SAND, some gravel, some boulders, | | - 0 | | | | | | | | | |
| | <u></u> | dark brown, moist TEST PIT TERMINATED AT ~ 0.5 m DEPTH DUE TO SUSPECTED BEDROCK | 7 | - | | | | | | | | | |



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 | Drý | Öpen |

| Project | No. Sl | JD-22025423-A0 | og of | | | | | | | | | | | | | | igure | e No. | _ | В | -22 |
|------------|---------------|-----------------------------|---------|-----------------------|-------------|------|---------------|------|--------|------|-------|----|----------|------------|---------------|---------------------|--------------|--------------|-----------|-------------|------|
| Project | : <u>Pr</u> | oposed Rosseau Sprir | ngs Res | ide | nt | ial | D | ev | elo | p | mer | nt | | | | _ 5 | Shee | t No. | _1 | | of _ |
| Locatio | on: <u>Ro</u> | osseau, ON | | | | | | | | | | | | | | | | | | | |
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| Date E | xcavated: O | ctober 26, 2022 | | | | | | | | | | ~ | . | | | Moistur | • | Reauli | iy | × | |
| Excava | ator Type: Ex | cavator | | | | | o Sa etror | | | | | G | | | | nd Liqi ed Tria: | | | F | | 0 |
| Datum | | cal (Non-Geodetic) | | | F | ield | l Var | ne T | est | | | S | • | | | at Fai | | | θ | Ð | |
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| G Y | | | ELEV. | P | | | | | | Valu | | | | Co | ombusti 25 | ible Vap | oour R 50 | eading 75 | (ppm) | S A M | Sam |
| G M B O L | | Soil Description | m | D E P T H | Sh | | 20 Stre | ngth | 40 | | 60 | | 0 kPa | - | Atterbe | al Mois rg Limit | :s (% E | Dry Wei | % ght) | SAMP-LES | Numl |
| L | TOPSOIL, - | ~ 300 mm thick | _ | 0 | | | | | 50 | | | 1 | 0 | | 10 | | 20 | 30 | | S | |
| <u>~~~</u> | SAND. som | ne gravel, some boulders, | _ | | | | | | | | | | | | | | | | | _ | |
| | brown to gr | rey, moist | - | | | | | | | | | | | | × | | | | | G | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Drý | Òpén |

| Project | No. | SUD-22025423-A0 | g of | | | | | | | | | | Figur | e No. | | B- | 23 |
|---------|---|--|---------|------------------------|-----|-------|----------------------|----------|-------------|-------------|----------|---|--|------------------|-------|-------------|-------------|
| Project | | Proposed Rosseau Sprir Rosseau, ON | ngs Res | ide | nti | al | De | velo | pmer | nt | | | Shee | et No | 1 | _ c | of <u>1</u> |
| | Excavated: October 26, 2022 wator Type: Excavator m: Local (Non-Geodetic) | | | | P | eneti | Samı rome /ane | | | G A S | | Combustib Natural Mo Plastic and Undrained % Strain a | bisture I Liquid Lii Triaxial at | mit l | Ð | □ × ← | |
| G N B O | | Soil Description | ELEV. | D E P T H | | 20 | | 40 | /alue 60 | 80 | | Combustible 25 Natural | 50 Moisture C | 75 Content % | m) | SAMPLES | Sample |
| | TOPS | DIL , ~ 350 mm thick | | н 0- | Sne | ear S | treng | tn 50 | | 100 | kPa I | Atterberg 10 | 20 | Dry Weight 30 | , | E S | |
| | SAND, | some gravel, some boulders, to grey, moist | _ | | | | | | | | | × | | | | G | |
| | | | _ | + + 1+ + + | | | | | | | | | | | | | |
| | ~ 1.7 r | PIT TERMINATED AT n DEPTH DUE TO ECTED BEDROCK | | | | | | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Drý | Ópen |

| roject No. | SUD-22025423-A0 Proposed Rosseau Spri | nas Peo | idz | antia | ים וי | 21/2 | ہماد | nmer | nt | | | | igure l | | | -24 |
|-----------------------|--|---------|-------|-------|----------------|-----------|-----------|------|----|-----|--------|-------------------------|-------------------------|-------------------------|---------------|----------|
| roject: ocation: | Rosseau, ON | ngs res | iu(| SIIUS | | eve | | uner | n. | | | : | Sheet I | NO | <u> </u> | of _ |
| | | | | | | | | | | | | | | | | |
| late Excavated: | October 26, 2022 | | | | | | | | | | | oustible V al Moistu | ˈapour Re re | eading | | |
| xcavator Type: | | | | | b San etrom | | | | G | | Plasti | c and Lic | uid Limit | ⊢ | | Ð |
| atum: | Local (Non-Geodetic) | | | | d Van | | st | | s | | | ained Tria ain at Fa | | | \oplus | |
| atum. | | | | | | | | | | | | | | | | |
| S Y | | ELEV. | P | | | | | alue | | | | 25 | pour Read 50 | 75 |) S A M | Samp |
| S Y B O L | Soil Description | m | DEPTH | Shea | 20 r Strer | igth | 10 | 60 | 8 | kPa | Atte | rberg Lim | sture Con its (% Dry | tent % Weight) 30 |) SAMPLES | Numl |
| | IL, ~ 300 mm thick | - | 0. | | | | 50 | | | | | 10 | 20 | 30 | | |
| SAND, | some gravel, some boulders, | _ | | | | | | | | | | | | | | |
| brown to | o grey, moist | 1 | - | | | | | | | | | × | | | ₽G | 1 |
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| TEOT | | _ | Ľ. | | | | | | | | | | | | + | <u> </u> |
| ~ 1.2 m | DEPTH DUE TO | | | | | | | | | | | | | | | |
| SUSPE | CTED BEDROCK | | | | | | | | | | | | | | -1 | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

| | Lo | g of | 7 | Fest Pit | ГР-1 | 4B | | | |
|-----------------------|---------------------------------------|---------|----|---------------------------------|----------|-------------------------|---|--------|-------|
| Project No. | SUD-22025423-A0 | 0 | | | | | Figure No. | B-2 | 5 |
| Project: Location: | Proposed Rosseau Sprin Rosseau, ON | gs Resi | de | ntial Developmer | nt | | Sheet No. | _1_of | _1_ |
| Date Excavated | : October 26, 2022 | | | Grab Sample | G | Natural Mo | ile Vapour Reading bisture I Liquid Limit | □ × | |
| Excavator Type: | Excavator | | | Penetrometer Field Vane Test | ‡ | Undrained % Strain a | Triaxial at | • | |
| Datum: | Local (Non-Geodetic) | | | | S | 70 Ottain a | | | |
| G Y M | | ELEV. | DE | N Value | 80 | Combustible 25 | e Vapour Reading (p 50 75 | A | ample |

| | G | Y | | ELEV. | PE | ! | | | | | | /alue | | | | | | | | 25 | | 5 | 50 | | 75 | (ppn | ., | A | Sample |
|---|-------------|---------------------------------------|--------------------------------------|-------|-------|----------------|-----------|------------|------|------------------|------------------|-----------|----|---|-----------|---|-----|-----------|-------------|-----------|------------------|------------------|------------------|-------------|------------|------------------|--------------|--------|--------|
| ' | G W L | S Y M B O L | Soil Description | m | DEPTH | - | Shear | 20 r.St | | 4 Ith | 10 | | 60 | | 8(| | кРа | - | N Atte | latur | al N | loist imits | ure | Con | tent We | % ight) | | AMPLES | Number |
| | | | | | | | onou | | long | | 50 | | | | 10 | | | | | 10 | | | 20 | | 30 | | | E S | |
| | | · · · · · · · · · · · · · · · · · · · | TOPSOIL, ~ 200 mm thick | | 0 - | \square | | | | | | | | | | | | | | | | | | | | | + | | |
| | | <u>~ ~ </u> | SAND, trace silt, trace boulders and | | - | Ħ | | | | | | | | | | + | | | | | | | | | | | | | 1 |
| | | | cobbles, brown to grey, moist to wet | | - | + | | | ++- | | | | | | | + | | | \vdash | | + | ┝ | ᢤ | ++- | | | + | G | |
| | Ī | | TEST PIT TERMINATED AT | | - | Ħ | | | | | | | | | | + | | | | | \square | | \square | | | | | | |
| | | | ~ 0.5 m DEPTH DUE TO | | | \square | | | | | | | | | | | | | | | | | | | | | | | |
| | | | SUSPECTED BEDROCK | | - | \mathbb{H} | | | | | | | | | | - | | | | | $\left \right $ | | $\left \right $ | | | | + | | |
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| TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT 11/24/22 | | | | | | \ddagger | | | | | | | | | | | | | | | | | | | | | \pm | | 1 |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Ďrý | Öpen |

| roject No. | SUD-22025423-A0 | og of | | | | | | | | | | Fi | gure N | - | | | -26 |
|----------------------------|---|------------|-------|-------|--------------------------|-----------|-----|------------|-----|-----------|-----------------------------|---|----------------------------|------------------------|----|--------------|------------|
| roject: ocation: | Proposed Rosseau Sprin Rosseau, ON | igs Res | a | entia | I De | eve | lop | ome | ent | | | s | heet N | NO | 1 | _ C |)† _ |
| | October 26, 2022 | | | Pen | b Sam etrom d Vane | eter | t | | 4 | | Natura Plastic Undrai | ustible Va al Moisture c and Liqu ined Triax ain at Failu | id Limit ial at | ading F | | □ × ←€ | |
| S Y M B O L | Soil Description | ELEV. m | DEPTH | Shear | 20 Stren | 4(gth | | alue 60 | | 80 kPa | Na Atter | tural Moist berg Limits | i0 ure Cont s (% Dry | 75 ent % Weight) | n) | SAMPLES | Sar Nur |
| | IL, ~ 300 mm thick | - | 0 | | | 50 |) | | 1 | 00 | | 10 2 | 20 | 30 | - | s | |
| SAND, | some gravel, some boulders, o grey, moist | _ | | | | | | | | | | | × | | = | đ | |
| ~ 0.6 m | PIT TERMINATED AT DEPTH DUE TO CTED BEDROCK | | | | | | | | | | | | | | | | |

Ē NIT VA -d U L 2 Ę - OA 122 10000 TESTPIT (GEO) SUD-:



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| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Drý | Ópen |

| Project No. Project: | SUD-22025423-A0 Proposed Rosseau Sprii | C | | | st Pi | | | | Figure | | | -27 of 1 |
|-------------------------|---|---------|-----------------------|-------|--------------------------|------------|------------|-----------------|-------------------------------|--------------------------------|-------------|-------------|
| Location: | Rosseau, ON | ngs nes | | nua | I Develo | JIIICI | | | Silee | [NO | _ | |
| Date Excav | ated: October 26, 2022 | | | Gra | b Sample | | G | Natural M | | | □ × | < |
| Excavator T | Type: Excavator | | | Pen | etrometer d Vane Test | | | | d Liquid Lin I Triaxial at | | Ð | 5 |
| Datum: | Local (Non-Geodetic) | | | | | | S | | | | | |
| G Y W B L O | Soil Description | ELEV. | D E P T H | | 20 40 | alue 60 | 80 | 25 Natura | 50 I Moisture C | eading (ppm) 75 ontent % | SAZPLES | Sampl |
| L | DPSOIL , ~ 300 mm thick | m | Т Н 0- | Shear | Strength 50 | | kPa 100 | Atterberg 10 | 1 Limits (% E | Ory Weight) 30 | L E S | Numbe |
| SA | AND, some gravel, some boulders, own to grey, moist | _ | | | | | | | | | | - |
| ~ (| EST PIT TERMINATED AT 0.7 m DEPTH DUE TO USPECTED BEDROCK | | | | | | | | | | | |



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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 | Drý | Öpen |

| Project No. | SUD-22025423-A0 | | أما | ont | ial | | ~ ` ' | مام | ~ ~ | m. | | | | | | - | ure N | | | | -28 |
|-----------------------|---|------------|-------|-----------|------|--------------|-------|-----|------------|-----------|-----|--------|-----|----------------------------|-------------------------|--------------|-----------------------------------|-------------|---|---------|------------------|
| Project: Location: | Proposed Rosseau Sprin Rosseau, ON | igs res | au | ent | a | U | ev | eit | op | 1116 | eni | | | | _ | Sr | ieet r | NO. | | _ ' | of <u>1</u> |
| | October 25, 2022 | | | - | Grab | o Sar | nple | • | | | | G | | Combi Natura Plastic | al Mois | ture | our Re | ading | | × | |
| Excavator Type: | | | | _ | | etron Var | | | | | | ▲ • | | Undrai % Stra | ined T | riaxia | al at | | € |) | |
| Datum: | Local (Non-Geodetic) | | | - | | | | | | | | 3 | | | | | | | | | |
| GWL SYMBO- | Soil Description | ELEV. m | DEPTH | Sh | | 20 Strer | ngth | 40 | l Val | lue 60 |) | 80 | kPa | 2 Nat Atter | 25 tural N berg L | 50 loistu | ur Reac) re Cont (% Dry | 75 ent % | | SAMPLES | Sample Number |
| TOPSO | IL, ~ 300 mm thick | - | 0 | \square | | | | 50 | | | | 10 | 0 | | 10 | 20 |) | 30 | | s | |
| | some gravel, some boulders, o grey, moist | - | | | | | | | | | | | | | × | | | | | G | |
| ~ 1.1 m | PIT TERMINATED AT DEPTH DUE TO CTED BEDROCK | | | | | | | | | | | | | | | | | | | | |



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

| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Dry | Ópén |

| | | | Lo | g of | | Fest Pit | ГР-1 | \mathbf{C} | | | | | |
|-------------|--|-----------|---|------------|----|--|------------------|-------------------------|--|-----------------|---|--------|------------------|
| Pr | oject | No. | SUD-22025423-A0 | 0 | | | | | Figur | re No. | | B-2 | 29 |
| | oject: ocatio | | Proposed Rosseau Spring Rosseau, ON | gs Resi | de | ential Developmer | nt | | Shee | et No. | | _ of | _1 |
| E | | tor Type: | October 25, 2022 Excavator Local (Non-Geodetic) | | | Grab Sample Penetrometer Field Vane Test | € ▲ \$ | Natural M Plastic an | d Liquid Li d Triaxial a | imit | · | □ × | |
| G W L | SYMBOL | | Soil Description | ELEV. m | | N Value 20 40 60 Shear Strength 50 | 80 kPa 100 | 25 Natura | le Vapour F 50 I Moisture (J Limits (% 20 | 75 Content % | | | Sample Jumber |
| | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | DIL, ~ 100 mm thick | | 0- | | | | | | | \mp | |

| L | 0 | Soli Description | m | T - | Sh | ear S | Stren | gth | | | | | kPa | A | tterb | erg Li | imits (| % Dr | y We | ight) | Ĺ | Num |
|-----|-------------|--------------------|---|-----|----|-------|-----------|------|------------------|------------------|-----------|-----|------|-----|-----------|-----------|---------|-------|------|------------------|--------------|-----|
| | B O L | | | | | | | - 50 | | | | 100 | | | | 0 | 20 | | 30 | | LES | |
| - | TOPSO | IL, ~ 100 mm thick | | 0+ | | | | | | | | | | | | | | | T | | | |
| - 1 | | | | | | | | | | | | | | | | | | | | | | |
| | TEST F | TT TERMINATED AT | | 1 | | | | | | | | | | | | | | | | | | |
| | ~ 0 1 m | DEPTH DUE TO | | 1 | | | | | | | | | | | | | | | | | 1 | |
| | | CTED BEDROCK | | 1 | | | | | | | | | | | | | | | | | \perp | |
| | 505PE | CIED BEDROCK | | 1 | | | | | | | | | | | | | | | | | 1 | |
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| 1 | | | | Ť | | | | | | | | | | | | | | | | | Τŀ | 1 |
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| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

| cation: Rosseau, ON ate Excavated: October 25, 2022 cavator Type: Excavator Field Vane Test Combustible Vapour Reading Natural Moisture Plastic and Liquid Limit Undrained Triaxial at % Strain at Failure Combustible Vapour Reading Natural Moisture Plastic and Liquid Limit Strain at Failure Combustible Vapour Reading Natural Moisture Plastic and Liquid Limit Strain at Failure Combustible Vapour Reading Natural Moisture Plastic and Liquid Limit Strain at Failure Combustible Vapour Reading Natural Moisture Natural Moisture Natural Moisture Strain at Failure Strain at Failure Combustible Vapour Reading Natural Moisture Natural Moisture Strain at Failure Combustible Vapour Reading Natural Moisture Strain at Failure Combustible Vapour Reading Natural Moisture Strain at Failure Strain at Failure Combustible Vapour Reading Natural Moisture Strain at Failure Strain at Failure | oject No. | SUD-22025423-A0 | _ | | | | | | | | | Figure | - | B-: | |
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| And the excavated: October 25, 2022 Cavator Type: Excavator Local (Non-Geodetic) | roject: | | ngs Res | ide | ntia | l De | velc | pme | ent | | | Shee | t No | <u>1</u> o | ſ |
| Cavator Type: Excavator Penetrometer Itum: Local (Non-Geodetic) Field Vane Test Undrained Travial at % Strain at Failure Mag Soil Description ELEV. Prestormeter TOPSOIL, ~ 300 mm thick Field Vane Strength Combustible Vapour Reading (opm) 25 00 75 00 75 00 75 00 75 00 75 00 75 00 75 00 75 00 75 00 75 00 70 00 72 00 70 75 00 75 | | | | | Grad | - Came | | | 6 | <u> </u> | | | Reading | X | |
| Autom Local (Non-Geodetic) Soil Description FLEV. m TOPSOIL, ~ 300 mm thick SAND, some silt, trace gravel, trace moist to wet TEST PIT TERMINATED AT ~ 1 3 DEPTH DUE TO SUSPECTED BEDROCK | cavator Type | : Excavator | | | | | | | | | | | nit – | |) |
| Note Soil Description ELEV. P 20 40 60 80 TOPSOIL, ~ 300 mm thick 50 100 10 20 30 SAND, some silt, trace gravel, trace boulders and cobbles, brown to grey, moist to wet 50 100 10 20 30 TEST PIT TERMINATED AT ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK TEST PIT TERMINATED AT 10 </td <td>atum:</td> <td>Local (Non-Geodetic)</td> <td></td> <td></td> <td>Field</td> <td>d Vane</td> <td>Test</td> <td></td> <td>5</td> <td>5</td> <td>% Strai</td> <td>n at Failure</td> <td></td> <td>Ð</td> <td></td> | atum: | Local (Non-Geodetic) | | | Field | d Vane | Test | | 5 | 5 | % Strai | n at Failure | | Ð | |
| TOPSOIL, ~ 300 mm thick 0 SAND, some silt, trace gravel, trace - -boulders and cobbles, brown to grey, moist to wet - - - 1 - TEST PIT TERMINATED AT - ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK | S Y | | | P | | | N | Value | | | | | | n) S A | _ |
| TOPSOIL, ~ 300 mm thick 0 SAND, some silt, trace gravel, trace - -boulders and cobbles, brown to grey, moist to wet - - - 1 - TEST PIT TERMINATED AT - ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK | B O | Soil Description | | | | | th | 60 | | kPa | Natu Atterb | ural Moisture C erg Limits (% E | ontent % Pry Weight) | P L L L S | |
| -boulders and cobbles, brown to grey, - | TOPS | DIL, ~ 300 mm thick | | | | | | | | | | | | _ | _ |
| ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK | ⊡ – boulde | ers and cobbles, brown to grey, | | | | | | | | | | × | | G | |
| ~ 1.3 m DEPTH DUE TO SUSPECTED BEDROCK | | | _ | | | | | | | | | | | | |
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TESTPIT (GEO)

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| Time | Water Level (m) | Depth to Cave (m) |
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| Project | | g of | | | | | | | | | | | | | | | | F | igur | eΝ | lo. | | В | -3 | 1 |
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| Project | Proposed Rosseau Sprin | gs Res | ide | en | tia | I D |)e | ve | lo | pm | ne | ent | | | | | | 5 | Shee | et N | lo. | _1 | | of | _1 |
| Locatio | n: Rosseau, ON | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | Comb | oustil | ble V | apou | Rea | adinc | | | 1 | |
| Date E | xcavated: October 25, 2022 | | | | Gra | b Sa | mn | le | | | | | G | | | Natur | al M | oistu | re | | | | X | | |
| Excava | tor Type: Excavator | | | | Pen | etro | me | ter | | | | | | | | Plasti Undra | ainec | l Tria | xial a | | | - | —€ ₽ | .) | |
| Datum | Local (Non-Geodetic) | | | | Fiel | d Va | ine | Test | t | | | | S | | | % Str | ain a | at Fai | lure | | | | U | | |
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| | TOPSOIL, ~ 300 mm thick | | | | | | | | | | | | | | | | | | | | | | _ | | |
| | SAND, some gravel, trace boulders and cobbles, brown to grey, moist | - | | | | | | | | | | | | | | | | | | | | | - | | |
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| | ~ 0.9 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) |
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| Upon Completion | Drý | Öpen |

| roject | No. | SUD-22025423-A0 | | | | | | | | | | | | | | I | Figur | e No | • | В | -32 |
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| roject | | Proposed Rosseau Spr | ings Res | ide | entia | al C |)e | velo | ор | me | ent | | | | | _ | Shee | t No | · | 1 | of _ |
| ocatio | on: | Rosseau, ON | | | | | | | | | | | | | | | | | | | |
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| ate E | xcavated: | October 25, 2022 | | | Gra | ab Sa | ampl | le | | | | G | | | itural I | | ure quid Lir | nit | L | × | (|
| xcava | ator Type: | Excavator | | | - | netro Id Va | | | | | | | | Un | | ed Tria | axial at | | | ⊕ ` | 5 |
| atum | : | Local (Non-Geodetic) | | | - Fie | iu va | iiie | rest | | | | S | | 70 | Strain | alra | allure | | | | |
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| <u>~ ~</u> | SAND, | some gravel, trace boulders | | | | | | | | | | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Ďrý | Ópén |

| Project No. Project: Location: | SUD-22025423-A0 Proposed Rosseau Spri Rosseau, ON | ngs Res | | | | | | | | | Figure Shee | e No. t No. | | B- | |
|--|---|------------|--------|------------------------------|----------------|----|------------|------------------|-----------------------------|---|-----------------------------|----------------|--------|-------------|--|
| Date Excavated Excavator Type Datum: | : October 25, 2022 : Excavator Local (Non-Geodetic) | | Pe | ab Sar enetron eld Var | neter | st | | Œ ▲ S | Natura Plastic Undrai | and Li | ure quid Lin axial at | Reading nit | L E | ⊔ × ⊕ | |
| GWL GWL | Soil Description DIL, ~ 300 mm thick | ELEV. m | She | 20 ar Strer | 4 ngth 5 | | alue 60 | 80 kPa 100 | 2 Nat Attert | ombustible Vapour Reading (pp 25 50 75 Natural Moisture Content % Atterberg Limits (% Dry Weight 10 20 30 | | | | | |
| TEST | pit terminated at n DEPTH DUE TO ECTED BEDROCK | | | | | | | | | | | | | G | |

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

| Time | Water Level (m) | Depth to Cave (m) |
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| Project No. | <u>SUD-22025423-A</u> 0 | | - | _ | Figure No. | B-3 | 4 |
| Project: Location: | Proposed Rosseau Springs Reside Rosseau, ON | ntial Development | | | Sheet No. | _1_ of | _1 |
| Date Excavated: Excavator Type: Datum: | October 25, 2022 Excavator Local (Non-Geodetic) | Grab Sample Penetrometer Field Vane Test | © ▲ \$ | Combustible Natural Mois Plastic and Undrained T % Strain at | Liquid Limit Triaxial at | ⊥ × ⊕ | |

| $\begin{bmatrix} G & Y \\ G & Y \end{bmatrix}$ Soil Description $\begin{bmatrix} ELEV. \\ E \\ E \end{bmatrix}$ 20 40 60 80 $\begin{bmatrix} 25 & 50 & y \\ ELEVE \\ E \\ E \end{bmatrix}$ Solution of the set of the s | | S | | | D N Value | | | | | Combustible Vapour Reading (ppm) | | | | | i) S | | | | | | | | | | |
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| BEDROCK AT SURFACE | G | M | Soil Description | ELEV. | Ë | | | 20 | 4 | | | | 80 | 5 | - | | 2: Nati | 5 ural N | 5 Aoisti | | 75 ntent | 0/2 | — Ĥ | Sample | |
| BEDROCK AT SURFACE | Ľ | B O | | m | Ϊ | S | | | gth | - | | | | kP | а | At | terb | erg L | imits | (% Dr | y We | ight) | Ŀ | Numbe | er |
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| TESTETT (GEO) SUD-22028423-A0- ROSSEAU SPRING GEO GEO AN NEW GET 11124/22 | | | | | | \vdash | +++ | | | | | | | | ++ | $\left \right $ | | | | | | +++ | +1 | | |
| TESTETT (EEO) SUD-ZAZGARIZ-MO- ROSSEAU SPRING GEO GEO NEW GOT 11/24/22 | | | | | | | | | | | | | | | | | | | | | | | \pm | | |
| TESTETT (CEO) SUD-22028423-40 - ROSSEAU SPRING GEO GPU NEW GDT 11/24/22 | | | | | | \square | | | | | | | | | ++ | | | | _ | | | | | | |
| TESTETT (ECO) SUD-22025423-04. ROSE AU SERVIG GEO CO-DI MEMODI 11/24/22 11/ | | | | | | | | | | | | | | | | | | | | | | | | | |
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| TESTPTI (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO GPJ NEW.ODT 11/24 | 52 | | | | - | | | | | | | | | | | | | | ++- | | | +++ | + | | |
| TESTEIT (GEO) SUD-22028423-A0 - ROSSEAU SPRING GEO GPJ NEW GDT 11 | 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| TESTPIT (GEO) SUD-222023423-A0 - ROSSEAU SPRING GEO GPU NEW GOLO PULSUES (GEO GPU NEW GOLO PULSU | 7 | | | | - | \vdash | | | | | | | | | + | | | | ++- | | | +++ | + | | |
| TESTETH (GEO) SUD-22025423-AO- ROSSEAU SPRING GEO GPJ NEW G | 티 | | | | | | | | | | | | | | | | | | | | | | | | |
| TESTPIT (EC) SUD-22028423-A0 - ROSSEAU SPRING GEO.GPJ NEW | 5 | | | | - | \vdash | +++ | +++ | | | | $\left \right $ | +++ | +++ | ++ | | | | ++- | | | +++ | | | |
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| TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO. | 곬 | | | | | | | | | | | | | | | | | | | | | | | | |
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| TESTPIT (GEO) SUD-22025423-A0 - R | S | | | | - | \vdash | +++ | +++ | | | ++- | $\left \right $ | | +++ | ++ | $\left \right $ | | | ++- | | | +++ | | | |
| TESTPIT (GEO) SUD-22025423-A0 | Ω. | | | | | | | | | | | | | | | | | | | | | | | | |
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| TESTPIT (GEO) SUD-22024 | 23- | 1 | | | | | | | | | | | | | | | | | | | | | \pm | | |
| TESTPIT (GEO) SUD-2200 | 254 | 1 | | | | \parallel | ++1 | ++ | ++ | H | ++ | \mathbb{H} | ++ | ++1 | + | H | \mathbb{H} | + | ++ | H | $+ \Gamma$ | H | +1 | | |
| TESTPIT (GEO) SUD-2 | 202 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6-2 | | | | | | | | | | | | | \square | | | | \square | \square | | \square | + | | | |
| TESTPIT (GEO) | Ins | 1 | | | - | + | +++ | ++ | ++ | \mathbb{H} | ++ | $\left \right $ | | ++ | + | $\left \right $ | | ++ | ++ | $\left \right $ | ++ | +++ | +1 | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
|-----------------|-----------------------|-------------------------|
| Upon Completion | Drý | Öpen |

| Project No. | Log SUD-22025423-A0 | , | | | | | | | | Figur | e No | B | -35 | |
|------------------------------------|--|------------|----|-------|-------------------|------|-------------|-----------|-----------------------|---|------|---|-----------------|--|
| Project: | Proposed Rosseau Spring | s Resid | er | ntia | l De | velo | pmer | nt | | Shee | t No | 1 | of <u>1</u> | |
| Location: | Rosseau, ON | | | | | | | | | | | | | |
| Date Excavated | : October 24, 2022 | | - | | | | | _ | Combusti Natural M | tible Vapour Reading | | | | |
| Excavator Type | | | _ | | b Samp etromet | | | | | tic and Liquid Limit | | | | |
| Datum: | Local (Non-Geodetic) | | _ | Fiel | d Vane | Test | | S | % Strain | | | Ð | | |
| GWL SYM BOL | Soil Description | ELEV. m | | Shear | 20 Strengt | 40 | √alue 60 | 80 kPa | 25 | le Vapour R 50 al Moisture C g Limits (% I | 75 | | Sample Numbe | |
| | DIL , ~ 300 mm thick | Ĥ 0 | | | | 50 | | 100 | 10 | 20 | 30 | Ē | | |
| SAND, boulde some s below | some silt, some gravel, trace rs and cobbles, brown - silt, light brown, dry to moist ~ 0.6 m depth - - PIT TERMINATED AT n DEPTH ON SUSPECTED | 2 | | | | | | | | | | G | | |
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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 | Drý | Öpen |

| | Lo | g of | | Гest | Pi | t] | ГР-2 | 2D | | | | |
|----------------------------|---|--|-------------|---------------------------|------|-------|---|------------|--------------------------------|---------|----------------|--------|
| Project No. | SUD-22025423-A0 | 0 | | | | | | | Figure | ∍ No | B | 8-36 |
| Project: | Proposed Rosseau Sprin | Proposed Rosseau Springs Residential Development | | | | | | | | | 1 | of _1 |
| Location: | Rosseau, ON | | | | | | | | | | | |
| | | | | | | | | Combusti | ble Vapour I | Pooding | Г | 7 |
| Date Excavated | October 24, 2022 | | | Crah Cam | nla | | G | Natural M | • | Reading | > | _ |
| Excavator Type: | Excavator | | | Grab Sam Penetrome | • | | | | ld Liquid Lim d Triaxial at | - | (| Ð |
| Datum: | Local (Non-Geodetic) | | | Field Vane | Test | | S | % Strain a | at Failure | | ⊕ | |
| | | | | | | | | | | | | |
| G | | ELEV. | DEP | | | /alue | | 25 | le Vapour Re 50 | 75 | n) S A P | Sample |
| S G W B L O | Soil Description | m | P T H | 20 40 6 Shear Strength | | 60 | 80 kPa | | I Moisture Co g Limits (% D | | P | Number |
| L TOPOG | | - | 0- | | 50 | | 100 | 10 | 20 | 30 | L E S | |
| | DIL, ~ 200 mm thick | 4 | | | | | | | | | | |
| | some gravel, trace boulders bbles, brown to grey, dry to | | | | | | | | | | | |
| moist | | 1 | | | | | | | | | | |
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| STPIT (GEO) SUD-22025423-A(| |
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TEST PIT TERMINATED AT

BEDROCK

~ 2.0 m DEPTH DUE TO RESISTANCE ON SUSPECTED

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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 | Depth to Cave |
|-----------------|----------------|------------------|
| | <u>(m)</u> | (m) |
| Upon Completion | Dry | Open |
| | | |
| | | |
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| | | | LO | og of | j | l est Pi | t . | I P-3 | D | | | | | |
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| Pr | oject | No. <u>SUD-22025</u> | 1 <u>23-A</u> 0 | 0 | | | | | | Figure | ∗No | B | -37 | |
| | oject: | | | ngs Resi | de | ential Develop | pmer | | Sheet | <u>1</u> o | of <u>1</u> | _ | | |
| E | | tor Type: <u>Excavator</u> Local (Non-4 | | | | Grab Sample Penetrometer Field Vane Test | | € ▲ 5 | Combustibl Natural Mo Plastic and Undrained % Strain at | isture Liquid Lim Triaxial at | nit 🛏 | □ × ⊕ | | |
| G W L | SYMBOL | Soil Descript | on | ELEV. m | | N V 20 40 Shear Strength 50 | alue 60 | 80 kPa 100 | | Vapour Re 50 Moisture Co Limits (% D 20 | 75 ontent % | I) SAMPLIIS | Sample Number | |
| | | TOPSOIL, ~ 200 mm th | | | 0 | | | | | | | | | - |
| | | | | | | | | | | | | | | |

| LW | B O L | Soil Description | m | | P T H | Shear Strength | 40 | 60 | 80 kPa | Atter | berg L | _imits (% | e Content % % Dry Weight) | PLES | Number |
|----|-------------|---|---|---|-------------|---|------|----|-----------|-------|----------------------|-----------|---|------------------|--------|
| | | | | | н 0 — | 5 | 50 | | 100 | | 10 | 20 | 30 | E S | |
| | | TOPSOIL, ~ 200 mm thick | | ľ | ۰Į | | | | | | | | | - | |
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| | | SAND, some gravel, trace boulders and cobbles, brown to grey, dry to | | | Ŧ | | | | | | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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|-------------|--|------------|-------|--------------------|-----|----------------------------|---|---------------------------|-------------|------------------|
| Project No. | SUD-22025423-A0 | 0 | | | | | Figure | No. | B | -38 |
| Project: | Proposed Rosseau Sprin | gs Res | ide | ential Development | | | Sheet | No. | 1 | of <u>1</u> |
| Location: | Rosseau, ON | | | | | | | | | |
| Date Excava | ated: October 24, 2022 | | | | | Combustib Natural Mo | ole Vapour F bisture | leading | ⊑ ⊁ | |
| Excavator T | ype: Excavator | | | Grab Sample G | | Plastic and Undrained | d Liquid Limi Triaxial at | t ł | | Ð |
| Datum: | Local (Non-Geodetic) | | | Field Vane Test | | % Strain a | | | \oplus | |
| GWL O- | Soil Description | ELEV. m | DEPTH | | kPa | 25 Natural Atterberg | e Vapour Res 50 Moisture Co Limits (% Dr | 75 ntent % y Weight | A M P | Sample Number |
| gra | ND, with topsoil, some silt, some avel, some boulders and cobble, rk brown, wet | | 0 - | 50 100 | | | 20 | 30 | E | 1 |
| ~ (| EST PIT TERMINATED AT D.5 m DEPTH ON SUSPECTED EDROCK | | | | | | | | | |

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| ESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ N | |
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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) |
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| Upon Completion | Drý | Öpen |

| oject No. | SUD-22025423-A0 | | | | | | | | | | | | | | Figur | e No. | | В | -39 |
|----------------|---|---------|-------|----|------------------|-------|------|------|----|----|----------|-----|--------|----------|------------------------|--------|-----------|-------------|------|
| oject: | Proposed Rosseau Sprin | ngs Res | ide | en | tial D |)e\ | velo | ppr | ne | nt | | | | | Shee | et No. | _1 | | of _ |
| cation: | Rosseau, ON | | | | | | | | | | | | | | | | | | |
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| ate Excavated: | October 24, 2022 | | | _ | Grab Sa | mnl | ما | | | I | G | | Natura | al Moist | ture | | | X | Ś |
| cavator Type: | Excavator | | | | Penetro | • | | | | | A | | | | iquid Lir iaxial at | | | —€ Đ | .) |
| atum: | Local (Non-Geodetic) | | | | Field Va | ne - | Test | | | | s | | % Stra | ain at F | ailure | | C | D | |
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| %≻МвО | | ELEV. | DE | | | | | Valu | | | | | | 25 | apour R 50 | 75 | , | S A M | Sam |
| B O L | Soil Description | m | DEPTH | s | 20 Shear Stre | engti | | | 60 | | 80 | kPa | | | nits (% I | | % ght) | SAMP-LES | Num |
| | ID SAND, some topsoil at | - | 0- | | | | 50 | | | | 100 | | | 10 | 20 | 30 | | | |
| surface | , grey, moist | | | | | | | | | | | | | | × | | | G | |
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| SAND, s | some gravel, some silt, trace s and cobbles, grey, moist | | | | | | | | | | | | | × | | | | | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| Project No. Project: | <u>SUD-22025423-A</u> 0 Proposed Rosseau S | LOG 0 | | | | | | | Figure Sheet | | | -40 of _1 |
|-------------------------|---|-----------|--------|----------|---------------------------|-------------|-----------|---------------|---|----------------|---------|----------------|
| ocation: | Rosseau, ON | | | | | | | | | | | |
| ate Excavated | : October 24, 2022 | | | - Gra | b Sample | | G | Natural Mo | | | × | |
| xcavator Type | Excavator | | | Per | netrometer d Vane Test | | 4 | | d Liquid Lim Triaxial at | | € € | |
| Datum: | Local (Non-Geodetic) | | | - | d vane rest | | 5 | % Strain a | it Failure | | | |
| S Y B O | Soil Description | ELE\ m | /. | Shea | N 20 40 r Strength | Value 60 | 80 kPa | 25 Natural | e Vapour Re 50 Moisture Co Limits (% D | 75 Intent % | SAMPLES | Sampl Numbe |
| L | DIL , some sand | | н 0 | | 50 | | 100 | 10 | 20 | 30 | S | |
| SAND, | some gravel, trace boulders, | , | | | | | | | | | | |
| ⊟grey, n | noist | | | | | | | × | | | -9 | |
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TESTPIT (GEO) SUD-22025423-A0 - ROSSEAU SPRING GEO.GPJ NEW.GDT



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.

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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 | Drý | Ópén |

| | oject | | SUD-22025423-A0 | - | | | | _ | | | | | | | | | | | gure | | - | | | 41 |
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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.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

| Projec | t No. | <u>SUD-22025423-A</u> 0 | - | | | | | | | | | | F | igure | No. | | | -42 |
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| | | October 24, 2022 | | | Gra | b Sar | nple | | | G | | | l Moistu and Liq | re uid Limi | t | — | × ← | |
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Test Pit data requires interpretation assistance from EXP before use by others.

| Time | Water Level (m) | Depth to Cave (m) |
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| | Lo | g of] | Fest Pit | TP-2 | 2E | | | |
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| | : October 24, 2022 | | Grab Sample | G | Combustible V Natural Moistu Plastic and Liq | - | □ × | |
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| G M | | ELEV. | N Value | | Combustible Va | pour Reading (pr 50 75 | A | ample |

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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.

| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

| Project | | og of | | | | | | | | | | | | Fig | ure | No. | | B- | -44 |
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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

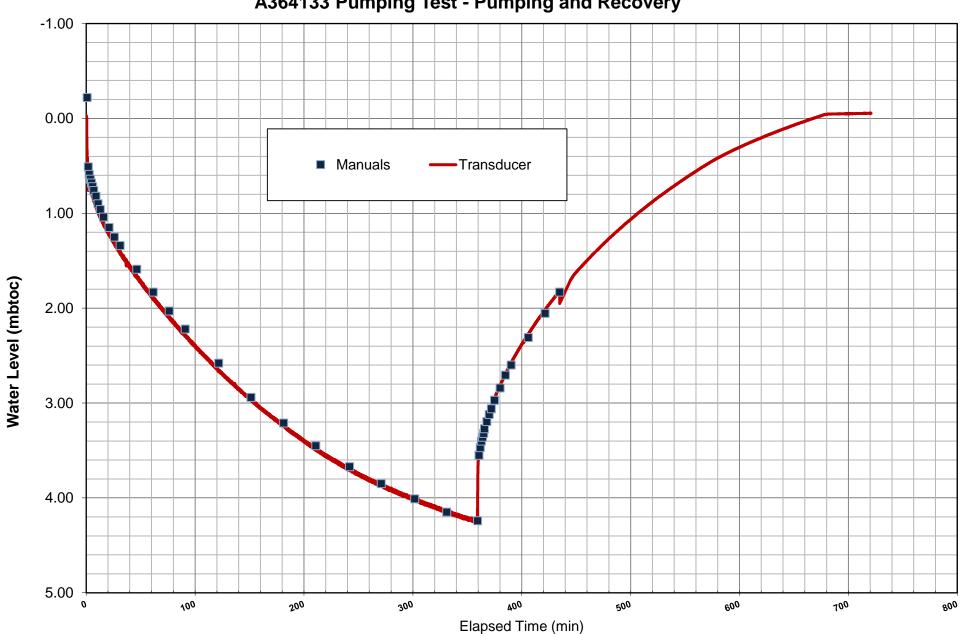
Test Pit data requires interpretation assistance from EXP before use by others.

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

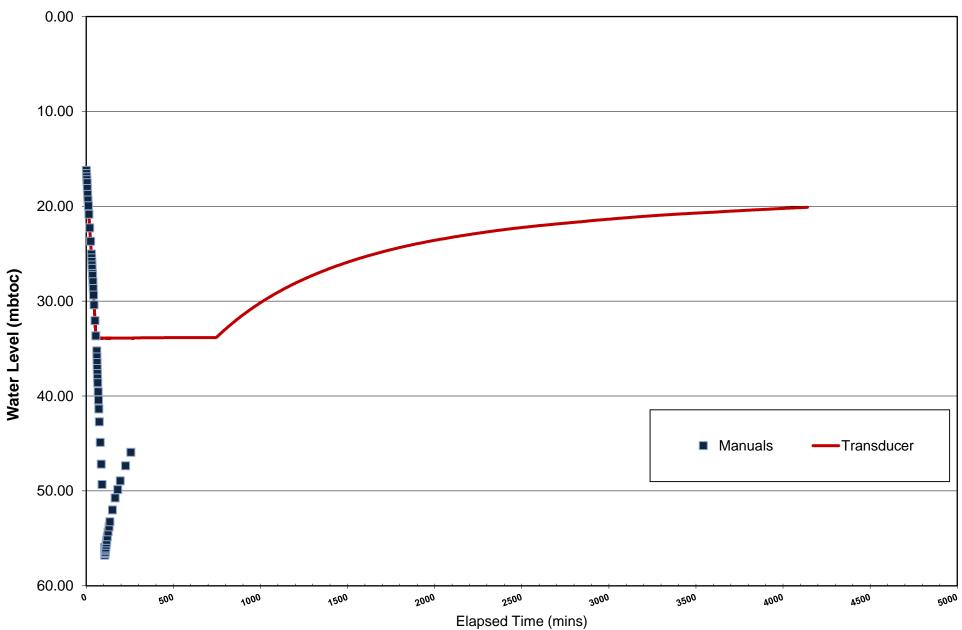
| Time | Water Level (m) | Depth to Cave (m) |
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| Upon Completion | Drý | Öpen |

Appendix C – Raw Data and Certificates of Analysis

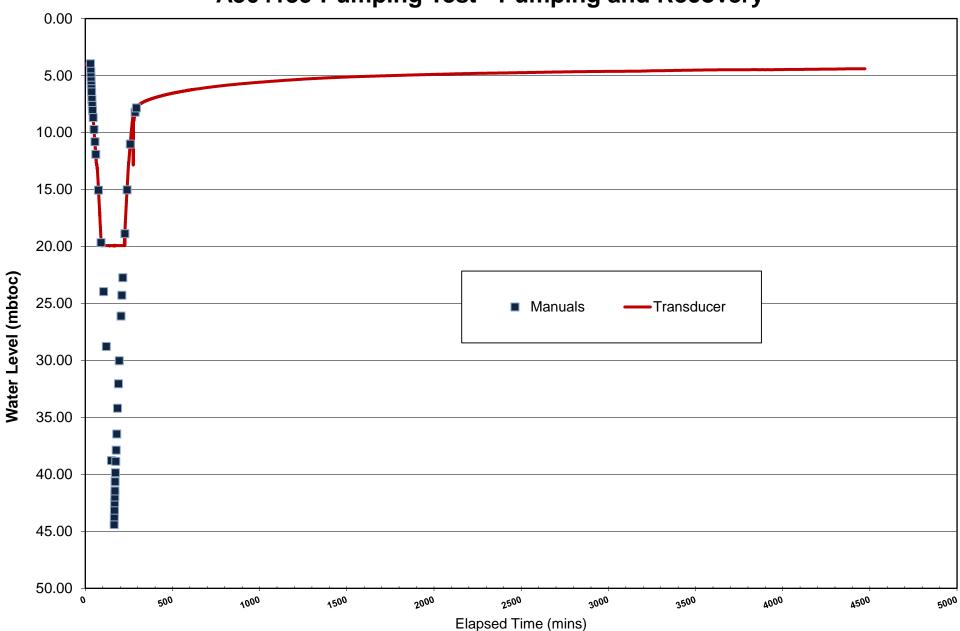




A364133 Pumping Test - Pumping and Recovery



A364138 Pumping Test - Pumping and Recovery



A364139 Pumping Test - Pumping and Recovery



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

EXP Services Inc.

Attn : Jamie Batten

885 Reagent Street Sudbury, Ontario P3E 5M4, Canada

Phone: 705-674-9681 Fax:705-674-5583 Project : SUD-22025423-A0

1

02-June-2023

Date Rec. :01 June 2023LR Report:CA13015-JUN23Reference:SUD-22025423-A0, Jamie
Batten

Copy:

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 Cumpbell

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

0003354452

OnLine LIMS

Results relate only to the sample tested. Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.) Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples. SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.







FINAL REPORT

CA15208-MAY23 R

SUD-22025423-AO

Prepared for

EXP Services Inc



FINAL REPORT

First Page

| CLIENT DETAILS | | LABORATORY DETAILS | |
|----------------|----------------------|--------------------|---|
| Client | EXP Services Inc | Project Specialist | Jill Campbell, B.Sc.,GISAS |
| | | Laboratory | SGS Canada Inc. |
| Address | 885 Regent Street | Address | 185 Concession St., Lakefield ON, K0L 2H0 |
| | Sudbury, Ontario | | |
| | P3E 5M4. Canada | | |
| Contact | Jamie Batten | Telephone | 2165 |
| Telephone | 705-674-9681 | Facsimile | 705-652-6365 |
| Facsimile | 705-674-5583 | Email | jill.campbell@sgs.com |
| Email | Jamie.Batten@exp.com | SGS Reference | CA15208-MAY23 |
| Project | SUD-22025423-AO | Received | 05/19/2023 |
| Order Number | | Approved | 05/29/2023 |
| Samples | Solution (6) | 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

Jill Cumpbell

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FINAL REPORT

Client: EXP Services Inc

| | | | | | | | | Pro | oject: SUD-220254 | 23-AO |
|---|-------------------------------|-------|-----|---------------|--|--|--|--|--|----------------------------|
| | | | | | | | | Project Mana | ager: Jamie Batten | |
| | | | | | | | | Samp | blers: JB & JN | |
| MATRIX: WATER | | | | Sample Number | 8 | 9 | 10 | 11 | 12 | 13 |
| | | | | Sample Name | A364133 | A364139 | 20 ROS | 39 ROS | A364138 | DUP |
| .1 = ODWS_AO_OG / WATER / Table 4 - Drink | king Water - Reg O.169_03 | | | Sample Matrix | Solution | Solution | Solution | Solution | Solution | Solution |
| 2 = ODWS_MAC / WATER / Table 1,2 and 3 - | Drinking Water - Reg O.169_03 | | | 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 |
| Netals 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< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.003# <mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.003# <mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.003# <mdl< td=""><td>0.003#<mdl< td=""><td>0.003#<mdl< td=""></mdl<></td></mdl<></td></mdl<> | 0.003# <mdl< td=""><td>0.003#<mdl< td=""></mdl<></td></mdl<> | 0.003# <mdl< td=""></mdl<> |
| Nitrate (as N) | as N mg/L | 0.006 | | 10 | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<> | 0.327 | 0.006# <mdl< td=""></mdl<> |
| Nitrate + Nitrite (as N) | as N mg/L | 0.006 | | | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.006#<mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<></td></mdl<> | 0.006# <mdl< td=""><td>0.327</td><td>0.006#<mdl< td=""></mdl<></td></mdl<> | 0.327 | 0.006# <mdl< td=""></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 |



FINAL REPORT

Client: EXP Services Inc Project: SUD-22025423-AO

| | | | | | | | | | • | |
|---|-------------------------------|------|-----|---------------|------------|------------|------------|-------------|--------------------|------------|
| | | | | | | | | Project Man | ager: Jamie Batten | ı |
| | | | | | | | | Sam | olers: JB & JN | |
| | | | | | | | | | | |
| MATRIX: WATER | | | 5 | Sample Number | 8 | 9 | 10 | 11 | 12 | 13 |
| | | | | Sample Name | A364133 | A364139 | 20 ROS | 39 ROS | A364138 | DUP |
| L1 = ODWS_AO_OG / WATER / Table 4 - Drinki | ing Water - Reg O.169_03 | | | Sample Matrix | Solution | Solution | Solution | Solution | Solution | Solution |
| L2 = ODWS_MAC / WATER / Table 1,2 and 3 - I | Drinking Water - Reg O.169_03 | | | 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#U | 0 | 30 | 0 | #NDOGT | 0 |
| | | | | | AL | | | | | |
| E. Coli | cfu/100mL | 0 | | 0 | #NDOGN#U | 0 | 0 | 0 | #NDOGT | 0 |
| | | | | | AL | | | | | |
| Fecal Coliform | cfu/100mL | 0 | | | 0##UAL | 0 | 0 | 0 | 0 | 0 |
| Total Coliform Background | cfu/100mL | 0 | | | #NDOGN#U | 68 | 61 | 0 | #NDOGT | 87 |
| | | | | | AL | | | | | |
| Other (ORP) | | | | | | | | | | |
| рН | 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

| | | | | ODWS_AO_OG / WATER / Table 4 - Drinking Water - Reg O.169_03 | ODWS_MAC / WATER / Tabl 1,2 and 3 - Drinking Water - Reg 0.169_03 |
|------------------------|--------------------------|---------------|--------|---|---|
| Parameter | Method | Units | Result | L1 | L2 |
| 364133 | | | | | |
| 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 | |
| 64139 | | | | | |
| 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 | |
| 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 |
| ROS | | | | | |
| Hardness | SM 3030/EPA 200.8 | mg/L as CaCO3 | 116 | 100 | |
| Sodium | SM 3030/EPA 200.8 | mg/L | 25.9 | | 20 |
| 64138 | | | | | |
| 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 | |
| IP | | | | | |
| 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

713

µg/L



Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-006

| Parameter | QC batch | Units | Units RL | Method | Duplicate | | LC | LCS/Spike Blank | | м | latrix Spike / Ref | | | | | | | |
|------------|---------------|------------------|----------|--------|-----------|-----|-----------------|-----------------|------|-----|--------------------|------|-------|------------------------|--|-------------------|------------------------|--|
| | Reference | | | | | | | | | | RPD | AC | Spike | Recovery Limits (%) | | Spike Recovery | Recovery Limits (%) | |
| | | | | | | (%) | Recovery (%) | 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 | Internal ref.: ME-CA-IENVISFA-LAK-AN-007

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



Anions by IC

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

| Parameter | QC batch | Units | RL | Method | Dup | licate | LC | S/Spike Blank | | Matrix Spike / Ref. | | | | | | |
|--------------------------|---------------|-------|-------|--------|-----|--------------------------|-----|---------------|------|---------------------|-----|---------|---|-------------------|--------|---|
| | Reference | | | Blank | RPD | AC Spike (%) Recovery | | AC (%) | | | | Recover | • | Spike Recovery | Recove | - |
| | | | | | | (70) | (%) | 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 | Units | RL | Method | Dup | licate | LC | S/Spike Blank | | M | atrix Spike / Re | f. |
|--------------------------|---------------|-------|----|--------|-----|--------|-----------------|---------------|------------------|-------------------|------------------|------------------|
| | Reference | | | Blank | RPD | AC | Spike | | ery Limits %) | Spike Recovery | | ory Limits %) |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| Dissolved Organic Carbon | SKA0272-MAY23 | mg/L | 1 | <1 | 3 | 10 | 99 | 90 | 110 | 101 | 75 | 125 |



Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-002

| Parameter | QC batch | Units | RL | Method | Dup | olicate | LC | S/Spike Blank | | M | latrix Spike / Ref | : |
|-----------|---------------|-------|----|--------|-----|---------|-----------------|---------------|-----------------|-------------------|--------------------|-----------------|
| | Reference | | | Blank | RPD | AC | Spike | | ry Limits %) | Spike Recovery | Recove | ry Limits 6) |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| Colour | EWL0554-MAY23 | TCU | 3 | < 3 | ND | 10 | 105 | 80 | 120 | NA | | |

Conductivity

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

| Parameter | QC batch | Units | RL | Method | Dup | olicate | LC | S/Spike Blank | | M | atrix Spike / Re | f. |
|--------------|---------------|-------|----|--------|-----|---------|-----------------|---------------|------------------|-------------------|------------------|------------------|
| | Reference | | | Blank | RPD | AC | Spike | | ery Limits %) | Spike Recovery | | ery Limits %) |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| Conductivity | EWL0542-MAY23 | uS/cm | 2 | < 2 | 2 | 20 | 99 | 90 | 110 | NA | | |



Metals in aqueous samples - ICP-MS

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

| Parameter | QC batch | Units | RL | Method | Dup | licate | LC | S/Spike Blank | | M | atrix Spike / Rei | |
|-----------|---------------|-------|-------|---------|-----|-----------|-------------------|---------------|------|-------------------|-------------------|-----------------|
| | Reference | | | Blank | RPD | AC (%) | Spike Recovery | Recover (۹ | - | Spike Recovery | Recove | ry Limits %) |
| | | | | | | (70) | (%) | 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 | Units | RL | Method | Dupl | icate | LC | S/Spike Blank | | M | atrix Spike / Ref. | · |
|---------------------------|---------------|-----------|----|----------|---------|-------|-----------------|---------------|------|-------------------|--------------------|------|
| | Reference | | | Blank | RPD | AC | Spike | Recove (% | - | Spike Recovery | Recover | - |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| Total Coliform Background | BAC9354-MAY23 | cfu/100mL | - | ACCEPTED | ACCEPTE | | | | | | | |
| | | | | | D | | | | | | | |
| E. Coli | BAC9354-MAY23 | cfu/100mL | - | ACCEPTED | ACCEPTE | | | | | | | |
| | | | | | D | | | | | | | |
| Fecal Coliform | BAC9354-MAY23 | cfu/100mL | - | ACCEPTED | ACCEPTE | | | | | | | |
| | | | | | D | | | | | | | |
| Total Coliform | BAC9354-MAY23 | cfu/100mL | - | ACCEPTED | ACCEPTE | | | | | | | |
| | | | | | D | | | | | | | |



pН

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

| Parameter | QC batch | Units | RL | Method | Dup | licate | LC | S/Spike Blank | | M | atrix Spike / Ref | |
|-----------|---------------|---------|----|--------|-----|--------|-----------------|---------------|-------------------|-------------------|-------------------|-----------------|
| | Reference | | | Blank | RPD | AC | Spike | | ery Limits (%) | Spike Recovery | Recover (% | ry Limits 6) |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| рН | EWL0542-MAY23 | No unit | 5 | NA | 0 | | 100 | | | NA | | |

Solids Analysis

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

| Parameter | QC batch | Units | RL | Method | Dup | licate | LC | S/Spike Blank | | M | latrix Spike / Ref | |
|------------------------|---------------|-------|----|--------|-----|--------|-----------------|---------------|-----------------|-------------------|--------------------|------|
| | Reference | | | Blank | RPD | AC | Spike | Recove (۹ | ry Limits %) | Spike Recovery | Recover | - |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | 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 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

| Parameter | QC batch | Units | RL | Method | Dup | olicate | LC | S/Spike Blank | | м | atrix Spike / Ref | |
|-----------|---------------|-------|------|--------|-----|---------|-----------------|---------------|-----------|-------------------|-------------------|------|
| | Reference | | | Blank | RPD | AC | Spike | Recove | ry Limits | Spike Recovery | Recover (% | • |
| | | | | | | (%) | Recovery (%) | Low | High | (%) | Low | High |
| Turbidity | EWL0508-MAY23 | NTU | 0.10 | < 0.10 | ND | 10 | 99 | 90 | 110 | NA | | |



FINAL REPORT

QC SUMMARY

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

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

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL. Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.

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

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

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

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This report supersedes all previous versions.

-- End of Analytical Report --

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|---|--|--|---|------------------------------|---|--|---|--------------------------------------|--------------------------------|-------------------|----------------------------|-------------------------------|--------------------------------|--|-----------------------------|-----------------------------|---|
| Industries & Environment - Lakelield: 185 Concession St., Laketield, 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: 877-648-8060 Fax: 519-672-0361 | keiteid: 185 Concession St., Lakeiteid, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environmi - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 | sion St., Lakefie sortium Court, | eld, ON K0L 21 London, ON, 1 | 10 Phone: 70 16E 2S8 Phor | e: 519-672-450 | 705-652-63 0 Toll Free: | 65 Web: www 877-848-8060 | .sgs.com/e Fax: 519-6 | invironmer 372-0361 | | | | | | | | Page of |
| Received By Katelyn Medla. J | 2011年7月1日日本 | Received Bv (signature). | (signature). | Labo | Laboratory Information Section - Lab use only | mation Se | ection - La | b use or | ۲۲ | | | | | | | | |
| Received Date: $05/19/23$ (mm/dd/yy) Received Time: $10:00$ (hr: min) | (65) | Custody Seal Present Custody Seal Intact: | Custody Seal Present: Yes Custody Seal Intact: Yes | 20 | | Cooling Age Temperatur | Cooling Agent Present: Yes No | Ves C | - <u>v</u> | Type: 1 | Ce la | | | 2 | B LIMS #: | CAL | LAB LIMS #: CA 15208- May 23 |
| REPORT INFORMATION | 4 | INVOICE INFORMATION | RMATION | | | | | | | | | | | | | | |
| Company. EXP Services | (same as Report Information) | Report Informs | ation) | | Quotation #: | | 2023 | 584 | 10.30 | | | P.(| P.O.#: | | | | |
| Contact: Jamie Bitten | Company: | | | | Project #: | Sub | - 2207 | 224220 | 3-20 | Q | | Sit | Site Location/ID | | | | |
| Address: 885 Regent Street | Contact: | | | | | | | | - | URNARC | UND TIM | IE (TAT) | TURNAROUND TIME (TAT) REQUIRED | | | | |
| - 23 | Address: | | | | A. | Regular TAT (5-7days) | (5-7days) | | | | | TAT's Samp | are quoted i es received | n business da after 6pm or | ays (exclu on weekel | de statutory nds: TAT be | TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day |
| Phone: (ANT 409 (w (py | | | | | RUSH TAT (Additional Charges May Apply): | Additiona | I Charges N | lay Apply | ;(| 1 Day | / 21 | 2 Days |] 3 Days | 4 Days | | | |
| Fax: | Phone: | | | | PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION | NFIRM RU | JSH FEASIE | ILLY WI | TH SGS | REPRESE | INTATIV | E PRIOR | TO SUBM | SSION | | | |
| Email: Very is by then Derro. Corre | Email: | | | | Specify Due Date: | Date: | | | ON* | TE: DRIN | KING (PO | TABLE) W. WITH SO | TER SAMP S DRINKIN | ABLE) WATER SAMPLES FOR HUMAN CONSUMPTIO WITH SGS DRINKING WATER CHAIN OF CUSTODY | HAIN OF | NSUMPTIO | •NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY |
| 1923 | REGULATIONS | | | | | | | A | VALYS | ANALYSIS REQUESTE | QUES | TED | | | | | |
| O.Reg 153/04 | Other Regulations: | ations: | Sewe | Sewer Bv-Law: | M | <u>& </u> | SVOC | PCB | PHC | VOC | Pest | | Cher (please specify) | e specify) | SPL | SPLP TCLP | |
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| Appx. | MISA | | | and and a start | ios-A | CrVI | | Aroc | | 1 | | 0 | | <u>Pkc</u> | Metals | Is DMRI | |
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| RECORD OF SITE CONDITION (RSC) | VES | ON | | | gar | etino lia Vino lia V se V | ʻ\\'0'U | | | | y othe | 0 | mal | | oəpuə | | COMMENT O. |
| SAMPLE IDENTIFICATION | DATE SAMPLED | TIME | # OF BOTTLES | MATRIX | ield Filtered (letals & Inor scvv, cw,Hg pH.(B(H, | JZ ZIGIA UN Se-2WH)8 suig slatem 5 Ino 2153 AU | Co,Cu,Pb,Mo,Ni,Se,Ag, AHs only VOCS | LetoT 283 | 1-F4 + BTEX | TEX only OCS | seticides | 512'E | 2 paras | ater Character ecity pkg: IH S F VH 9 | | B(a)P D(a)P DABN | |
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| Observations/Comments/Special Instructions | | | | | | | | | | | | | | | - | | |
| Sampled By (NAME): 1 C + JN | | | Signature: | 11 | h | | | | | Date: | e: 05 | 117 | 1 23 | (wm/dd/yy) | (yy) | | Pink Copy - Client |
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| Revision #1.6 Note: Submission of samples to SGS is acknowledgement that you have been provided direction mample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is acknowledgement that you have been provided direction acknowledgement is assumption of work. Signatures may appear on this form or be accessible at the contract, or in an alternative format for attemptions of Service accessible at the accessible upon request. This document is issued by the Commany under Its General Conditions of Service accessible at the contract. | S is acknowledgement the format (e.g. shippir | hat you have been ng documents). {3 | I provided direction } Results may be | on on sample c | o an unlimited num | ind transportat | ion of samples. ses for no additi | {2} Submission onal cost. Faraget | on of sample ax is availabl | es to SGS is | considered est. This do | authorizatior cument is is | for completio | of work. Sign | latures may ts General (| appear on th | s form or be retained on file in Service accessible at |
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