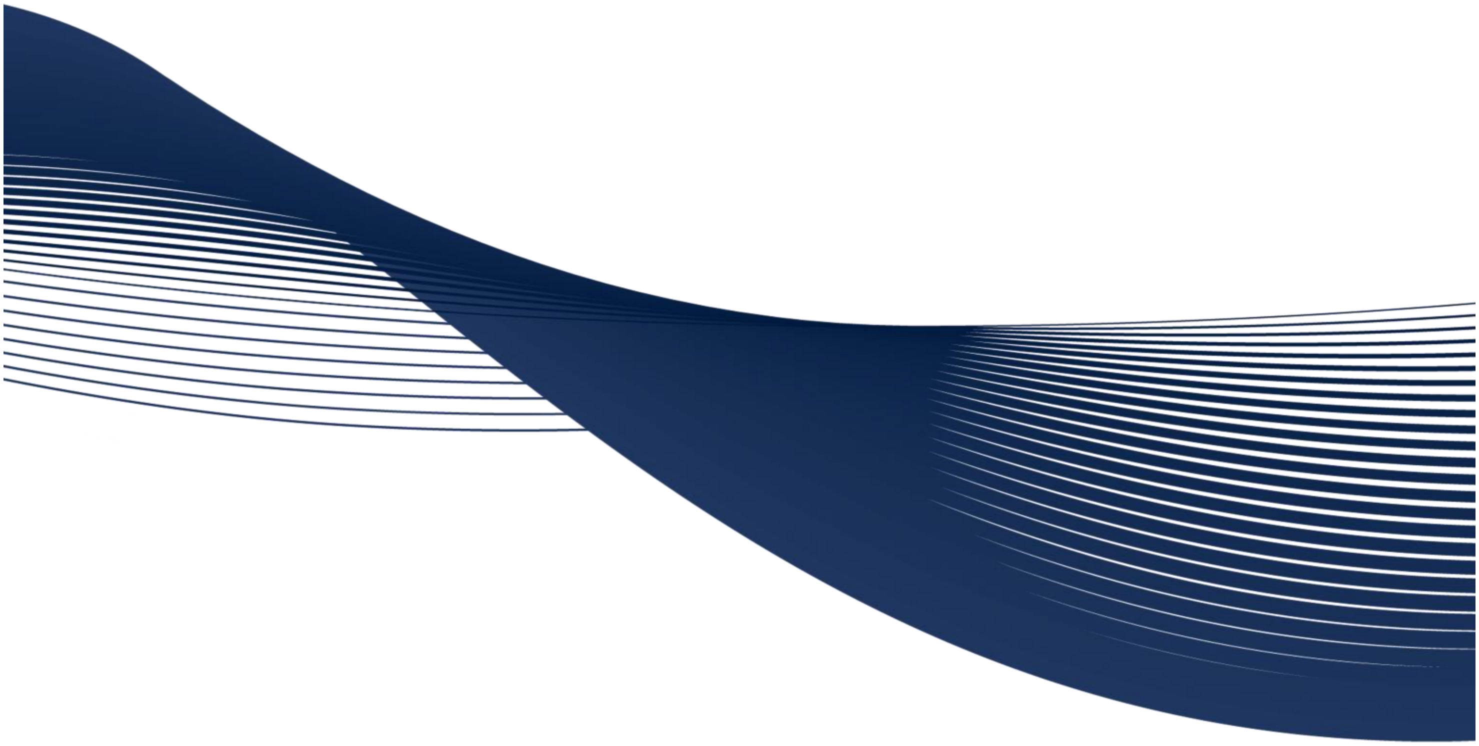
# MANORS OF BELFOUNTAIN CORP

## HYDROGEOLOGICAL INVESTIGATION REPORT

Manors of Belfountain, Caledon, ON

COLE Reference No. 2017-0646



FEBRUARY 2018

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February 13, 2018
Reference No. 2017-0646

Manors of Belfountain Corp
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**Attention:** **John Spina**

**Re:** **Manors of Belfountain, Caledon, ON**
**Hydrogeological Investigation Report**

Dear Mr. Spina,

Cole Engineering Group Ltd. (COLE) is pleased to submit the enclosed hydrogeological investigation report for the development Lot 9, Concession 5 in Caledon, ON. The investigation includes a review of existing hydrogeological information for the study area, characterization of the geological and hydrogeological setting, an assessment of potential impacts due to development, and potential mitigation measures. The findings of our study are summarized in the following report.

Should you have any questions or comments, please do not hesitate to contact the undersigned.

Best Regards,
**COLE ENGINEERING GROUP LTD.**

Steve Davies, M.Sc., P.Geo.
Senior Hydrogeologist

/th/cc

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**Issues and Revisions Registry**

| Identification | Date | Description of issued and/or revision |
|---|---|---|
| Draft Report | December 22, 2017 | For client review |
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| Final Report | February 13, 2018 | |
| | | |
| | | |

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# Executive Summary

Cole Engineering Group Ltd. (COLE) was retained by Manors of Belfountain Corporation (Manors of Belfountain) to undertake a hydrogeological study at part of Lot 9, Concession 5 in Caledon, ON (the “Site”). The Site is approximately 70.28 hectares (ha) in area and is currently used for agricultural purposes. It is generally bounded by Bush Street to the north, Shaws Creek Road to the west, Mississauga Road to the east, and vacant lands to the south. The Belfountain Public School and several existing residential properties are located northwest of the Site. The Site is located within the jurisdiction of the Credit Valley Conservation Authority and partially within a regulated area. Based on the Draft Plan of Subdivision 21T-91015C dated December 5, 2017, prepared by Glen Schnarr & Associates Inc., the development will include 67 rural estate lots with an average lot size of 0.63 ha. Water supply will be provided by private wells and waste water servicing will be provided by individual septic systems with tertiary (Level IV) treatment. The stormwater management plan for the Site will rely on retention and infiltration to closely match existing conditions.

Previous Site investigations date back to 1988 and include work done by Terraprobe, W.B. Beatty & Associates Limited, and R.J. Burnside. These investigations include drilling of monitoring wells, pumping tests, a water supply and wastewater servicing review, groundwater level monitoring and sampling, infiltration tests, and a well survey of nearby properties. Since October 2017, COLE conducted a hydrogeological investigation consisting of groundwater level measurements, groundwater sampling, water balance analysis, nitrate loading assessment, and the assessment of water taking rates and analysis of pumping tests.

The Site is located within the West Credit River Subwatershed and is considered to be within the Horseshoe Moraine physiographic region due to the sand content and hummocky nature of the topography. Geology at the Site consists of approximately 10 meters (m) to 20 m of sandy overburden overlying the Guelph / Amabel dolostone aquifer, which overlies the Cabot Head shale aquitard. Hydraulic conductivity estimates of the dolostone bedrock aquifer range from $4.7 \times 10^{-6}$ m/s to $2.9 \times 10^{-4}$ m/s with an average of $3.6 \times 10^{-5}$ m/s. Based on testing completed at the Site by R.J. Burnside, infiltration rates for the overburden range from 29 mm/hr to 420 mm/hr with an average of approximately 152 mm/hr.

Water levels measured in October 2017 indicate that groundwater across the Site is typically 10 to 20 m below ground surface (mbgs) with the exception of the on-Site wetland features (SWT3-2 and MAS3-1) where groundwater is typically between 0 to 1 mbgs. Seasonal groundwater fluctuations across the Site are typically not greater than 3 m, with decreasing water levels in the summer and fall months. In general, groundwater elevations are higher in the south and groundwater movement is approximately south to north across the Site.

Groundwater discharge is expected to occur at the West Credit River and the off-Site wetland features (SWM1-1 and MAM3-1). However, no on-Site water courses or wetland features (SWT3-2 and MAS3-1) were interpreted to receive groundwater discharge.

A pre-development Site water balance analysis was completed and results indicate that infiltration comprises approximately 32% of the total precipitation across the Site, runoff comprises approximately 9% of total precipitation, and evapotranspiration comprises more than half (59%) of total precipitation. The water balance analysis shows a significant amount of infiltration, which is to be expected due to the closed depressions within the hummocky topography and sandy overburden materials. It is understood that infiltration measures will be utilized to maintain pre-development infiltration on-Site in post-development conditions, with essentially no runoff leaving the Site up to the 100 year storm capacity.

Groundwater quality analysis was conducted at twelve (12) on-Site wells and results indicate no exceedances of health-related Ontario Drinking Water Standards (ODWS), while there were some exceedances in total hardness, total dissolved solids, sulphate, turbidity, and iron. These parameters, with the exception of hardness, are considered aesthetic parameters that affect the taste, odour or colour of water but do not directly affect the safety of the water supply. Water hardness at the Site and aesthetic parameters can be controlled with water treatment systems for each property.

Nitrate concentrations in groundwater at the Site meet the ODWS of 10 mg/L. Nitrate concentrations generally increase from south to north across the Site, with the existing nitrate concentrations likely due to agricultural activities both on and off-Site. Development of the Site will result in a reduction of the agricultural areas suspected of contributing to the on-Site nitrate concentrations by approximately 67%. Thus, development of the Site is expected to lead to a long-term decrease in nitrate concentrations.

A nitrate loading analysis was completed in compliance with MOECC Procedure D-5-4 in order to evaluate the potential impact of the individual on-Site septic systems. Results indicate that a nitrate loading concentration of approximately 2.17 mg/L is expected at the Site boundary. This concentration is lower than the CCME guideline for $NO_3$-as-N of 3 mg/L for protection of sensitive surface water habitat, which has also been adopted by CVC. As on-Site wetland features (SWT3-2 and MAS3-1) are essentially at the Site boundary, and any groundwater seepage locations appear to be beyond the Site boundary, the CCME / CVC guideline is therefore met at all downgradient natural features that may receive even minimal groundwater discharge.

Although existing on-Site nitrate concentrations in groundwater are consistently below the ODWS, as a precautionary approach it is recommended that supply wells should not be installed in the northernmost portion of the Site where the highest on-Site nitrate concentration were identified. It is therefore recommended that supply wells not be placed north of an identified line of higher nitrate concentrations (i.e., > 7 mg/L) and that any wells be located a minimum of 7 m south (upgradient) of this line, based on a zone of contribution analysis. Review of the Draft Plan for the Site confirms that there is sufficient room to locate supply wells on every lot in compliance with this recommendation.

Pumping tests to assess the supply of groundwater available at the Site were completed at the Site by R.J. Burnside and are considered to demonstrate water supply compliance with MOECC Procedure D-5-5. Water supply analysis based on the pumping test results indicate that all tested wells can sustainably support continuous pumping at the expected average pumping rate of 1.56 L/min/house for a duration of 50 years. In addition, a more conservative analysis indicates that most tested wells can sustainably support continuous pumping at the peak pumping rate of 18.75 L/min/house for a duration of 50 years. The total water takings expected at the Site, based on an average pumping rate of 1.56 L/min/house and 67 houses, is 150,750 L/day, which is a small portion of the estimated recharge across the Site (549,474 L/day).

Based on the estimated long term average pumping rate of 1.56 L/min/house and the effect of recharge on groundwater quantity, the expected radius of influence for each well is estimated to be approximately 30 m (or 0.27 ha in area). As the average lot size is approximately 0.63 ha in area, minimal supply interference is expected between lots.

On-Site wells be placed a minimum of 30 m apart. Since the radius of influence of each well is expected to be 30 m, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible.

Potential long-term impacts to the closest groundwater users are expected to be minimal as nitrate loading at the Site boundary is low, the radius of influence of individual supply wells is not expected to extend beyond the Site, and total water takings are small compared to total input of horizontal groundwater flux and recharge at the Site.

Potential long-term impacts to natural features are also expected to be minimal as on-Site features do not rely on groundwater contributions. For off-Site features that do rely on groundwater contributions, impacts are also expected to be minimal as total nitrate loadings at the property boundary are expected to be lower than the CCME and CVC guideline for $NO_3$-as-N of 3 mg/L, infiltration is expected to be maintained post-development, and total groundwater taking on-Site are small. Therefore, feature based water balance analysis for on-Site and off-Site wetland features is not recommended.

Based on the results of the various groundwater investigations completed at the Site and the review of groundwater receptors and potential impacts from development of the Site from changes to groundwater quality and quantity, there does not appear to be a significant potential for impacts to groundwater users or natural features from the proposed development of the Site. This assessment assumes that mitigation measures, such as maintain infiltration and implementation of tertiary (Level IV) septic systems will be implemented across the proposed development.

# 1 Introduction

Cole Engineering Group Ltd. (COLE) was retained by Manors of Belfountain Corporation (Manors of Belfountain) to undertake a hydrogeological study at part of Lot 9, Concession 5 in Caledon, ON (the "Site"). The Site is located near the intersection of Bush Street and Mississauga Road in Caledon, Ontario. The location of the Site is shown on **Figure 1**.

## 1.1 Project Description

The Site is approximately 70.28 hectares (ha) in area and is currently used for agricultural purposes. It is approximately bounded by Bush Street to the north, Shaws Creek Road to the west, Mississauga Road to the east, and vacant lands to the south. Belfountain Public School and several existing residential properties are located northwest of the Site. The Site is located within the jurisdiction of the Credit Valley Conservation (CVC) and partially within a regulated area. Based on the Draft Plan of Subdivision 21T-91015C dated December 5, 2017, prepared by Glen Schnarr & Associates Inc., the proposed development will include 67 rural estate lots with an average lot size of 0.63 ha. Water supply will be provided by private wells and waste water servicing will be provided by individual septic systems with tertiary (Level IV) treatment. The stormwater management plan for the Site will rely on retention and infiltration to closely match existing conditions. Site servicing is described in detail in the functional servicing report prepared by COLE and submitted under separate cover.

The Draft Plan of Subdivision is included as **Appendix A**.

## 1.2 Objectives

The objectives of this hydrogeological investigation are:

- Characterize the existing geological and hydrogeological setting;
- Identify environmentally sensitive features and groundwater receptors on or near the Site;
- Estimate the water balance parameters for the Site, particularly groundwater recharge;
- Estimate the potential water supply demand for the development and assess the results of pumping tests completed at on-Site test wells;
- Review groundwater quality results for the Site and compare to Ontario Drinking Water Quality Standards;
- Estimate the potential nitrate loading to the groundwater system from the private septic systems;
- Assess the potential impacts to the natural environment and other groundwater users as a result of the development, including the planned private wells and septic systems; and
- Provide recommendations on management and mitigation measures.

## 1.3 Applicable Regulations and Agencies

Environmental regulations and policies that may be relevant for this hydrogeological investigation are briefly discussed below.

### Provincial Policy Statement (2014)

The Provincial Policy Statement provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and water resources. According to the Provincial Policy Statement, development and Site alteration shall not be permitted in:

- Significant habitat of endangered species or threatened species;
- Significant wetlands within specific Ecoregions (as per schedule in the Provincial Policy Statement);
- Significant coastal wetlands (as per schedule in the Provincial Policy Statement);
- Significant woodlands and valleylands within specific Ecoregions (as per schedule in the Provincial Policy Statement);
- Significant areas of natural and scientific interest;
- Within or near sensitive surface water and sensitive groundwater features; and
- Fish habitat except in accordance with provincial and federal requirements.

Similarly, for lands adjacent to the natural heritage features as defined above, it needs to be demonstrated that the development will not result in negative impacts on natural features or ecological functions. Typically, significant natural features are identified through an Environmental Impact Study (EIS) and significant wetlands are identified by the Ministry of Natural Resources and Forestry (MNRF). Endangered or threatened species habitat is identified through ecological studies, such as an EIS, and regulated by the MNRF. Fish habitat is under the jurisdiction of Fisheries and Oceans Canada (DFO) with support from Conservation Authorities. Identification and regulation of woodlands, valleylands, Areas of Natural and Scientific Interest (ANSI), and wildlife habitats are typically the responsibility of the municipality or other planning authority.

Restrictions to development and alterations should be implemented to protect all municipal drinking water supplies and designated vulnerable areas. Development and alterations are to be restricted in or near sensitive surface water features and sensitive groundwater features such that their hydrologic function will be protected, restored, or improved.

### Niagara Escarpment Plan (2017)

The Niagara Escarpment Plan (NEP), last amended in 2017, seeks to protect the geologic feature of the Niagara Escarpment and lands within the vicinity by allowing only developments compatible with the natural environment. The objectives of the NEP are:

- To protect unique ecologic and historic areas;
- To maintain and enhance the quality and character of natural streams and water supplies;
- To provide adequate opportunities for outdoor recreation;
- To maintain and enhance the open landscape character of the Niagara Escarpment in so far as possible, by such means as compatible farming or forestry and by preserving the natural scenery;
- To ensure that all new development is compatible with the purpose of the Plan;
- To provide for adequate public access to the Niagara Escarpment; and
- To support municipalities within the Niagara Escarpment Plan Area in their exercise of the planning functions conferred upon them by the Planning Act.

Based on the NEP, the Site is located within the Minor Urban centre of Belfountain and is designated “Escarpment Rural Area”, “Escarpment Protection Area” and “Escarpment Natural Area”.

### Region of Peel Official Plan (2016)

The Region of Peel Official Plan is a public document that outlines the long-term policy framework for decision making related to protection of the environment, management of resources, directing growth and sets the basis for providing Regional services. The Region of Peel recognizes the importance of preserving and protecting natural environment and ecosystems. The Site is within the Region's "Rural System" and the northeastern portion is within the Core Areas of the Greenlands System.

### Town of Caledon Official Plan (2016)

The Town of Caledon Official Plan is a document that outlines the principles, goals, objectives, and policies intended to guide future land use, physical development, effects on the social, economic, and natural environment within the Town of Caledon. It was initially adopted in 1979 but has been consolidated in 2016. According to the Town of Caledon Official Plan, the Site is situated within the settlement area (Hamlet) of Belfountain.

### Permit to Take Water – Section 34 of the Ontario Water Resources Act (1990)

Based on recent regulatory changes, a Permit to Take Water (PTTW) is required under Section 34 of the Ontario Water Resources Act (OWRA) for water takings greater than 50,000 L/day, and for construction water takings greater than 400,000 L/day. Construction water takings between 50,000 L/day and 400,000 L/day require registration on the Environmental Activity and Sector Registry (EASR). Water taking permit applications are not anticipated for either construction dewatering or for water supply purposes.

### Credit Valley Conservation Authority (O.Reg. 160/06)

Under Section 28 of the Conservation Authorities Act, the local Conservation Authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. CVC, through its regulatory mandate, is responsible for issuing permits under O.Reg. 160/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development applications or Site alteration works within regulated areas.

### The Endangered Species Act – Ministry of Natural Resources and Forestry

The MNRF has jurisdiction to administer the Endangered Species Act (2007) to protect species at risk (SAR) and their habitat. Where works may occur in or near a protected habitat, SAR are on or near the Site, and/or the works may harm / harass the species or damage / destroy the protected habitat, a confirmation of notice of activity, a permit or a Letter of Authorization or Advice will be required.

### The Clean Water Act, 2006 – Ontario Ministry of the Environment and Climate Change

The Ministry of the Environment and Climate Change (MOECC) mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs. Based on mapping completed by the CVC, the Site appears to border a WHPA-E of Peel Region's Inglewood Well 2.

# 2 Regional Geological and Hydrogeological Understanding

A conceptual understanding of the geological and hydrogeological system was developed through review of existing reports and available geological information. This included:

- Chapman, L.J. and Putnam, D.F. (1984) The Physiography of Southern Ontario, 3rd Edition. Ontario Geologic Survey, Special Volume 2, 270 p.;
- Cowan, W.R. (1976) Quaternary Geology of the Orangeville Area Southern Ontario. Ontario Division of Mines, Report 141, 98 p.;
- Credit Valley Conservation (1998) West Credit Subwatershed Study: Characterization Report.
- Davies, S. and Holysh, S. (2007) Groundwater Resources Study of the Credit River Watershed. Ontario Geological Survey; and,
- AquaResources Inc. (2009) Integrated Water Budget Report – Tier 2: Credit Valley Source Protection Area. Credit Valley Conservation Authority.

## 2.1 Topography and Drainage

The Site lies within the West Credit River Subwatershed under the jurisdiction of the CVC. The West Credit River drains into the main branch of the Credit River east of Belfountain, below the Niagara Escarpment at the Forks of the Credit. The West Credit Subwatershed is an important groundwater recharge area due to the local presence of coarse-grained soils and hummocky topography. Significant groundwater discharge occurs along the West Credit River and, as a result, it is mapped as coldwater fish habitat. The West Credit Subwatershed includes the Town of Erin, the Town of Caledon, and the community of Belfountain.

Topography of the West Credit River Subwatershed varies from between approximately 375 m above sea level (masl) to approximately 475 masl. Topography within this area reflects glacial processes that deposited landforms such as streamlined hills (drumlins), topographic ridges (moraines), and high-relief hummocky topography with closed depressions. As noted above, recharge within the subwatershed is relatively high, due to extensive high permeable sediments, and is amplified in areas with hummocky topography compared to areas covered by relatively flat till plains.

Regional topography is shown on **Figure 2**.

## 2.2 Physiography

Several physiographic regions have been mapped (Chapman and Putnam, 1984) within the West Credit River Subwatershed as follows:

- Niagara Escarpment;
- Horseshoe Moraine;
- Guelph Drumlin Field; and,
- Hillsburgh Sandhills (Orangeville Moraine)

The majority of the subwatershed is comprised of the Guelph Drumlin Field and the Horseshoe Moraines regions.

A summary of each physiographic region is provided below.

**Niagara Escarpment:** The Niagara Escarpment is a major topographic change in the bedrock of Southern Ontario that results from differential weathering of the underlying dolostone and shale. Bedrock only outcrops within the West Credit River Subwatershed at the Niagara Escarpment and within river valleys.

The vast majority of the subwatershed is above the Escarpment where ground surface elevations are higher.

**Horseshoe Moraine:** The Horseshoe moraine includes the Paris, Galt, and Singhampton moraines and is described as a kame moraine deposited by ice-contact processes.

Within the subwatershed, the Paris Moraine is the dominant moraine feature and occurs in the southern portion of the study area. The Horseshoe moraine is considered a hummocky deposit primarily composed of sand to sandy silt till that is commonly referred to as the Wentworth Till. The sandy silt till results in lower infiltration rates that may be increased by the hummocky topography and closed depressions of the moraine. Sandy interbeds may be found within the Horseshoe moraine and where present may also increase permeability.

**Guelph Drumlin Field:** The drumlins of the Guelph drumlin field are typically composed of sandy silt till commonly referred to as the Port Stanley Till. The sandy silt till results in lower infiltration rates and do not likely contain sand and gravel interbeds. Between the streamlined drumlin hills are relatively flat meltwater channels composed of glaciofluvial sand and gravel that may extend to bedrock. Significant outwash deposits associated with the Caledon Meltwater channel occur in the subwatershed from the Niagara Escarpment west towards Erin.

**Hillsburgh Sandhills (Orangeville Moraine):** The Hillsburgh Sandhills / Orangeville Moraine are primarily ice contact sand and gravel. In addition to the sandy nature of this deposit, the high-relief and hummocky topography promotes increased recharge in the area. As a result, the Hillsburgh Sandhills are an important recharge area within the West Credit River Subwatershed.

Bedrock topography of the area is gently sloping towards the south / southwest and is relatively flat with local relief commonly ranging from 2 m to 6 m. An exception to the relatively flat bedrock topography is the existence of buried bedrock valleys and the steep change in elevation at the Niagara Escarpment. Specifically, within the West Credit River Subwatershed, there is a buried valley that follows the current West Credit River from Erin to Belfountain. In this location overburden materials are thicker and top of bedrock elevations are lower. In general, the bedrock surface represents a regional unconformity affected by erosion from glacial and fluvial processes.

A map of the regional physiography is shown on **Figure 3**.

## 2.3 Regional Geology and Hydrogeology

A conceptual understanding of the geological and hydrogeological system was developed through review of existing reports and available geological information primarily from work conducted by the Ontario Geological Survey (OGS) and reports completed for the CVC. From these resources, the West Credit River Subwatershed stratigraphy was interpreted to consist of the following units (youngest to oldest):

- Recent deposits (Overburden);
- Wentworth Till (Overburden);
- Glaciofluvial deposits / Orangeville Moraine (Overburden);
- Port Stanley Till (Overburden);
- Guelph Formation Dolostone (Bedrock);
- Amabel Formation Dolostone (a.k.a., Gasport Formation; Bedrock);
- Fossil Hill Formation Dolostone (Bedrock);
- Cabot Head Formation Shale (Bedrock);
- Manitoulin Formation Dolostone (Bedrock);

- Whirlpool Formation Sandstone (Bedrock); and,
- Queenston Formation Shale (Bedrock).

The following section provides a detailed summary of each overburden and bedrock unit.

### Overburden Units

**Recent Deposits:** The most recent deposits consist of a mixture of gravel, sand, silt, and clay that commonly occurs along streams. Recent deposits in the area also consist of organic deposits in areas with poor drainage.

**Wentworth Till:** The Wentworth Till is described predominantly as a sandy silt to silty sand till and displays variable thickness, with its thickest portion found within the Paris Moraine of the Horseshoe Moraine physiographic element. The sandy silt till results in lower infiltration rates that may be increased due to the hummocky topography and closed depressions common in the Horseshoe Moraine physiographic element.

**Glaciofluvial/Orangeville Moraine:** The glaciofluvial / Orangeville Moraine sediments are dominated by sand and gravel. Specifically, the Orangeville Moraine is considered an ice contact kame moraine dominated by sand and gravel sediments. The coarse sediments result in higher infiltration but may be locally absent between local till units.

**Port Stanley Till:** The Port Stanley till is a stoney sandy silt till with low plasticity that is commonly considered the basal till unit existing above bedrock. This till is texturally similar to the Wentworth Till although it may have a greater total carbonate content. Similar to the Wentworth Till, the sandy silt till of the Port Stanley Till results in lower infiltration rates and may act as a confining unit.

Overburden geology is shown on **Figure 4**.

### Bedrock Units

**Guelph Formation:** The Guelph Formation is a light brown crystalline dolostone similar to the Amabel Formation. This Formation acts as an aquifer, but is only found in the western parts of the Credit River Watershed and where found it is commonly thin and difficult to distinguish from the Amabel Formation.

**Amabel Formation (a.k.a. Gasport Formation):** The Amabel Formation is a light grey, crystalline dolostone with thick beds and abundant fossils and reefal structures. The Amabel Formation is regionally extensive and is considered a significant aquifer due to its high primary and secondary porosity, common fractures, and possible karstic features. Above the Niagara Escarpment the Amabel Formation is the primary surficial bedrock unit and is considered the cap rock of the escarpment.

**Fossil Hill Formation:** The Fossil Hill Formation of the Clinton group is a fossiliferous dolostone. This unit is commonly thin within the Credit River Watershed, with maximum thickness of approximately 3 m.

**Cabot Head Formation:** The Cabot Head Formation is described as a greenish grey and red silty shale that is considered a regional aquitard. This formation contains thin sandstone and limestone interbeds and abundant fossils (fossiliferous).

**Manitoulin Formation:** The Manitoulin Formation is a thin to medium bedded dolostone with abundant fossils and shale beds.

**Whirlpool Formation:** The Whirlpool Formation is a grey to reddish grey / brown fine grained quartzose sandstone.

**Queenston Formation:** The Queenston Formation consists of thin to thick beds of red shale and may contain interbeds of grey-green shale, limestone, or siltstone. Although the Queenston Formation is commonly considered an aquitard, when weathered its aquitard characteristics are diminished.

Bedrock geology is shown on **Figure 5**.

### 2.3.1 Groundwater Takings

In the upper Credit River Watershed, most municipal water supplies are sourced from groundwater and several municipal wells take significant amounts of water from the Guelph-Amabel regional bedrock aquifer, which also is the main aquifer underlying the Site.

The following tables summarize the details of the municipal supply wells in the upper Credit River Watershed, including the well depth below ground surface, permitted rate of water taking and average rate of water taking in 2016 as reported by the municipalities. The municipal groundwater takings indicate that the Guelph-Amabel bedrock aquifer is generally capable of supporting large groundwater takings for drinking water systems.

The closest municipal takings to this Site are the Erin municipal wells, which are approximately 4.3 Km away from the Site. The cumulative total of the Erin municipal takings were 768,031 L/day in 2016. **Table 2.1** to **Table 2.6** demonstrates that the Guelph-Amabel formations are regionally very transmissive aquifers.

**Table 2.1 Orangeville Groundwater Takings (Town of Orangeville, 2016)**

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| 2A | Guelph-Amabel | 38.7 | 1,309,000 | 435,156 |
| 5/5A | Overburden | 17.7 | 5,282,000 | 2,259,976 |
| 6 | Guelph-Amabel | 48.8 | 3,600,000 | 2,183,077 |
| 7 | Guelph-Amabel | 47.2 | 1,310,000 | 950,991 |
| 8C, 8C | Guelph-Amabel | 79.2<br>76.2 | 654,000 | 311,145 |
| 9A/9B | Guelph-Amabel | 17.4<br>17.4 | 878,000 | 679,890 |
| 10 | Overburden | 60.9 | 1,245,000 | 957,830 |
| 11 | Guelph-Amabel | 54.8 | 1,309,000 | 837,862 |
| 12 | Guelph-Amabel | 49.4 | 1,309,000 | 25,677 |

**Table 2.2 Mono Groundwater Takings (Town of Orangeville, 2017)**

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| MW-1 | Guelph-Amabel | 60 | 820,000 | 20,252 |

### Table 2.2 Mono Groundwater Takings (Town of Orangeville, 2017)

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| MW-3 | Guelph-Amabel | 55 | 1,571,000 | 322,158 |
| MW-4 | Guelph-Amabel | 36 | 751,000 | 21,238 |
| Island Lake TW1 | Overburden | 57.3 | 3,932,640 | 300,986 |
| Island Lake PW1 | Overburden | 58.8 | | |
| Island PW2-06 | Overburden | 50.3 | | |
| PW1 | Guelph-Amabel | 25.1 | 655,200 | 150,214 |
| PW2 | Guelph-Amabel | 25.1 | | |

### Table 2.3 Erin Groundwater Takings (Town of Erin, 2017)

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| E7 | Guelph-Amabel | 42 | 2,159,998 | 335,342 |
| E8 | Guelph-Amabel | 46 | 1,967,998 | 432,689 |

### Table 2.4 Hillsburgh Groundwater Takings (Town of Erin, 2017)

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| H2 | Guelph-Amabel | 88 | 454,000 | 76,149 |
| H3 | Guelph-Amabel | 58 | 682,000 | |

### Table 2.5 Caledon Village Groundwater Takings (Regional Municipality of Peel, 2015)

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| Caledon Village 3 | Overburden | 36.1 | 1,964,000 | - |
| Caledon Village 3B | Overburden | 34.7 | 1,309,000 | - |
| Caledon Village 4 | Overburden | 75.9 | 3,273,000 | - |

### Table 2.6 Alton Groundwater Takings (Regional Municipality of Peel, 2015)

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| Alton 3 | Guelph-Amabel | 22 | 1,047,398 | - |

**Table 2.6 Alton Groundwater Takings (Regional Municipality of Peel, 2015)**

| Supply Well | Screened Layer | Depth (mbgs) | Permitted Water Taking Rate (L/day) | 2016 Average Water Taking Rate (L/day) |
|---|---|---|---|---|
| Alton 4 | Guelph-Amabel | 25 | 1,047,398 | - |

### 2.4 Source Protection Plan Considerations

As per the Clean Water Act, delineation of Wellhead Protection Areas (WHPA), Significant Groundwater Recharge Areas (SGRA) and Highly Vulnerable Aquifers (HVA) must be completed for the protection of existing and future drinking water sources.

Based on the Credit Valley Source Protection Area Assessment Report, the Site is located within a SGRA and partially within a HVA. The Site also borders a WHPA-E of Peel Region's Inglewood Well 2. The WHPA-E is an area associated with wells that may be Groundwater Under Direct Influence (GUDI) of surface water.

The portion of the Site that borders the WHPA-E and is within the HVA is an open space feature that will continue to be open space post-development. Therefore, no influence or impact within the WHPA-E or HVA from development of the Site is anticipated. As discussed later in this report, groundwater recharge will be maintained post-development, which fulfills the requirement for development within a SGRA.

## 3 Natural Heritage

### 3.1 Water Courses

The West Credit River is managed as a cold-water fish habitat. In the main and middle tributaries, it is home to cold-water fish such as brook trout and brown trout. The lower portion of the West Credit River supports a migratory cold water fishery, including Chinook salmon, rainbow trout and brown trout (CVC, 2009). The cold-water habitat is supported by groundwater discharge, which supports baseflow. Baseflow within the West Credit River has been estimated to be approximately 330 L/s (Davies and Holysh 2007). By comparison, an assumed groundwater taking of approximately 1.7 L/s is expected at the Site (150,750 L/day) (~ 0.5% of the total baseflow of the West Credit River). There are no other watercourses that traverse the Site. There is an intermittent drainage feature that flows onto the Site from the property to the south, and the source of the flow is considered to be wetland drainage. The drainage feature was observed to be dry during COLE site visits in fall 2017, and it appears that any flow in this feature infiltrates into the overburden in a depression and provides recharge to the groundwater system.

### 3.2 Wetlands

The on-Site wetlands (SWT3-2 and MAS3-1), located in the northern area of the Site, are a diverse habitat consisting of at least two organic soil vegetation types; Cattail Marsh (MAS3-1) and Willow Thicket Swamp (SWT3-2) (Savanta 2018). The Cattail Marsh is classified as a shallow marsh with the tall herb layer formed of broad-leaved cattail, blue-joint grass and reed-canary grass, while the medium layer is dominated by beaked sedge. The marsh has been confirmed as a breeding habitat for the endangered Jefferson Salamander, and is dominated by Broad-leaved Cattail (*Typha latifolia*), Reed-canary Grass (*Phalaris arundinacea*) and Blue-joint Grass (*Calamagrostis canadensis; Savanta 2018*). The Willow Thicket Swamp occurs in shallow water on an almost floating organic mat. The willow is accompanied by red-osier dogwood and bitter nightshade. Beneath the canopy of shrubs grow tall grasses – blue joint and reed canary. The swamp is dominated by the locally rare (CVC) plant species Autumn Willow *(Salix serissima)*, and is accompanied by Red-Osier Dogwood (*Cornus sericea*) and Bitter Nightshade (*Solanum dulcamara; Savanta 2018*).

The off-Site wetlands (SWM1-1 and MAM3-1), located just north of the Site, consist of a White Cedar-Hardwood Mineral Mixed Treed Swamp (SWM1-1) and a Blue-Joint Organic Meadow Marsh (MAM3-1). The EIS determined that there is no significant amphibian breeding habitat on the Site or the off-Site wetlands (Savanta 2018).

The wetland locations identified above can be seen on **Figure 6**.

# 4 Site Investigations

## 4.1 Previous Investigations

The following are summaries of previous hydrogeological investigations at the Site conducted by other consultants.

### 4.1.1 Terraprobe

Terraprobe conducted a hydrogeological investigation at the Site between 1988 and 1989. There were a total of 30 boreholes completed with standpipes drilled to approximately three (3) mbgs and an additional nine (9) boreholes completed with standpipes ranging between 3.6 mbgs to 18.7 mbgs in 1989. A layer of fine sand to silt material was noted at depths of up to approximately 1.4 mbgs at locations 88-2, 88-4, 88-6, 88-7, 88-13, 88-14, 88-17 and 88-18. Outwash materials were encountered at depths of approximately 2.1 mbgs at the northeast portion of the Site in the vicinity of OW-1 and approximately 15 mbgs in the vicinity of OW-2 south of the Site. Glacial till extended from close to ground surface to the base of boreholes at 88-13, 88-21 to 88-30 and OW-2.

Aquifer performance tests were conducted during the hydrogeological investigation. In 1988, a step-drawdown test was conducted at PW-1 at rates of 1 gpm (0.08 L/s), 2.5 gpm (0.18 L/s) and 4 gpm (0.30 L/s). At PW-2, the pumping rates were set to 10 gpm (0.76 L/s), 20 gpm (1.52 L/s), 30 gpm (2.27 L/s) and 35 gpm (2.65 L/s). In 1989, a 24 hour pumping test was conducted at PW-3 at a rate of 25 gpm (1.89 L/s). Two pumping tests were performed at PW-4 at a rate of 1 gpm (0.08 L/s). Based on Terraprobe's report, the test results demonstrated that there is sufficient water supply for the proposed development at the Site.

Terraprobe conducted a private residential well survey at 63 residences in the Belfountain area in 1988 and contact was made with 13 residents. An additional private well survey was conducted by Terraprobe in 1989 at 81 residences and 31 responses were received. A third survey was conducted at select residences in 1990 in the Caledon Mountain Estates. Based on the findings from the private well surveys, Terraprobe identified that water supply from shallow dug wells had generally poor quality and quantity in contrast to drilled wells.

Based on the completed investigation, Terraprobe concluded that the proposed development of 73 lots (at that time) could be supported by groundwater supply and that conventional septic systems would be appropriate for the development. Terraprobe concluded that the development could proceed with minimal potential for impact to natural features or groundwater users.

### 4.1.2 W.B. Beatty & Associates

In June 2002, W.B. Beatty & Associates Limited (W.B. Beatty) conducted an assessment of water supply and wastewater servicing at the Site through a review of previously completed reports, including hydrogeological studies by Terraprobe from 1988 to 1992. W.B. Beatty commented that the sand and gravel aquifer and dolostone aquifer along the western boundary of the Site would be the most promising areas for water quantity and that water supply wells located within this area would also minimize potential interference with nearby wetlands and ponds. It was suggested that average day water supply demand could be met by a single well in the dolostone aquifer.

### 4.1.3 R.J. Burnside

Between June 2014 and June 2017, R.J. Burnside monitored groundwater elevations in 29 wells which included four (4) piezometers on-site and three (3) nearby residential wells. Groundwater samples were collected from monitoring wells TW1 to TW12 for water quality analysis and comparison to ODWS between December 2014 and May 2017.

R.J. Burnside completed five (5) infiltration tests at five (5) separate locations using a Turf-Tec Infiltrometer. The analyses from these infiltration tests are provided in **Section 5.4**.

Six (6) pumping tests were conducted between June 2014 and August 2014 and two (2) additional pumping tests were conducted between March 2016 and April 2016. The results are presented in **Section 5.4.** R.J. Burnside provided the data, analyses and drawings from their investigation to Manors of Belfountain for use by COLE.

### 4.1.4 Geotechnical Investigations

In June 2014, *exp* conducted a geotechnical investigation that involved drilling four (4) boreholes at the Site to depths ranging from 4.9 mbgs to 12 mbgs. From Boreholes 1 to 3, sand and gravel to sand and silt were found beneath a thin layer of ploughed material. A very dense sandy silt layer was encountered approximately 7 mbgs at Borehole 3 towards the southeast of the Site. It was suspected that the dolostone bedrock was found at approximately 3.2 mbgs at Borehole 4 located near the north boundary of the Site.

An additional seven (7) boreholes were drilled at the Site in August 2017 ranging from 4.6 mbgs to 8.2 mbgs. A topsoil layer approximately 20 cm to 50 cm in thickness was encountered during drilling at all boreholes. Below the layer of topsoil was a layer of reworked materials consisting of dark brown to brown silty sand mixed with trace clay to clayey, trace to some gravel, trace rootlets, and occasional boulder fragments at all boreholes from approximately 0.6 mbgs to 1.4 mbgs. Sand and gravel were encountered until termination at 8.2 mbgs.

## 4.2 COLE Investigations

Starting in October 2017, COLE conducted a hydrogeological investigation consisting of the following:

- Groundwater level measurements;
- Groundwater sampling;
- Review of existing geologic and hydrogeological information;
- Water balance analysis;
- Nitrate loading assessment; and
- Assessment of water taking rates and analysis of pumping test results.

Findings from the investigation are discussed further below. Boreholes, wells, and other monitoring locations shown on **Figure 6**. Monitoring wells used in the current hydrogeological investigation are outlined in **Table 4.1**. Borehole logs for monitoring wells are included as **Appendix B**.

**Table 4.1 Monitoring Well Details**

| Well ID | Easting | Northing | Ground Elevation (masl) | Consultant | Well Stick up (m) | Well Elevation Top of Pipe (masl) | Screen Material | Depth to Bottom (mbtop) | Depth to Bottom (masl) | Depth to Bedrock (mbtop) |
|---|---|---|---|---|---|---|---|---|---|---|
| TW1 | 579485 | 4848275 | 412.7 | R.J. Burnside | 1.1 | 413.8 | limestone and shale | 55 | 54 | 29 |
| TW1-09 | 579078 | 4848671 | 403.0 | Beatty | 0.69 | 403.7 | limestone | 35 | 34 | 22 |
| TW2 | 579799 | 4848770 | 402.1 | R.J. Burnside | 0.60 | 402.7 | limestone and shale | 21 | 20 | 12 |
| TW3 | 579615 | 4848765 | 402.3 | | 0.55 | 402.9 | limestone and shale | 37 | 36 | 19 |
| TW4 | 579633 | 4849059 | 404.5 | | 0.60 | 405.1 | limestone and shale | 26 | 36 | 17 |
| TW5 | 579982 | 4849204 | 405.1 | | 0.54 | 405.7 | limestone and shale | 33 | 32 | 13 |
| TW6 | 580018 | 4849204 | 405.9 | | 0.52 | 406.4 | limestone and shale | 32 | 31 | 13 |
| TW7 | 580089 | 4849093 | 405.0 | | 0.58 | 405.6 | limestone | 23 | 23 | 7.9 |
| TW8 | 579760 | 4849152 | 405.9 | | 0.66 | 406.5 | limestone and shale | 35 | 35 | 19 |
| TW9 | 579973 | 4848950 | 404.7 | | 0.59 | 405.3 | limestone and shale | 36 | 35 | 9.8 |
| TW10 | 579766 | 4848879 | 402.6 | | 0.80 | 403.4 | limestone | 31 | 30 | 15 |
| TW11 | 579655 | 4849078 | 406.1 | | 0.70 | 406.8 | limestone | 32 | 37 | 15 |
| TW12 | 579433 | 4848647 | 402.1 | | 0.73 | 402.9 | limestone and shale | 37 | 37 | 23 |

**Table 4.1 Monitoring Well Details**

| Well ID | Easting | Northing | Ground Elevation (masl) | Consultant | Well Stick up (m) | Well Elevation Top of Pipe (masl) | Screen Material | Depth to Bottom (mbtop) | Depth to Bottom (masl) | Depth to Bedrock (mbtop) |
|---|---|---|---|---|---|---|---|---|---|---|
| MW1-14D | 579813 | 4848758 | 400.6 | R.J. Burnside | 0.70 | 401.3 | clay and stones | 12 | 12 | N/A |
| MW1-14S | 579812.90 | 4848758.30 | 400.6 | | 0.70 | 401.3 | clay and stones | 8.2 | 7.5 | N/A |
| OW1 | 579792.70 | 4849322.10 | 390.0 | | 0.77 | 390.8 | dolostone | 5.9 | 5.1 | 2.1 |
| PW3 | 579257.58 | 4848934.12 | 401.3 | | 0.44 | 401.8 | dolostone and shale | 35 | 35 | 24 |
| PW4 | 579547.70 | 4849264.70 | 383.9 | | 1.2 | 385.1 | shale | 27 | 26 | - |
| PZ2-14 | 579557.10 | 4849228.50 | 389.5 | - | 0.87 | 390.3 | - | 1.7 | 0.80 | - |
| BH 105 | 579640.16 | 4849029.99 | 405.0 | exp | 0.85 | 405.8 | - | - | - | - |
| BH 107 | 579996.10 | 4849206.50 | 405.3 | exp | - | - | - | - | - | - |

Note:

- Indicates unavailable data

# 5 Local Geological and Hydrogeological Conditions

## 5.1 Topography and Physiography

Topography at the Site is predominantly hummocky with closed depressions allowing for increased groundwater recharge. The Site is considered to be primarily within the Horseshoe Moraine physiographic region due to the sand content and hummocky nature of the topography. Specifically, the Site is in close proximity to Paris Moraine sediments but overlies meltwater channel glaciofluvial sediments. In the north / northeast portion of the Site there is a steep slope towards the West Credit River that likely represents the proximity of the Niagara Escarpment physiographic region.

## 5.2 Geology

In order to characterize the hydrogeological setting on Site, COLE developed two geologic cross-sections. The cross-sections were developed based on Site logs for boreholes completed during previous hydrogeological studies. **Figure 7** presents a plan view of the Site and location of the cross-sections. **Figure 8** and **Figure 9** present a cross-section geological understanding of the Site.

**Table 5.1 Summary of Geologic Units at the Site**

| Formation | Geology | Material |
|---|---|---|
| Recent Deposits | Overburden | Mix of gravel, sand, silt and clay along streams and organic deposits in wetlands |
| Wentworth Till (aquitard) | Overburden | Sandy silt to silty sand till |
| Glaciofluvial / Orangeville Moraine (aquifer) | Overburden | Sand and gravel sediments |
| Port Stanley Till (aquitard) | Overburden | Stoney sandy silt till |
| Guelph Formation (aquifer) | Bedrock | Light brown crystalline dolostone |
| Amabel Formation (aquifer) | Bedrock | Light grey, crystalline, fossiliferous dolostone |
| Cabot Head Formation (aquitard) | Bedrock | Greenish grey and red silty shale |
| Manitoulin / Whirlpool Formation (confined aquifer) | Bedrock | Medium bedded dolostone with shaley interbeds; Grey to reddish quartzose sandstone |
| Queenston Formation (aquitard) | Bedrock | Red shale |

### 5.2.1 Overburden Geology

Recent deposits at the Site are primarily located within the wetlands to the north of the Site (SWT3-1 and MAS3-1). Based on borehole logs, the overburden materials within the Site are dominated by sand and gravel deposits interpreted to be glaciofluvial deposits. As a result of the prevalence of sand and gravel encountered at surface, it is interpreted that the Wentworth Till is limited in extent across the Site. The glaciofluvial sand and gravel deposits are sometimes found underlying the Wentworth Till, where the till is present.

Based on the regional stratigraphy, Port Stanley Till is expected to be the basal till occurring above bedrock at the Site. Although, based on borehole logs, a sandy silt till is not defined above bedrock across the entire Site, it is possible that the clay materials above bedrock and possibly some of the sandy silt / silty sand described above bedrock may be the Port Stanley Till.

### 5.2.2 Bedrock Geology

Based on borehole logs at the Site, bedrock is dominated by limestone and dolostone deposits. Although borehole logs do not differentiate the limestone and dolostone bedrock units, it is likely that they are primarily composed of the Guelph-Amabel Formation dolostone aquifer and possibly contain a thin unit of the Fossil Hill Formation.

Based on available OGS mapping, there is the potential for karst in the Belfountain area (Brunton and Dodge, 2008). Karst expressions at the surface may act as points of focused recharge. However, identifying Karst within the area is difficult as the significant overburden thickness reduces the ability to identify individual karst features. Focused recharge within thick overburden deposits may be a result of other features within the sediment, such as closed depressions, or a buried tile bed. Due to the relatively thick overburden at the Site, it will be difficult to confirm the presence of any potential karst features.

The limestone and dolostone deposits of the Guelph and Amabel Formations are underlain by shale interpreted to be the Cabot Head Formation, which acts as a regional aquitard. Borehole logs on Site do not extend deep enough to characterize the lower bedrock units and the presence / absence and thickness of the Manitoulin / Whirlpool and Queenston formations. However, off-Site boreholes and MOECC water well records indicate that the Cabot Head Formation shales are underlain by the Manitoulin / Whirlpool Formation Aquifer, followed by the Queenston Formation shale aquitard.

## 5.3 Hydraulic Conductivity

Six (6) different 6-hour pumping tests were conducted by R.J. Burnside in select wells (TW1 to TW6) in order to obtain an understanding of the in-situ hydraulic properties of the dolostone unit across the Site. Tests were conducted in late spring or summer month when generally drier conditions would be expected, including on June 11, 2014, July 8, 2014, July 15, 2014, August 26, 2014, and August 28, 2014.

For each test, a known pumping rate was used and drawdown and recovery were measured manually and/or with a data logger until a minimum of 95% recovery was achieved. Transmissivity estimates were subsequently obtained from the Cooper-Jacob non-equilibrium equation below.

$$T = \frac{0.183Q}{\Delta s}$$

Where,

$T$ transmissivity (m$^2$/day)
$Q$ pumping rate (m$^3$/day)
$\Delta s$ Slope of the time-drawdown graph expressed as a change in drawdown between any two times on the log scale whose ratio is 10 (one log cycle).

Hydraulic conductivity was then calculated using the equation below.

$$K = \frac{T}{b}$$

Where,

$K$ hydraulic conductivity (m/day)
$B$ thickness of saturated aquifer (m)

Distance-time curves used to estimate $\Delta s$ for the above equation are shown in **Appendix C. Table 5.2** summarizes the transmissivity and hydraulic conductivity estimates obtained by R.J. Burnside using the Cooper-Jacob method. Further discussion of the pumping test results are presented in **Section 6**.

**Table 5.2 Estimated Transmissivity and Hydraulic Conductivity**

| Well ID | Pumping Rate (L/min) | Aquifer Thickness (m) | Transmissivity ($m^2$/day) | Hydraulic Conductivity (m/s) |
|---|---|---|---|---|
| TW1 | 45 | 23.2 | 9.37 | $4.7 \times 10^{-6}$ |
| TW2 | 11.34 | 6.04 | 14.94 | $2.86 \times 10^{-5}$ |
| TW3 | 96.6 | 16.12 | 84.85 | $6.1 \times 10^{-5}$ |
| TW4 | 30.6 | 16.12 | 403.19 | $2.9 \times 10^{-4}$ |
| TW5 | 75.6 | 16.88 | 26.60 | $1.83 \times 10^{-5}$ |
| TW6 | 68.4 | 17.18 | 72.10 | $4.86 \times 10^{-5}$ |

## 5.4 Infiltration Rates

R.J. Burnside completed five (5) infiltration tests using a Turf-Tec Infiltrometer and two (2) infiltration tests were completed using test pits. The test results are summarized in the following table. The location of infiltration tests are shown on **Figure 6**.

Review of the infiltration test results by COLE indicates that the results seem reasonable and accurate with the exception of the some of the surface material descriptions. Surface materials at the Site are expected to be primarily sandy with some till. The higher infiltration rates seen in **Table 5.3** agree with the expected sandy sediments on Site. Raw data and graphs by R.J. Burnside are provided in **Appendix D**.

**Table 5.3 Infiltration Test Results**

| Location | Depth (m) | Materials | Stable Infiltration Rate (mm/hr) |
|---|---|---|---|
| IT1 | 0.33 | Silt, some sand, trace clay | 171 |
| IT2 | 0.32 | Sandy silt, firm, moist, trace clay, bobbles | 29 |
| IT4 | 0.36 | Silty clay, some sand, cobbles | 327 |
| IT5 | 0.33 | Clayey silt, till, soft, wet, some sand, cobbles, boulders | 90 |
| IP1 | 0.50 | Silt, dark brown, some sand, trace clay | 200 |
| IP2 | 0.50 | clay silt, soft with coarse gravel | 420 |

The infiltration rate values estimated by R.J. Burnside are generally quite high and reflect the high content of sand and gravel in the shallow deposits at the Site. As described in **Section 6**, the water balance for the Site indicates that groundwater recharge is generally high, reflecting the coarse grained soils and hummocky topography at the Site. As noted in the discussion of groundwater levels below, the overburden is largely unsaturated across most of the Site, which further enhances groundwater recharge.

## 5.5 Groundwater Levels

Historical groundwater level monitoring on Site was completed by R.J. Burnside between June 2014 and June 2017. COLE began monitoring in October 2017. Water levels from October 2017 for on-Site wells are provided in **Table 5.4** and hydrographs for wells historically monitored by R.J. Burnside are provided in **Appendix E**.

**Table 5.4 Groundwater Level Measurements (October 2017)**

| Well ID | Monitoring Point Elevation (masl) | Ground Elevation (masl) | Water Level (mbgs) | Water Level (masl) |
|---|---|---|---|---|
| **TW1** | 413.80 | 412.74 | 18.16 | 394.59 |
| **TW1-09** | 403.69 | 403.00 | 15.63 | 387.37 |
| **TW2** | 402.67 | 402.07 | 11.53 | 390.54 |
| **TW3** | 402.87 | 402.32 | 16.15 | 386.17 |
| **TW4** | 405.11 | 404.51 | 19.01 | 385.50 |
| **TW5** | 405.67 | 405.13 | 16.02 | 389.11 |
| **TW6** | 406.52 | 405.90 | 14.56 | 391.34 |
| **TW7** | 405.55 | 404.97 | 12.79 | 392.17 |
| **TW8** | 406.54 | 405.88 | 20.41 | 385.47 |
| **TW9** | 405.29 | 404.70 | 14.17 | 390.53 |
| **TW10** | 403.38 | 402.58 | 15.03 | 387.54 |
| **TW11** | 406.77 | 406.07 | 20.50 | 385.57 |
| **TW12** | 402.78 | 402.05 | 14.09 | 387.96 |
| **MW1-14S** | 401.33 | 400.63 | Dry | Dry |
| **MW1-14D** | 401.33 | 400.63 | 11.26 | 389.37 |
| **OW1** | 390.78 | 390.01 | Dry | Dry |
| **PW3** | 401.77 | 401.33 | 16.12 | 385.22 |
| **PZ2-14** | 390.33 | 389.46 | 0.83 | 388.60 |

Most wells on Site are screened within limestone and shale bedrock units (Amabel and Cabot Head Formations) and thus are considered to be representative of the bedrock groundwater flow system. A depth to groundwater map based on on-Site wells is illustrated on **Figure 10**.

Groundwater across the Site is typically 10 to 20 m below ground surface (mbgs). Near the on-Site wetland features (SWT3-2 and MAS3-1), groundwater is typically between 0 to 1 mbgs. Groundwater near the off-Site wetland features (SWM1-1 and MAM3-1) is also expected to be near ground surface; although, contours on **Figure 10** suggest that groundwater may be deeper near the off-Site wetland features. The deeper groundwater levels shown on **Figure 10** may be due to the lack of available data to constrain the contours in the vicinity of the off-Site wetland features.

In general, groundwater elevations mirrors the ground surface topography. Groundwater is typically found at greater depths in topographic highs and closer to surface in topographic lows. As a result, the depth to groundwater in the west of the Site generally decreases from south to north, with water levels closest to the surface near the wetlands in the North of the Site. In the east of the Site the depth to groundwater increases from south to north before decreasing again where elevation changes sharply.

Seasonal groundwater fluctuations are seen in the hydrographs (**Appendix E**) and indicate a general trend of decreasing water levels in the summer and fall and increasing water levels in the winter and spring. On average across the Site, seasonal water level changes are not greater than 3 m, with the exception of TW2 which seems to experience larger seasonal groundwater changes up to approximately 6 m.

## 5.6 Groundwater Flow and Hydraulic Gradients

Groundwater elevation contours based on on-Site wells and topographic elevations at the West Credit River can be seen on **Figure 11**.

Groundwater elevations on-Site range from approximately 385 masl to approximately 395 masl, with the water table found typically close to the bedrock / overburden interface. In general, groundwater elevations are higher in the south and lower in the north of the Site, mimicking the Site topography. Groundwater contours indicate horizontal groundwater flow within the bedrock is approximately south to north on Site, towards the West Credit River.

There have been anecdotal references to a “disappearing stream” and “underground stream” at the Site and, based on available mapping, there is the potential for karst in the Belfountain area. However, the significant overburden thickness at the Site suggests that the headwater drainage feature is a losing reach and is unlikely to be the result of local karst features. The loss of flow in the headwater drainage feature is interpreted to be the result of a losing reach once the stream crosses onto the highly permeable outwash deposits from the lower permeability Wentworth Till units to the south.

Vertical hydraulic gradients were not determined since nested monitoring wells were not installed on the Site. Regardless, based on regional mapping (Davies and Holysh, 2007), downward gradients are expected across the site. Upward gradients associated with groundwater discharge to surface is expected to occur in the West Credit River valley.

## 5.7 Groundwater Quality

Groundwater quality samples were collected by R.J. Burnside from twelve (12) on-Site wells between 2015 and 2017 and two (2) off-Site wells in 2015. The collected groundwater samples were sent to AGAT Laboratories for analysis of general inorganics, metals and total suspended solids to characterize the baseline groundwater quality at the Site. Results were compared to the Ontario Drinking Water Standards (ODWS) to identify potential exceedances of water quality parameters. Results for select parameters from the twelve (12) on-Site wells from March 3, 2017 are outlined in **Table 5.5** and **Table 5.6**. For full analytical results and certificates of analysis, please refer to **Appendices F** and **G**.

Review of the water quality results indicate that there were no exceedances of health-related ODWS. Results of the analysis do show exceedances of some aesthetic and operational ODWS for some samples (**Table 5.5** and **Table 5.6**). Parameters with exceedances of ODWS include total hardness, total dissolved solids, sulphate, turbidity, and iron. These parameters, with the exception of hardness, are considered aesthetic guidelines that are established for parameters that impair the taste, odour or colour of water but do not directly affect the safety of the water supply.

The water hardness at the Site and other aesthetic parameters (turbidity, sulphate, total dissolved solids, and iron) can be improved with water treatment systems for each property, including a water softener.

Information about a commonly employed residential water quality treatment unit is provided in **Appendix M** as an example for reference purposes. This example and many other residential water quality treatment systems are also capable of reducing concentrations of health-related parameters (such as nitrate); although, as noted above, there have been no exceedances of health-related ODWS from water quality results from the Site.

**Table 5.5 Select Groundwater Quality Results from March 10, 2017**

| Water Quality Parameter | Units | ODWS | | RDL | TW1 | TW2 | TW3 | TW4 | TW5 | TW6 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | OG | AG | | | | | | | |
| Total Hardness (as CaCO3) | mg/L | 80-100 | - | 0.5 | 361 | 181 | 433 | 275 | 288 | 288 |
| Total Dissolved Solids | mg/L | - | 500 | 20 | 396 | 198 | 484 | 284 | 306 | 308 |
| Nitrate as N | mg/L | 10 | - | 0.1 | <0.05 | 1.16 | 0.62 | 3.43 | 6.76 | 8.52 |
| Nitrite as N | mg/L | 1 | - | 0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Sulphate | mg/L | - | 500 | 0.2 | 105.0 | 13.8 | 193.0 | 18.9 | 14.1 | 13.5 |
| Turbidity | NTU | - | 5 | 0.5 | 135.0 | 3.3 | 15.3 | 0.6 | 1.9 | <0.5 |
| Iron | mg/L | - | 0.3 | 0.01 | 0.167 | <0.010 | 0.032 | <0.010 | <0.010 | <0.010 |

| | |
|---|---|
| 1.7 | Sample exceeded ODWS OG or AG |
| RDL | Reportable Detection Limit |
| - | No value available |
| ODWS | Ontario Drinking Water Standard |
| OG | Operational Guideline |
| AG | Aesthetic Guideline |

**Table 5.6 Select Groundwater Quality Results from March 10, 2017 Continued**

| Water Quality Parameter | Units | ODWS | | RDL | TW7 | TW8 | TW9 | TW10 | TW11 | TW12 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | OG | AG | | | | | | | |
| Total Hardness (as CaCO3) | mg/L | 80-100 | - | 0.5 | 291 | 301 | 310 | 202 | 278 | 1020 |

**Table 5.6 Select Groundwater Quality Results from March 10, 2017 Continued**

| Water Quality Parameter | Units | ODWS | | RDL | TW7 | TW8 | TW9 | TW10 | TW11 | TW12 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | OG | AG | | | | | | | |
| Total Dissolved Solids | mg/L | - | 500 | 20 | 306 | 312 | 326 | 216 | 286 | 1400 |
| Nitrate as N | mg/L | 10 | - | 0.1 | 5.77 | 6.68 | 2.68 | 1.68 | 3.94 | <0.25 |
| Nitrite as N | mg/L | 1 | - | 0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.25 |
| Sulphate | mg/L | - | 500 | 0.2 | 14.4 | 31.1 | 50.1 | 14.3 | 19.1 | 896 |
| Turbidity | NTU | - | 5 | 0.5 | 1.8 | 113 | 2.0 | 64.8 | 7.4 | 8.6 |
| Iron | mg/L | - | 0.3 | 0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.665 |

| | |
|---|---|
| 1.7 | Sample exceeded ODWS OG or AG |
| RDL | Reportable Detection Limit |
| - | No value available |
| ODWS | Ontario Drinking Water Standard |
| OG | Operational Guideline |
| AG | Aesthetic Guideline |

In addition to the general groundwater quality results discussed above, groundwater samples were collected from twelve (12) on Site wells (TW1 to TW12) by R.J. Burnside between July 2014 and May 2017 and by COLE in October 2017 and analyzed for nitrate and nitrite. Nitrate concentration results are provided in in **Table 5.7**.

Water samples obtained by COLE were collected using a submersible pump. Prior to collecting samples, the monitoring wells were purged by removing three (3) well volumes from each well. The purging process removes stagnant water from the well, thereby ensuring the groundwater samples are representative of the groundwater in the formation adjacent to the screen. In addition, groundwater parameters including pH, temperature, conductivity, and turbidity were monitored and samples were collected after all parameters had stabilized.

The collected groundwater samples went to Maxxam Analytics Inc. Mississauga, for laboratory analysis of nitrate and nitrite. Results were compared to ODWS for nitrate-nitrogen, 10 mg/L, to identify potential exceedances. Results of the analysis showed no exceedances of the ODWS for nitrate for any samples. Higher concentrations (>5 mg/L) were observed within the northern portion of the Site in five (5) wells (TW5, TW6, TW7, TW8 and TW11). Average nitrate concentrations across the Site from all sampling results can be seen in **Figure 12**.

The on-Site areas with higher nitrate concentrations are likely a result of the historical and current agricultural activities occurring both on-Site and up gradient of the Site. Development of the Site will result in a reduction of the agricultural areas suspected of contributing to the on-Site nitrate concentrations by approximately 67%. Thus, development of the Site is expected to lead to a long term decrease in nitrate concentration on-Site.

### Table 5.7 Nitrate Concentrations on Site

| Nitrate Concentrations (mg/L) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well ID | Apr 2015 | Jun 2015 | Sept 2015 | Nov 2015 | Feb 2016 | Mar 2016 | Apr 2016 | June 2016 | Sept 2016 | Dec 2016 | Mar 2017 | May 2017 | Oct 2017 |
| TW1 | - | - | - | | - | - | - | - | - | - | <0.05 | <0.05 | <0.10 |
| TW2 | 0.84 | 0.70 | 1.00 | 0.62 | - | 0.58 | - | 1.18 | 0.82 | 0.67 | 1.16 | 1.90 | 1.01 |
| TW3 | - | - | - | - | - | 0.54 | - | - | - | - | 0.62 | 0.58 | 0.21 |
| TW4 | - | - | - | - | - | 3.0 | - | - | - | - | 3.43 | 3.22 | 1.95 |
| TW5 | 6.31 | 8.28 | 7.77 | 7.09 | - | 7.80 | - | 6.72 | 7.18 | 6.34 | 6.76 | 7.99 | 8.41 |
| TW6 | 7.80 | 8.20 | 7.30 | - | - | - | 8.23 | - | - | - | 8.52 | 9.08 | 7.87 |
| TW7 | - | - | - | - | 8.52 | 7.27 | - | 6.32 | 6.97 | 5.97 | 5.77 | 6.87 | 8.13 |
| TW8 | - | - | - | - | 8.25 | 7.76 | - | 5.35 | 7.85 | 7.41 | 6.68 | 5.15 | 6.47 |
| TW9 | - | - | - | - | 3.65 | 3.41 | - | 2.99 | 2.17 | 1.51 | 2.68 | 3.02 | 2.81 |
| TW10 | - | - | - | - | 2.41 | - | - | - | - | - | 1.68 | 0.85 | 1.63 |
| TW11 | - | - | - | - | 4.61 | 5.03 | - | 3.00 | 4.08 | 3.58 | 3.94 | 3.00 | 3.41 |
| TW12 | - | - | - | - | - | <0.25 | - | - | - | - | <0.25 | <0.10 | <0.10 |

Note:

\- Indicates no sample collected

## 5.8 Groundwater – Surface Water Interactions

### 5.8.1 Water Courses

A small headwater drainage feature flows from off-Site near PZ1-14 onto the Site from the south near TW2 and MW1-14, where it appears to infiltrate through a depression into the thick coarse-grained (outwash) overburden. Although this feature has been anecdotally referred to as a “disappearing stream” or “underground stream” associated with karst, the relatively thick overburden at the Site reduces the possibility of this feature being a result of local karst features. This feature is interpreted to lose flow and infiltrate as it moves from less permeable Wentworth Till in the south onto the more permeable sandy outwash sediments on-Site. Water that infiltrates across the Site is interpreted to infiltrate vertically through the coarse-grained unsaturated zone to the water table where horizontal groundwater flow is generally towards the north. The on-Site portion of the small headwater drainage feature was observed by COLE staff to be dry during a Site visit in October 2017. Therefore, this feature is interpreted to be an ephemeral feature contributing groundwater recharge after precipitation, snowmelt and freshet events.

Groundwater levels at PZ1-14, near the headwater drainage feature, are consistently below ground surface by approximately 1 m. Similarly, groundwater levels at TW2 and MW1-14 are consistently below ground surface during all times of year when data was collected indicating that this feature is not supported locally by groundwater discharge but provides a groundwater recharge function (i.e., is a losing reach). Due to the higher water table at PZ1-14 compared to TW2, MW1-14, and the rest of the Site, it is interpreted that this high water table represents a local perched water table system. The hydrograph for PZ1-14, which is provided in **Appendix E**, shows that this piezometer frequently goes dry further supporting the interpretation of a localized perched system.

No other water courses are seen on Site. Off-Site, the West Credit River likely receives groundwater contributions that maintain the base flow of this cold water fish habitat.

### 5.8.2 Wetlands

One piezometer, PZ2-14, was installed to a depth of approximately 1 mbgs in one of the on-Site wetland units (SWT3-2). A hydrograph illustrating water level fluctuations relative to ground surface for PZ2-14 is provided in **Appendix E**.

Examination of the water levels in PZ2-14 shows variable groundwater levels that are consistently below ground surface with the exception of very wet spring conditions when groundwater levels are only slightly above ground surface (maximum of 4 cm above ground surface). As a result, groundwater contributions to SWT3-2 are estimated to be negligible.

Although, there is no direct groundwater monitoring data for wetland unit MAS3-1 on Site, the ground elevation (as indicated by cross-section A-A’ on **Figure 8**) is very similar to SWT3-2 and thus groundwater is expected to be at a similar elevation as STW3-2, or slightly deeper, as it declines towards the West Credit River. Observations made during a Site visit on November 8, 2017 confirm that groundwater is approximately 0.86 mbgs within SWT3-2 and no standing water was visible within MAS3-1.

The two off-Site wetland units (SWM1-1 / MAM3-1) do not have groundwater level monitoring data, thus, groundwater contributions cannot be accurately quantified. Based on a Site visit on November 8, 2017, SWM1-1 was observed to have standing water and wet soils. Therefore, groundwater contributions to SWM1-1 appear to be present. Although groundwater contributions to the off-Site wetlands are not quantified, they are not within the radius of influence or the radius of contribution of the closest potential on-Site supply well and the proposed development will maintain pre-development infiltration rates thus, no groundwater impacts to the off-Site wetlands are anticipated. Additional discussion of the potential impacts to the off-Site wetland features are described in **Section 7.2.2**.

## 5.9 MOECC Well Records

A MOECC well records search was conducted for a 500 m radius around the Site. A total of 145 wells were identified within a 500 m radius of the Site. Based on the MOECC well records, the majority (81%) of the nearby wells were identified as water supply wells. The search results are provided in **Appendix H** and are summarized in **Table 5.8** below. The locations of nearby MOECC well records are shown on **Figure 13**.

**Table 5.8 Summary of MOECC Well Records within a 500 m Radius Around the Site**

| Well Use | Number of Wells | Percent of Wells |
|---|---|---|
| Water Supply | 118 | 81.38 |
| Abandoned | 11 | 7.59 |
| Monitoring/Test Hole | 8 | 5.52 |
| Observation | 7 | 4.82 |
| Unfinished | 1 | 0.69 |
| **Total** | **145** | **100** |

A search of permitted water takers within a 500 m radius around the Site was conducted in December 2017 through the MOECC digital data request process. No active permitted groundwater takers were identified.

As noted in **Section 4.1**, a private residential well survey at 63 residences in the Belfountain area was conducted by Terraprobe in 1988 and contact was made with 13 residents. An additional private well survey was conducted by Terraprobe in 1989 at 81 residences and 31 responses were received. A third survey was conducted at select residences in 1990 in the Caledon Mountain Estates. Based on the findings from the private well surveys, Terraprobe found that water supply from shallow dug wells had generally poor quality and quantity in contrast to drilled wells.

It should be noted that results from these surveys may now be outdated, and an updated well survey for the area surrounding the Site would be helpful towards understanding current groundwater usage and quality in the area.

# 6 Impact Assessment

## 6.1 Water Balance

As part of the hydrogeological investigation a water balance analysis was completed to determine pre-development recharge and runoff conditions at the Site.

### 6.1.1 Background

For any system with defined boundaries, a water balance can be used to estimate the individual components of the hydrologic cycle. This exercise consists of an accounting of the transfer of water across the system’s boundaries over a certain period of time whereby any difference between inflows to the system and outflows from the system is balanced by a change of storage within the system.

In order to understand the components of the hydrologic cycle under existing conditions, a water balance analysis was conducted for the Site. The discussion below provides details on the methodology used and the results obtained from the analysis. A summary of the calculations is provided in **Appendix I**.

### 6.1.2 Methodology

A Site scale water balance analysis was completed in order to estimate the components of the hydrologic cycle for the Site, and was modelled using the following equation:

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

Where:

$P$ = Precipitation, which represents the sum of all rainfall and snowfall
$\Delta GS$ = Change in groundwater storage
$ET$ = Evapotranspiration
$R$ = Runoff
$I$ = Infiltration

The water balance for the Site was developed using the Thornthwaite and Mather (1955) methodology as outlined in Chapter 3 of MOECC's SWM Planning & Design Manual (MOECC, 2003). The methodology roughly estimates yearly evapotranspiration, infiltration and runoff volumes based on soil types, ground cover, topography, and annual precipitation.

Monthly mean temperature and monthly precipitation data were used in the Thornthwaite Equation to estimate the monthly potential evapotranspiration. The estimated monthly potential evapotranspiration was adjusted using a daylight correction factor to account for varying length of daylight throughout the year based on latitude. The actual evapotranspiration was then determined by accounting for a change in soil moisture storage.

The monthly water surplus (amount of water available to infiltrate or runoff) was estimated by calculating the difference between monthly precipitation and actual evapotranspiration. Infiltration was estimated by multiplying a set of infiltration factors (dependent on the topography, soil type, and land cover) to the estimated water surplus. Runoff was considered to be the remainder of the water surplus that was not infiltrated.

### 6.1.3 Site Water Balance

Site specific parameters used to calculate the Site water balance as described in **Section 6.1.2** were determined as follows.

Precipitation and temperature data were obtained from the Environment Canada Orangeville Weather station (Climate ID: 6155790). Climate normal data (1981-2010) were used in the water balance analysis to provide a general understanding of the climate on Site, while averaging out the effects of wet and dry years.

The Site was divided and classified according to agricultural areas and wooded areas. Infiltration factors were selected for each area from Table 3.1 in the MOECC's Stormwater Management Planning and Design Manual (MOECC, 2003). Ground cover and topography infiltration factors were informed from Site visits and using aerial photographs. Agricultural areas were considered flat lands due to closed depressions whereas wooded areas were considered hilly lands based on topographic slope.

Surficial soil infiltration factors were informed from Site borehole logs and determined to be predominantly sand. Soil moisture capacities were also determined from the MOECC 2003 document and informed by ground cover and soil type. Infiltration factors and soil moisture capacities for the different areas are summarized in **Table 6.1**.

**Table 6.1 Summary of Infiltration Factors and Soil Moisture Capacity**

| Area | Area (ha) | Infiltration Factor (Topography) | Infiltration Factor (Soil) | Infiltration Factor (Cover) | Soil Moisture Capacity (mm) |
|---|---|---|---|---|---|
| Agricultural | 50.27 | 0.30 | 0.40 | 0.10 | 75 |
| Wooded | 20.01 | 0.10 | 0.40 | 0.20 | 200 |

### 6.1.4 Water Balance Analysis Results

The results of the Site-wide pre-development water balance are summarized in **Table 6.2**. The time period used for the analysis was the 30 year climate normal period from 1981 to 2010 to allow for an understanding of average magnitudes of the components of the hydrologic cycle.

**Table 6.2 Results of Water Balance Analysis for 1981 to 2010**

|  | Hydrologic Cycle Component | Agricultural Lands |  | Wooded Areas |  |
|---|---|---|---|---|---|
|  |  | (mm/year) | ($m^3$/year) | (mm/year) | ($m^3$/year) |
| **Inputs** | Precipitation | 901.6 | 453,234 | 901.6 | 180,410 |
|  | **Total inputs** |  | **453,234** |  | **180,410** |
| **Outputs** | Evapotranspiration | 526 | 264,422 | 548 | 109,684 |
|  | Change in soil storage | 0 | 0 | 0 | 0 |
|  | Runoff | 75 | 37,762 | 106 | 21,218 |
|  | Infiltration | 300 | 151,050 | 247 | 49,508 |
|  | **Totals outputs** |  | **453,234** |  | **180,410** |

Based on the water balance analysis for pre-development conditions, infiltration comprises approximately 32% of the total precipitation across the entire Site, runoff comprises approximately 9% of total precipitation, and evapotranspiration comprises more than half (59%) of total precipitation. The water balance analysis shows a significant amount of infiltration on the Site. This is expected due to the closed depressions within the hummocky topography and sandy overburden materials. Details of the water balance analysis are presented in **Appendix I**.

The Thornthwaite and Mather water balance methodology provides a simplified approximation of the water balance for a given Site. The methodology does not account for yearly changes in groundwater elevations. As such, it is important to note that the evapotranspiration, runoff, and infiltration values estimated using the water balance analysis are understood to be approximations. A more detailed analysis of Site grading and potential for runoff is presented in the Functional Servicing Report prepared by COLE and submitted under separate cover.

Potential impacts to the Site water balance from the proposed development are discussed in **Section 7**. It is currently understood that infiltration measures will be utilized to maintain pre-development infiltration on Site in post-development conditions, with essentially no runoff leaving the Site up to the 100-year storm event. The stormwater management approach as well as a detailed discussion of the post-development water balance is described in the Functional Servicing Report, prepared by COLE and submitted under separate cover.

## 6.2 Nitrate Loading

### 6.2.1 Calculations

Nitrate loading analysis was completed in order to evaluate the potential impact of individual on-Site septic systems in compliance with MOECC Procedure D-5-4 and as informed through consultation with CVC. This procedure is outlined below, and assumes that every lot will have a tertiary (Level IV) treatment system such as the Waterloo Biofilter Systems Inc. standard system shown in **Appendix M** that successfully reduces total nitrogen concentrations in effluent by 50-65%.

The equation applied to estimate the influence of the septic systems on nitrate concentrations in groundwater is:

$$n_r = \frac{n_w * V_w}{V_T}$$

Where $n_r$ is the resulting nitrate concentration at the property boundary (mg/L), $n_w$ is the nitrate concentration in the effluent (mg/L), $V_w$ is the volume of effluent (m$^3$/year), and $V_T$ is the total dilution volume (m$^3$/year), which is a sum of annual recharge volume (as determined from the Site water balance analysis **Section 6**, assuming infiltration post-development is maintained) and effluent volume ($V_w$).

Nitrate loading calculations for the Site assume an effluent discharge of 1000 L/lot/day from the 67 proposed lots. It was also assumed that implementation of tertiary (Level IV) treatment systems will be applied across all 67 on-Site septic systems, resulting in a nitrate loading of 20 g/lot/day, which is half the expected concentration of 40 g/lot/day from traditional septic systems. In addition, it is understood that the planned septic systems will only produce nitrate and conversion of ammonia to nitrate (nitrification) is assumed to be complete in these systems. Therefore, it is not necessary to estimate groundwater concentrations for nitrite or un-ionized ammonia, which is also consistent with CVC review of potential septic system impacts. The analysis of nitrate loading at the property boundary is shown below and assumes an annual dilution volume from recharge of 200,558 m$^3$/year as described in **Section 6.1**:

$$n_r = \frac{\left(20\ \frac{g}{lot.day} * 1{,}000\frac{mg}{g} * \frac{1}{1000\frac{L}{lot.day}}\right)\left(1{,}000\frac{L}{lot.day} * 67\ lots * 365\frac{day}{year} * \frac{m^3}{1000\ L}\right)}{\left(1{,}000\frac{L}{lot.day} * 67\ lots * 365\frac{day}{year} * \frac{m^3}{1000\ L}\right) + \left(200{,}558\frac{m^3}{year}\right)}$$

$$n_r = \frac{(20\ mg.L^{-1})(24{,}455\ m^3.year^{-1})}{227{,}564.2\ m^3.year^{-1}} = 2.17\ mg.L^{-1}$$

It is also important to note that the nitrate loading analysis outlined in the MOECC guidance does not consider the complex spatial and temporal variability of nitrate concentrations. Therefore, the nitrate loading concentration determined for the Site is an estimate of the average nitrate concentration expected across the entire Site.

### 6.2.2 Nitrate Loading Results

From the nitrate loading analysis, which was completed in compliance with MOECC Procedure D-5-4 and consistent with CVC's review approach, a nitrate loading concentration of approximately 2.17 mg/L is estimated at the Site boundary. This concentration is below the ODWS for nitrate of 10 mg/L and also lower than the CCME guideline for $NO_3$-as-N of 3 mg/L, which has been adopted by CVC. As on-Site wetland features (SWT3-2 and MAS3-1) are essentially at the Site boundary, and any groundwater seepage locations appear to be beyond the Site boundary, the CCME / CVC guideline is met at all downgradient natural features that may receive even minimal groundwater discharge.

The existing nitrate concentrations at the Site (as discussed in **Section 5.7**) are interpreted to reflect nitrate loading from on-Site and adjacent agricultural activities. With development of the Site, the area interpreted to contribute to nitrate loading from agricultural activities will be reduced by approximately 67%. As a result, it is anticipated that long-term background nitrate concentrations will decline over time.

### 6.2.3 Line of Higher Nitrate Concentrations

All available groundwater quality results for on-Site wells indicate that existing on-Site nitrate concentrations are below the ODWS, and long-term nitrate concentrations are anticipated to decrease due to the reduction in agricultural activity on the site. However, as a precautionary approach it is recommended that supply wells should not be installed in the northernmost portion of the Site where the highest on-Site nitrate concentration are identified. Specifically, it is recommended that supply wells not be placed north of an estimated line of higher nitrate concentrations (i.e., > 7 mg/L). The line of higher nitrate concentrations is shown on **Figure 14** and is located based on the average nitrate concentrations at test wells TW8 and TW7 of slightly less than 7 mg/L.

To identify if any additional setback distance may be required between supply wells and the line of higher nitrate concentrations, a zone of contribution analysis was completed and is discussed in **Section 6.3.4.** As discussed in **Section 6.3.4**, the zone of contribution analysis suggests that an additional setback of 7 m from the line of higher nitrate concentrations, shown as the 7 m setback line in **Figure 14**, is warranted in recognition of the estimated area from which groundwater contributes to the supply wells. Therefore, supply wells located at least 7 m upgradient (south) of the line of higher nitrate concentrations are not expected to draw groundwater from the area with higher nitrate concentrations. Review of the lot locations and dimensions on the Draft Plan indicates that there is a minimum of 9 m between the road right-of-way and the 7 m setback line where wells can be located, or a minimum of 16 m between the road right-of-way and the higher nitrate line. Therefore, supply wells can be located on all proposed lots in compliance with the 7 m setback recommendation. The lot layout, line of higher nitrate concentrations, and the 7 m setback line can be found in **Figure 14**. Well locations in relation to the line of higher nitrate concentrations are provided in the FSR.

## 6.3 Water Supply

### 6.3.1 Water Supply Analysis

As noted in **Section 2.3.1**, the main aquifer underlying the Site is the Guelph-Amabel Formation, which provides water sufficient for several large municipal groundwater takings across the Upper Credit River

Watershed. As described below, the aquifer is considered to be capable of providing sufficient water supply for the proposed development based on the analysis completed following the MOECC Procedure D-5-5. An assessment of potential impacts from the water taking is provided in **Section 7.0**. These results are generally consistent with previous assessments of water supply at the Site (Terraprobe 1990).

Peak pumping rates expected per lot at the Site were determined based on the MOECC Procedure D-5-5 with the assumption of a peak pumping rate of 3.75 L/min/person in a four bedroom house (i.e., five people). This results in a peak pumping rate of 18.75 L/min/house. The estimated peak pumping rate is conservative as peak flow rates are only expected to last for only 120 minutes/day. In addition, private wells are typically pumped intermittently, putting less stress and demand on the aquifer. As a result, the expected long-term average pumping rate is estimated to be approximately 1.56 L/min/house (2,250 L/day/house) as outlined in the MOECC Procedure D-5-5.

To investigate the safe well yield on Site, R.J. Burnside conducted six (6) pumping tests between June 11, 2014 and August 29, 2014, which would be expected to generally reflect dry conditions when lower amounts of recharge would occur. The pumping tests lasted for approximately 6 hours with pumping rates ranging from 11.34 L/min to 96.6 L/min and recovery monitored until approximately 95% recovery, as required by the MOECC Procedure D-5-5. Although one of the six pumping tests had a pumping rate less than the maximum rate indicated by MOECC guidelines outlined in Procedure D-5-5, two (2) additional 26 hour pumping tests were conducted in March and April 2016 on TW6 and TW11 at a pumping rate of 60 L/min in compliance with Procedure D-5-5. Raw data for all pumping tests is provided in **Appendix J**.

Transmissivity was estimated from pumping test results using the modified non-equilibrium equation developed by Cooper and Jacob (1946) as outlined in Driscoll (1986) and shown below:

$$T = \frac{0.183Q}{\Delta s}$$

Where,

$T$ = transmissivity ($m^2$/day)
$Q$ = pumping rate ($m^3$/day)
$\Delta s$ = slope of the time-drawdown graph expressed as a change in drawdown between two times on log scale whose ratio is 10 (one log cycle). Time-drawdown curves can be found in **Appendix C**.

Transmissivity was then used to estimate drawdown after 20 years and 50 years based on the Theis (1935) solution.

$$s = \frac{Q}{4\pi T}W(u)$$

Where,

$s$ = drawdown (m)
$Q$ = pumping rate ($m^3$/day)
$T$ = transmissivity ($m^2$/day)

And $u = \frac{r^2 S}{4Tt}$, where *r* = distance from centre of pumping well to drawdown location (m), *S* is coefficient of storage (dimensionless), and *t* is time since pumping started (days)

If calculated drawdown after 20 and 50 years is less than the available drawdown within the pumping well then the well is considered to have adequate water supply. The available drawdown is considered to be the distance from the static water level to the middle of the open borehole.

### 6.3.2 Results

Resulting estimated transmissivity values and calculated 20 year and 50 year drawdowns for the six pumping tests, completed in 2014, are provided in **Table 6.3** and calculations are provided in **Appendix K**.

**Table 6.3 Pumping Test Results and Estimated Long Term Drawdown**

| | | | Peak Pumping Rate (18.75 L/min/house) | | Average Pumping Rate (1.56 L/min/house) |
|---|---|---|---|---|---|
| Well ID | Estimated Transmissivity ($m^2$/day) | Available Drawdown (m) | Calculated Drawdown after 20 years (m) | Calculated Drawdown after 50 years (m) | Calculated Drawdown after 50 years (m) |
| TW1 | 9.40 | 23 | 3.5 | 3.8 | 0.32 |
| TW2 | 14.9 | 2.2 | 2.3 | 2.4 | 0.20 |
| TW3 | 84.9 | 14 | 0.40 | 0.50 | 0.040 |
| TW4 | 403 | 7.1 | 0.10 | 0.10 | 0.010 |
| TW5 | 26.6 | 7.5 | 1.3 | 1.4 | 0.12 |
| TW6 | 72.1 | 8.2 | 0.50 | 0.60 | 0.050 |

Based on conservative available drawdown calculations, pumping tests results indicate that most wells can safely support 50 years of continuous pumping at the peak pumping rate of 18.75 L/min/house. This pumping rate exceeds the peak pumping rate likely to be realistically experienced by each well. This peak rate is only expected to occur for a total of 120 min/day and therefore results presented in **Table 6.2** represent a very conservative approximation of the drawdown that would occur after 20 and 50 years of pumping.

Based on the conservative calculations of available drawdown, TW2 was estimated to slightly exceed the available drawdown after 20 years and 50 years. This is not expected to be an issue as continuous pumping at the peak pumping rate is a significant over estimation of a likely pumping rate, which should be closer to 1.56 L/min/house of transient, not continuous, pumping. In addition, the available drawdown within TW2 represents a conservative estimate of the actual water available for drawdown. Given the expected long-term average pumping rate of 1.56 L/min/house, TW2 is only expected to experience 0.2 m of drawdown after 50 years of continuous pumping; significantly less than the available drawdown. Therefore, based on the comparison of predicted versus available drawdown in **Table 6.3**, the completed testing of the on-Site test wells is considered to confirm adequate water supply per MOECC Procedure D-5-5.

The combined water takings expected at the Site, based on an average pumping rate of 2,250 L/day/house and 67 houses, is 150,750 L/day. This is only a portion of the expected recharge which will occur on the Site (549,474 L/day), as calculated from the water balance (**Section 6.1, Appendix I**). In addition, when groundwater flow into the Site is considered (approximately 262,722 L/day), the total water takings at the

Site represent approximately 18% of the total water coming into the Site, much of which will be returned as treated effluent via septic systems.

### 6.3.3 Radius of Influence

Based on the calculated 50 year drawdown expected within TW1 and observation well PW1 at a pumping rate of 18.75 L/min/house, the radius of influence, beyond which no drawdown is expected to occur, was estimated. The radius of influence was estimated as per Driscoll (1986) using distance-drawdown plots to estimate the distance where zero drawdown would occur and found to be approximately 300 m, not considering recharge. However, given the more realistic pumping rate of 1.56 L/min/house, a radius of influence of approximately 100 m is calculated by this method, which does not consider the effect of recharge.

For comparison, TW4 was also used to estimate the radius of influence based on the drawdown expected after 50 years pumping at 1.56 L/min/house. Results from the analysis with TW4 also indicate a radius of influence of approximately 100 m at the Site. However, the results should be considered approximate as there are no observation wells within the radius of influence to confirm drawdown. The results of this analysis are provided in **Appendix L**. Results from the analysis of TW1 and TW4 were assumed to be representative of the expected radius of influence at the Site as they were calculated to have the largest and smallest transmissivity values (see **Table 6.3**) and therefore bracket the range of transmissivities expected at the Site.

The method described above and shown in **Appendix L** provides a conservative estimate of the radius of influence as it does not consider the influence of recharge on the calculations. Recharge on Site will significantly decrease the radius of influence since the drawdown cone is expected to expand until the recharge rate is equal to the pumping rate. Therefore, an approximate radius of influence can also be estimated from the interpreted recharge rates. Assuming a recharge rate of 300 mm/year (or $8.219\text{x}10^{-4}$ m/day; as determined in **Section 6.1**) and an average pumping rate of 1.56 L/min/house, the radius of influence would be approximately 29.5 m, resulting in an area of 2,738 $m^2$ (or 0.27 ha). Based on this analysis and an average lot size of approximately 0.64 ha, there is expected to be negligible supply interference between lots. Regardless of the calculated radius of influence, drawdown within the wells is estimated to be a maximum of 0.32 m after 50 years of continuous pumping at an average rate of 1.56 L/min/house (see **Table 6.3**). Therefore, drawdown within the radius of influence is expected to be very small.

Based on the FSR, wells on-Site will be placed a minimum of 30 m apart. Since the radius of influence of is conservatively expected to be 30 m at most, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible. The maximum drawdown from one well at this intersection point was conservatively calculated to be 0.11 m (**Appendix L**), which is significantly less than the available drawdown (0.5% of the available drawdown at TW1). Locations of wells on-Site are provided in the FSR.

### 6.3.4 Radius of Contribution

The zone of contribution is different than the zone of influence calculated above. The zone of influence discussed above outlines the distance at which there is nearly zero drawdown and therefore represents the drawdown cone of a supply well. In contrast, the zone of contribution is the area where groundwater and recharge are contributing to the supply well, and this concept is similar to well head protection areas (WHPA). This zone of contribution extends further upgradient than downgradient due to the effect of groundwater flow direction and gradient, unlike the zone of influence, which is typically more simplistically depicted as a uniform radius around the well.

The downgradient distance from the supply well to the edge of the zone of contribution is called the stagnation or null point and can be calculated using the following equation (US EPA 1987; Fileccia 2015).

$$x = \frac{Q}{2\pi Ti}$$

Where x is the distance from the well to the stagnation point (m), *Q* is the pumping rate ($m^3$/day), *T* is the transmissivity ($m^2$/day), and *i* is the horizontal hydraulic gradient (dimensionless).

By estimating the downgradient area contributing water to the supply well (distance to the stagnation point), a minimum separation distance can be determined for placing supply wells at the Site an appropriate distance from the approximated line of higher nitrate concentrations (**Figure 14**).

Based on an average pumping rate of 1.56 L/min (2.25 $m^3$/day), a transmissivity of 9.4 $m^2$/day, and an estimated minimum hydraulic gradient at the Site of 0.0055, the distance to the stagnation point can be calculated as below.

$$x = \frac{2.25}{2\pi(9.4)(0.0055)} = 6.9\ m$$

Based on this analysis, a separation distance of at least 7 m should be maintained between the supply well and the line of higher nitrate concentrations. As noted above, review of the lot locations and dimensions on the Draft Plan indicates that supply wells can be located on all proposed lots in compliance with this recommendation.

# 7 Receptors and Impacts

## 7.1 Surrounding Groundwater Users

Potential long-term impacts to surrounding groundwater users outlined in **Section 5.9** are usually related to changes in groundwater quality and quantity. As the nitrate loading concentration at the Site boundary is only expected to be 2.17 mg/L, which is less than the ODWS of 10 mg/L, negative impacts to groundwater quality for surrounding groundwater users are not anticipated.

Potential long-term impacts to surrounding groundwater users related to groundwater quantity are also expected to be minimal as the radius of influence of on-Site water supply wells is not expected to be larger than 30 m (when recharge is considered), and total groundwater takings are small compared to the total input of groundwater and recharge at the Site. In addition, a large portion of the extracted groundwater will be reintroduced to the groundwater system via septic systems, further reducing impacts to surrounding groundwater users.

Based on the lot configurations shown in **Appendix A**, and the MOECC well record locations shown on **Figure 13**, the closest neighbouring well is approximately 145 m from the closest potential on-Site supply well (**Table 7.1**). As this is considerably larger than the estimated conservative radius of influence of 30 m, when recharge is considered, no significant impacts to water quantity at neighbouring wells are anticipated. In addition, residential wells in Belfountain are commonly completed in the dolostone / sandstone units associated with the Manitoulin and Whirlpool Formations, which underlie the Amabel Formation and Cabot Head Formation shales. Since on-Site supply wells will be screened in the Amabel

Formation, interference between on-Site wells and water supply wells in Belfountain are further reduced since these wells are not interpreted to obtain water from the same aquifer.

**Table 7.1 Distance from Receptors to Closest on-Site Supply Well**

| Receptor | Approximate Minimum Distance to Potential on-Site Supply Well (m) | Zone of Influence of Supply Well (m) | Approximate Separation Between Zone of Influence and Receptor (m) |
|---|---|---|---|
| Surrounding Groundwater Users | 145 (lot 21) | 30 | 115 |
| On-Site Wetland Features | 185 (lot 20) | 30 | 155 |
| Off-Site Wetland Features | 164 (lot 49) | 30 | 134 |
| West Credit River | 370 (lot 49) | 30 | 340 |

## 7.2 Natural Features

### 7.2.1 On-Site Wetland Features

Potential long-term impacts to wetland features are usually related to changes in groundwater contributions to the feature and groundwater quality. As existing groundwater contributions to on-Site wetland features (SWT3-2 and MAS3-1) are considered negligible, no long-term impacts to these features are expected. Similarly, as groundwater contributions to these on-Site features are considered negligible, no negative impacts are expected from groundwater quality changes, and groundwater nitrate loadings at the on-Site wetland features are expected to be lower than the CCME / CVC guideline for $NO_3$-as-N of 3 mg/L.

In addition, based on zone of influence analysis and the lot layout shown in **Appendix A**, the closest potential on-Site supply well is approximately 185 m from the on-Site wetland features (**Table 7.1**). As this is considerably larger than the estimated radius of influence, no significant impacts to water quantity is anticipated.

### 7.2.2 Off-Site Wetland Features

Potential long-term impacts to off-Site wetland features will also be related to groundwater contributions and groundwater quality. Although, groundwater contributions to off-Site wetland features (SWM1-1 and MAM3-1) are expected, negative impacts are not anticipated as it is understood that infiltration measures will be utilized to maintain that pre-development infiltration on Site will be maintained post-development.

Groundwater takings from on-Site water supply wells are also not expected to have significant impacts on off-Site wetland features as total groundwater takings are small compared to the total input of groundwater and recharge at the Site. In addition, a large portion of the extracted groundwater will be reintroduced to the groundwater system through tertiary treated septic systems, further reducing impacts to natural features.

Similarly, on-Site water supply wells are not expected to directly impact off-Site wetland features as the shortest distance between the closest potential on-Site supply well and the off-Site wetland features is approximately 164 m, which is greater than the radius of influence of approximately 30 m, when recharge is considered (**Table 7.1**). Please refer to **Appendix A** for lot locations.

In addition, supply wells primarily obtain water in the upgradient direction whereas the off-Site wetland features are downgradient of the Site. Based on radius of contribution calculations (**Section 6.3.4**), water supply wells on-Site are interpreted to draw in groundwater from approximately 7 m in the downgradient direction. This is significantly less than the distance between the closest potential on-Site supply well and the off-Site wetland features. As a result, impacts to groundwater contributions to off-Site wetland features are expected to be minimal.

Potential long-term impacts to off-Site natural features from changes in groundwater quality are also expected to be negligible as groundwater nitrate loadings at the property boundary are expected to be lower than the CCME / CVC guideline for $NO_3$-as-N of 3 mg/L.

### 7.2.3 Feature Based Water Balance

Based on the potential long-term impacts to on- and off-Site wetland features discussed in **Section 7.2.1** and **Section 7.2.2** above, a feature based water balance is not recommended.

A feature based water balance is not recommended for the on-Site wetland features (SWT3-2 and MAS3-1) as these features receive negligible groundwater contributions; furthermore, groundwater recharge on-Site will be maintained to minimize negative impacts. In addition, based on long-term pumping at the average annual pumping rate, the radius of influence from supply wells are not estimated to reach these features and will not impact the on-Site wetlands.

A feature based water balance is not recommended for the off-Site wetland features (SWM1-1 and MAM3-1) as groundwater recharge on-Site will be maintained with infiltration measures to sustain groundwater contributions to these wetlands. These features will also not be impacted by groundwater takings from on-Site supply wells as they are outside the predicted zone of influence. In addition, nitrate loadings at the Site boundary are below the CCME / CVC guideline and not expected to impact off-Site wetlands. Finally, as outlined in the Functional Service Report (FSR), essentially all runoff from the Site up to the 100 year storm event will be contained to the Site, which is consistent with existing Site conditions, and therefore no change in hydrological conditions at off-Site wetland features from the development is anticipated.

### 7.2.4 Water Courses

Potential long-term impacts to the West Credit River will be related to groundwater contributions and groundwater quality. As infiltration is expected to be maintained post-development, the West Credit River is outside the zone of influence (approximate minimum distance to potential on-Site supply well is 370 m), and total groundwater takings on-Site are small and only 0.5% of the West Credit River baseflow, no changes to groundwater contributions to the West Credit River are anticipated. Similarly, long-term impacts to the West Credit River from changes in groundwater quality are expected to be minimal as groundwater nitrate loadings at the property boundary are expected to be lower than the CCME / CVC guideline for $NO_3$-as-N of 3 mg/L.

### 7.2.5 Karst Features

Karst features have not been identified at the Site; however, the OGS has indicated that there is the potential for karst features in the local area. Potential long-term impacts to karst features will be related to a reduction of recharge to these features or changes to water quality. As infiltration is expected to be maintained post-development, total groundwater takings on-Site are small, and site grading requirements are expected to be kept to a minimum, negative impacts to the function of any karst features that may be present are expected to be negligible. In addition, long-term impacts to karst features from changes in groundwater quality are expected to be minimal as the nitrate loading analysis demonstrates that nitrate loading from the septic systems would be small, and long-term nitrate concentrations at the Site are expected to decrease due the overall decrease in on-Site agricultural activity.

# 8 Summary

A summary of the hydrogeological investigation is provided below:

- The Site is located within West Credit River Subwatershed and is primarily within the Horseshoe Moraine physiographic region;
- Investigations at the Site have been completed by Terraprobe, Beatty, R.J. Burnside and COLE;
- Based on borehole logs and regional stratigraphy, the Site is generally underlain by Wentworth Till, glaciofluvial sediments, and Port Stanley Till. Bedrock units under the Site are the Guelph Formation and Amabel Formation dolostones, Cabot Head Formation shale, Manitoulin Formation dolostone, Whirlpool Formation sandstone, and Queenston Formation shale;
- Hydraulic conductivity estimates of the dolostone bedrock aquifer range from $4.7\text{x}10^{-6}$ m/s to $2.9\text{x}10^{-4}$ m/s with an average of $3.6\text{x}10^{-5}$ m/s. Infiltration rates of the overburden range from 420 mm/hr to 29 mm/hr with an average of approximately 152 mm/hr;
- Groundwater levels across the Site are typically 10 to 20 mbgs with the exception of shallower groundwater at the on-Site wetland features (SWT3-2 and MAS3-1) where it is typically 0 to 1 mbgs. In general, groundwater flow is primarily horizontal from south to north across the Site towards the West Credit River;
- On-Site groundwater quality meets the health-related ODWS for all tested parameters. Nitrate concentrations are below ODWS and generally increase from south to north across the Site. On-Site nitrate concentrations are attributed to on-Site and nearby agricultural activity;
- General groundwater quality on Site was found to have exceedances in total hardness and occasionally exceedances in turbidity with some occurrences of exceedances of aesthetic parameters such as total dissolved solids, sulphate, and iron. Water treatment systems are recommended to manage hard water and aesthetic water quality parameters;
- The one on-Site headwater drainage feature quickly infiltrates into the sandy overburden in the south of the Site. Groundwater is expected to discharge to the nearby West Credit River in support of base flow to the cold water fish habitat;
- Groundwater contributions to on-Site wetland features (SWT3-2 / MAS3-1) are estimated to be negligible. Qualitative investigations indicate that groundwater contributions to off-Site wetland features (SWM1-1 / MAM3-1) appear to be present;
- Water balance analysis indicates significant amounts of infiltration on the Site, which results from closed depressions within the hummocky topography and sandy overburden materials. Pre-development infiltration rates will be maintained post-development with no water leaving the Site up to the 100-year storm event;
- Nitrate loading analysis was completed in compliance with MOECC Procedure D-5-4. Nitrate loading from the 67 on-Site septic systems is expected to be 2.17 mg/L at the property

boundary, which is less than the CCME / CVC guideline for $NO_3$-as-N of 3 mg/L. This is provided that tertiary (Level IV) treatment systems such as the Waterloo Biofilter System Inc. standard the system that is able to reduce total nitrogen by 50-65% are installed at each house;

- CCME / CVC guideline for nitrate loading is met at all downgradient natural features that may receive even minimal groundwater discharge, provided tertiary (Level IV) treatment systems are installed at each house;
- Water quality results for the Site indicate nitrate concentrations meet the ODWS; however, it is noted that nitrate concentrations are generally higher in the northern portion of the Site. Although the reduction in agricultural activity with the development of the Site is expected to lead to long-term reductions in nitrate concentrations, it is recommended that future supply wells be located in areas where existing nitrate concentrations are less than 7 mg/L. Therefore, no supply wells will be located north of the line of higher nitrate concentrations, with a setback of at least 7 m of this line, as determined by a zone of contribution analysis. Review of the lot locations and dimensions on the Draft Plan indicates that supply wells can be located on all proposed lots in compliance with this recommendation as there is a minimum of 9 m between the road right-of-way and the 7 m setback line where wells can be located;
- A peak pumping rate of 18.75 L/min/house and average pumping rates of 1.56 L/min/house are expected, based on MOECC procedure D-5-5;
- Completed pumping tests, by R.J. Burnside, adequately demonstrate compliance with MOECC Procedure D-5-5;
- Long-term drawdown over 50 years at the average pumping rate is much less than available drawdown at all wells analyzed;
- The radius of influence of each well, based on average pumping rate, is expected to be approximately 100 m. However, this radius does not consider the influence of recharge. Therefore, the radius of influence of each well, based on average pumping rate and recharge analysis, is expected to be approximately 29.5 m, or a 0.27 ha area, which is less than the expected average lot size. Therefore, minimal supply interference is expected between private wells;
- Supply wells on-Site will be placed a minimum of 30 m apart. Since the radius of influence of each well is expected to be 30 m, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible;
- Overall, minimal to negligible long-term impacts are expected to surrounding groundwater users and natural features; and,
- Feature based water balances for on-Site and off-Site wetlands are not recommended, as groundwater and surface water contributions, if any, to natural features will be maintained.

# 9 Recommendations

Based on the presented hydrogeological investigations, the following recommendations for the development and future work are provided:

- The development can be supported by private wells based on an assessment of groundwater quality and quantity at the Site consistent with MOECC Procedure D-5-4 and D-5-5;
- The Site has appropriate subsurface conditions to support subsurface waste water disposal, and waste water servicing can be provided by private septic systems at each lot provided that tertiary (level IV) treatment systems such as the Waterloo Biofilter System Inc. standard system are installed;
- Based on nitrate concentrations, nitrate loading calculations, and radius of contribution calculations, supply wells within the Site should not be placed north of the line of higher nitrate concentrations, or within 7 m of this line to the south. Review of the lot locations and dimensions on the Draft Plan indicates that supply wells can be located on all proposed lots in compliance with this recommendation;
- The Site stormwater management plan should include implementation of LIDs to promote infiltration and maintain the Site water balance. Additional infiltration tests should be carried out at the Site to further quantify overburden infiltration rates in support of the detailed design of infiltration measures; and,
- An updated survey of private wells within 500 m of the Site may be beneficial to establish baseline conditions at those private wells prior to Site development.

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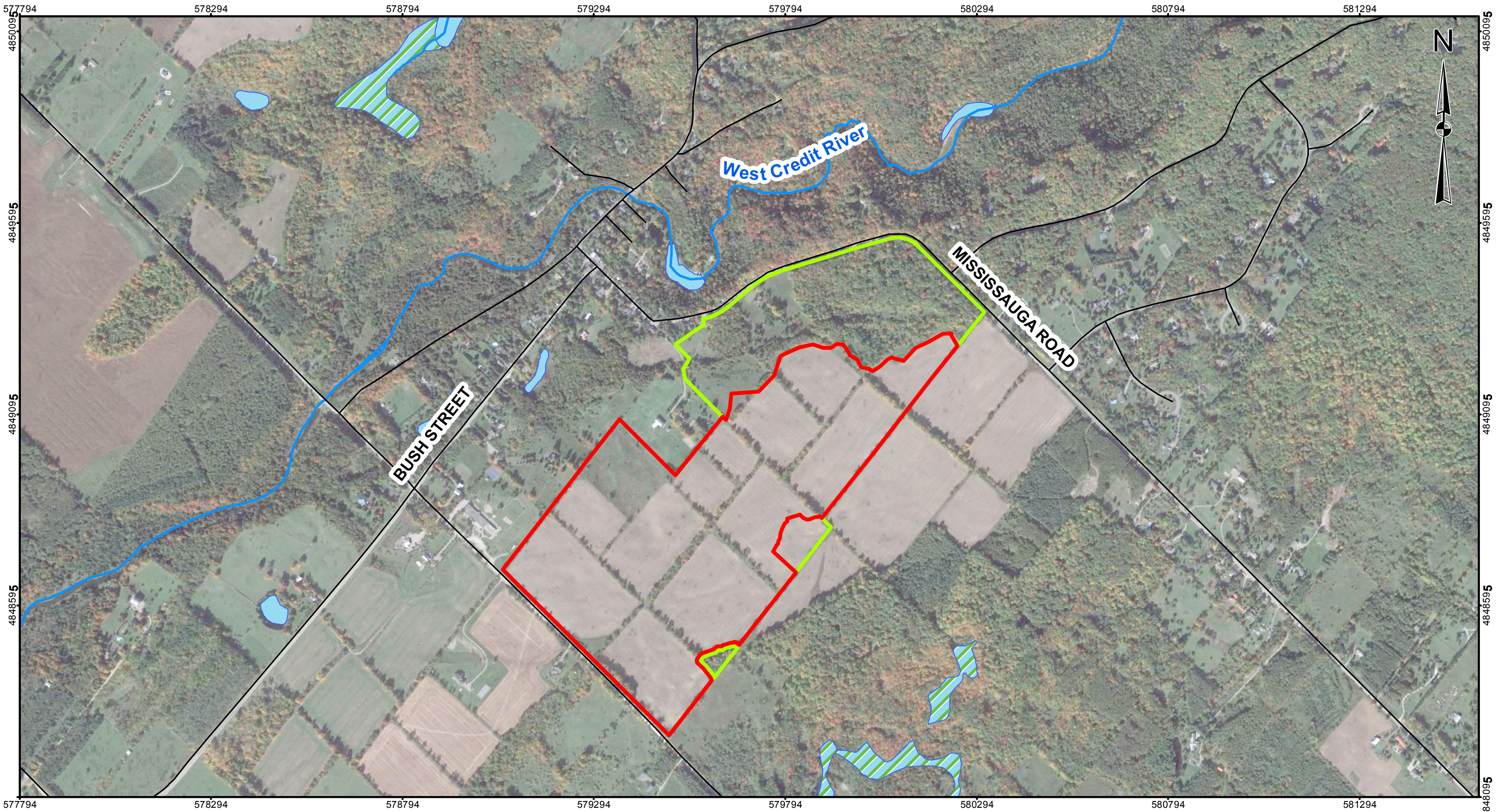
# Figures



COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

🟥 Site - Development Area

🟩 Site - Open Space Area

— Roads

~ Watercourses

Waterbody

▨ Wetlands

**REFERENCE**

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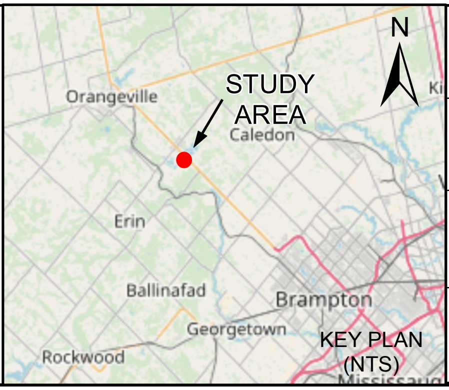

KEY PLAN (NTS)

SCALE 1:15,000

150 0 150 300 450 600 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Site Location

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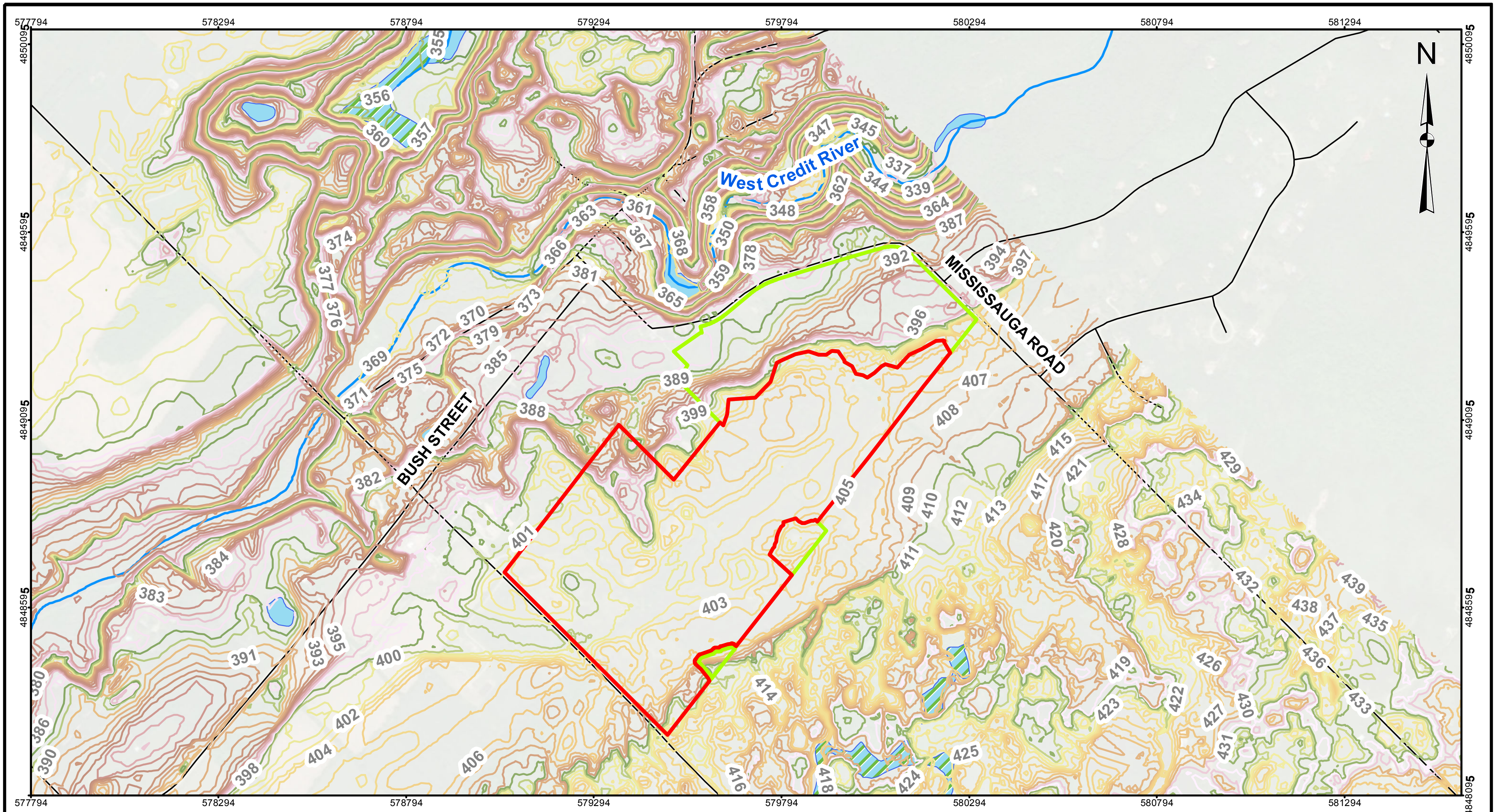
| | | |
|---|---|---|
| DATE: | 10/18/2017 | |
| GIS | C.C. | 10/18/2017 |
| DESIGN | | |
| CHECK | D.B. | 10/18/2017 |

PROJECT: 2017-0646

REV. 0.0

**FIGURE 1**



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## LEGEND

| | |
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| 🟥 Site - Development Area | Watercourses |
| 🟩 Site - Open Space Area | Waterbody |
| Roads | Wetlands |

**REFERENCE**

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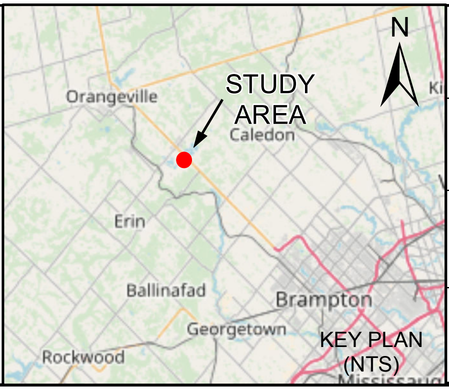

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Hydrogeological Investigation
Manors of Belfountain
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## Regional Topography

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| DATE: 10/18/2017 | | | PROJECT: 2017-0646 |
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| DESIGN | | | FIGURE 2 |
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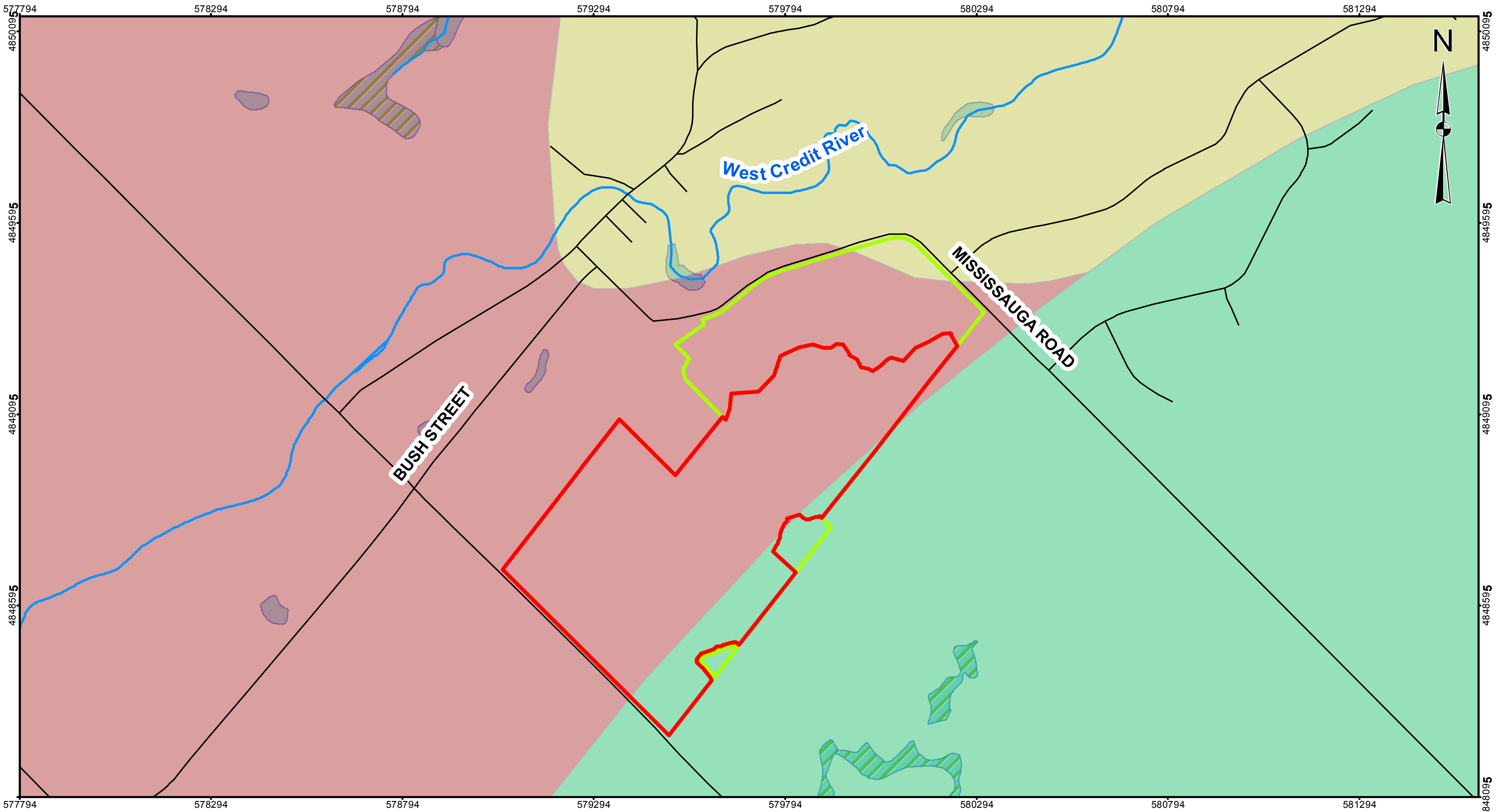

COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- 🟥 Site - Development Area
- 🟩 Site - Open Space Area
- — Roads
- 〰 Watercourses
- Waterbody
- ▨ Wetlands

**REGION**

- 🟥 Guelph Drumlin Field
- 🟩 Horseshoe Moraines
- 🟨 Niagara Escarpment

**REFERENCE**

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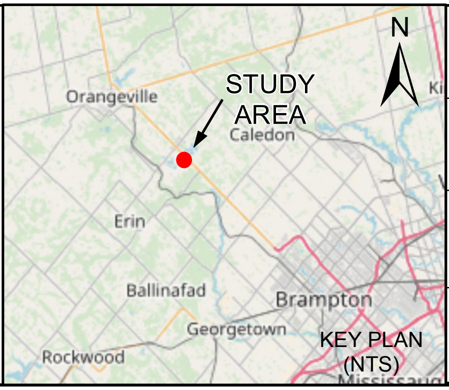

KEY PLAN
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Manors of Belfountain
Caledon, ON

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## Regional Physiography

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PROJECT: 2017-0646

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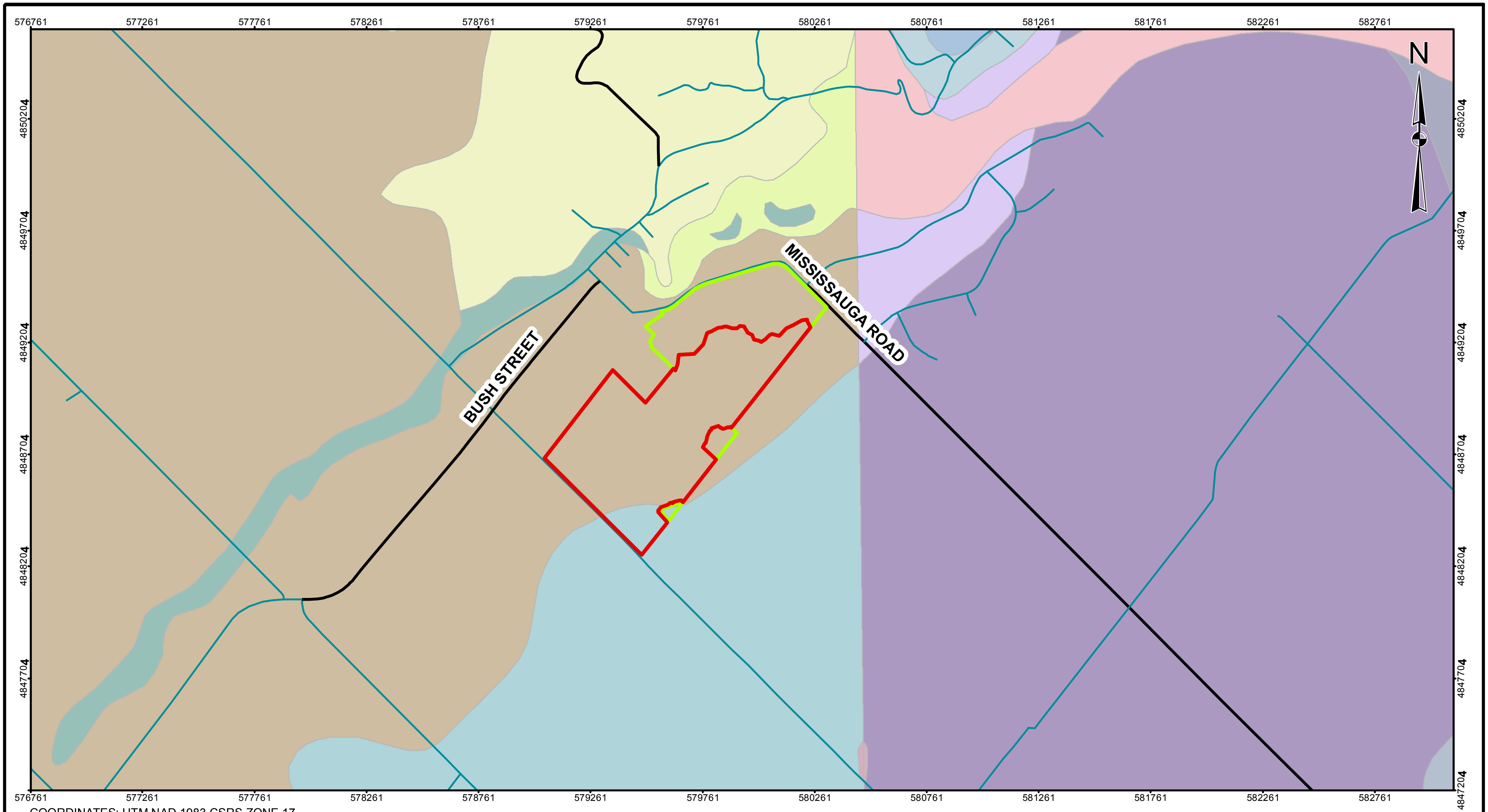
**FIGURE 3**



COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

▬ Site - Development Area
▬ Site - Open Space

**Material Description**

■ Bedrock
■ Bedrock-drift complex
■ Brown loam to silt loam till
■ Clinton and Cataract Groups
■ Gravel and gravelly sand, frequently overlain by several feet of sand or silt
■ Light brown, gravelly sandy loam and loam till. Considerable stratified material
■ Outwash gravel, usually covered by several feet of sand
■ Peat, muck, marl
■ Sand and gravel including some till or silt
■ Sandstone, dolostone, shale
■ Silt, sand, gravel
■ Stoney, sandy silt till
■ Unsubdivided silt, sand, gravel

**REFERENCE**

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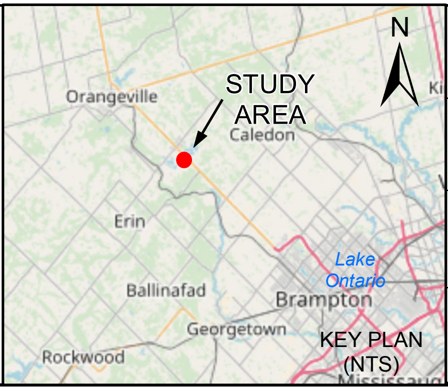

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PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Surficial Geology

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PROJECT: 2017-0646

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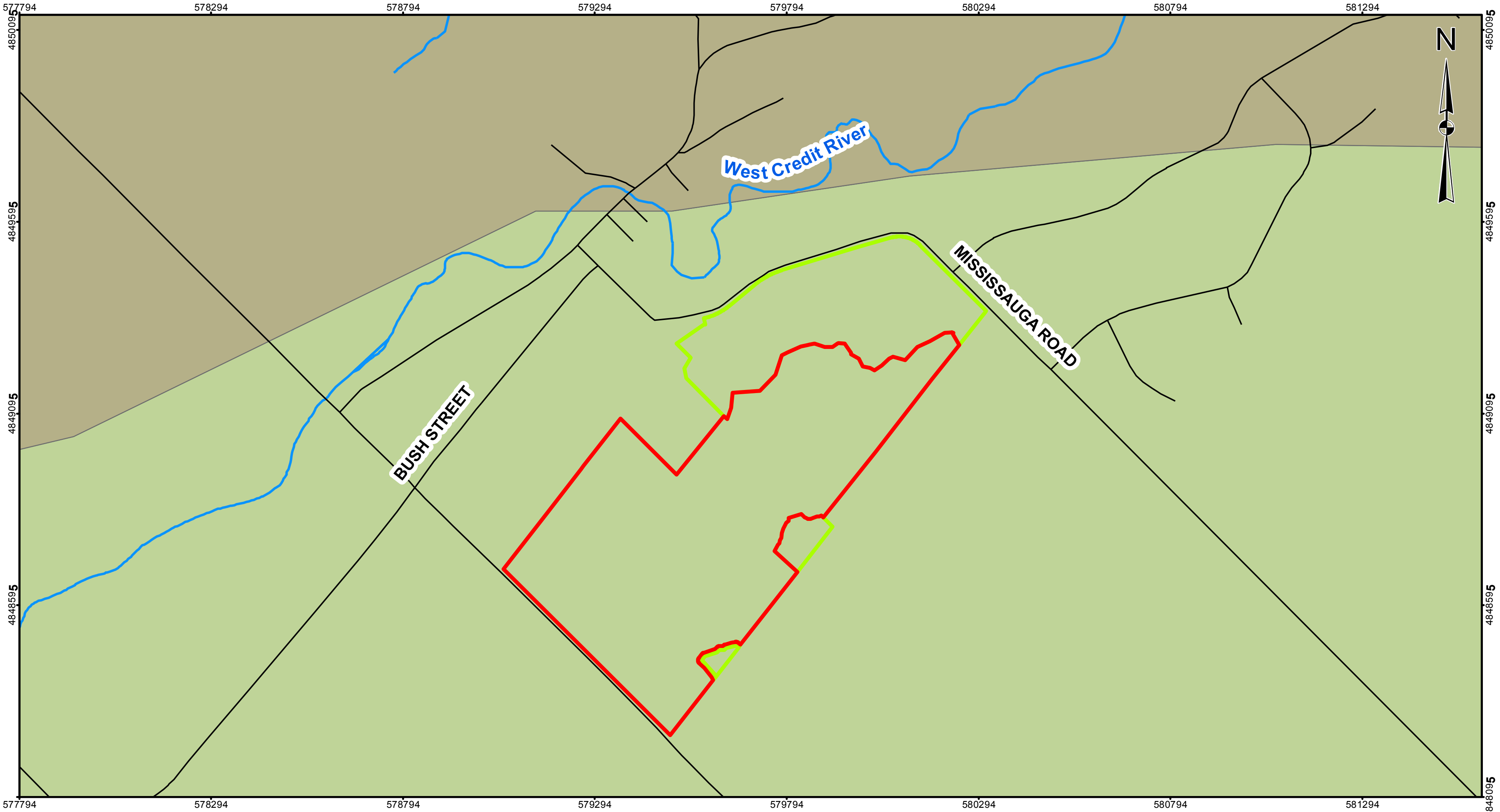
**FIGURE 4**



COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- 🟥 Site - Development Area
- 🟩 Site - Open Space Area
- — Roads
- ~ Watercourses

**Bedrock Geology**

- 🟩 Amabel Fm.
- ▨ Clinton Gp.; Cataract Gp.
- Waterbody
- Wetlands

**REFERENCE**

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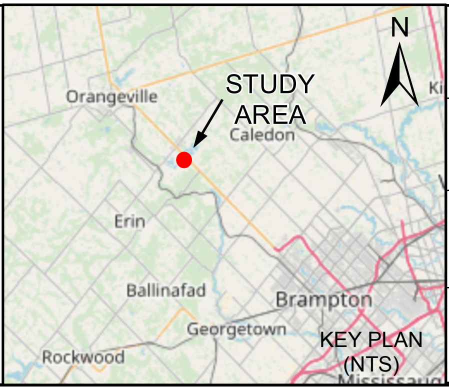

KEY PLAN (NTS)

SCALE 1:15,000

150 0 150 300 450 600 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Bedrock Geology

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| DATE: | 10/18/2017 | | PROJECT: 2017-0646 |
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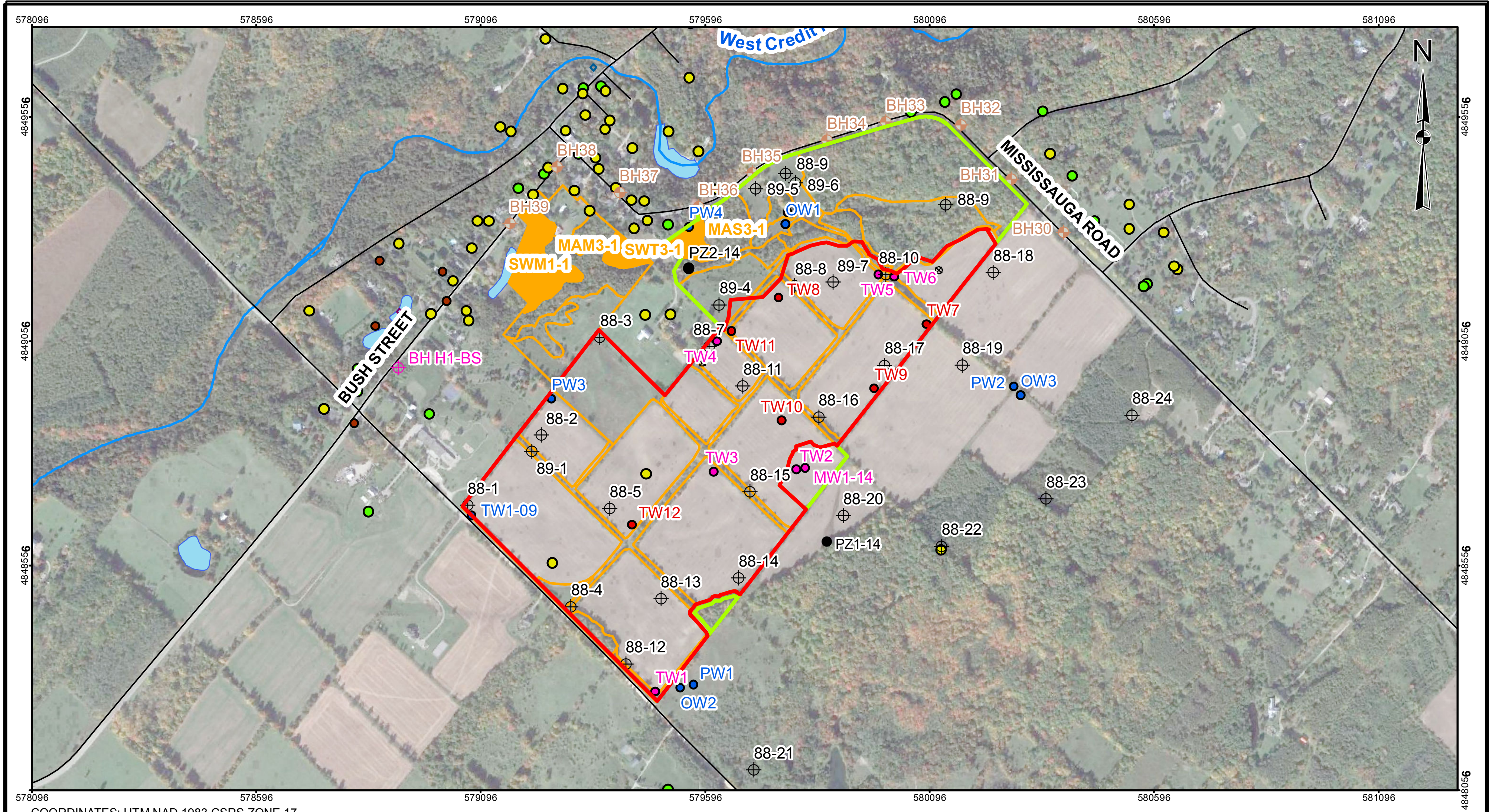

COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

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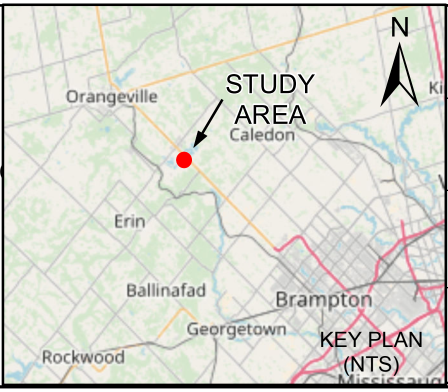
| ━ | Site - Development Area | ⊕ | Terraprobe Standpipes | 〰 | Watercourses |
| ━ | Site - Open Space Area | ● | Burnside Wells (2016) | ▨ | Waterbody |
| ● | PZ2-14 | ● | Burnside Wells (2014) | ▭ | Ecological Land Classification |
| — | Roads | ● | Beatty Wells | ■ | ELC marshes and swamps |
| ⊕ | Coffey (2013) | ● | MOECC Records (Shale) | ■ | MOECC Records (Dug Overburden) |
| ⊕ | Terraprobe (2013) | ● | MOECC Records (Limestone) | ■ | MOECC Records (Dug Shale) |
| | | ● | MOECC Records (Overburden) | | |

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



KEY PLAN (NTS)

SCALE 1:12,500

125 0 125 250 375 500 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Boreholes, Wells, and Other Monitoring Locations

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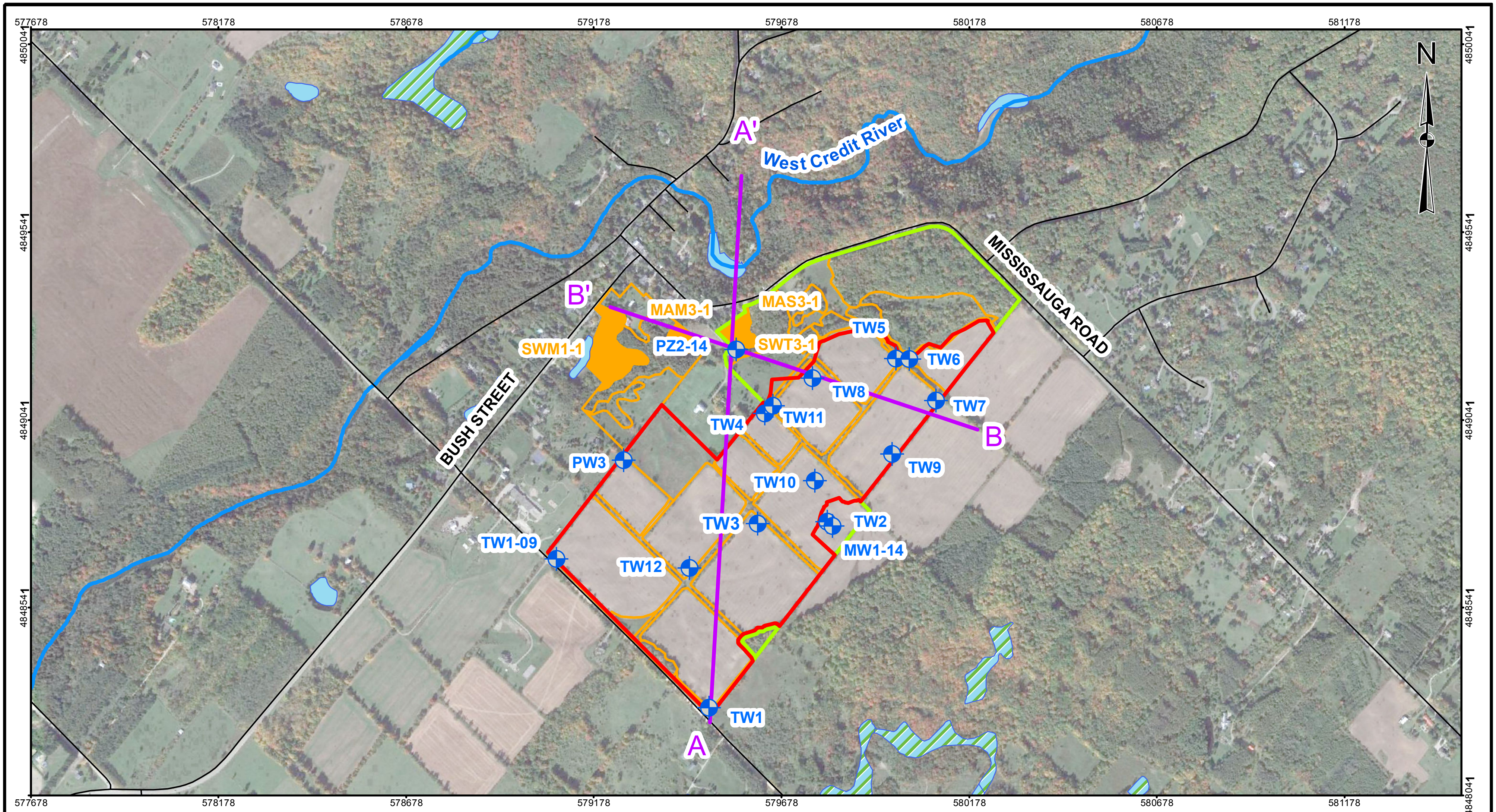
*Experience Enhancing Excellence*

| | | | |
|---|---|---|---|
| DATE: | 10/18/2017 | | PROJECT: 2017-0646 |
| GIS | C.C. | 10/18/2017 | REV. 0.0 |
| DESIGN | | | **FIGURE 6** |
| CHECK | D.B. | 10/18/2017 | |



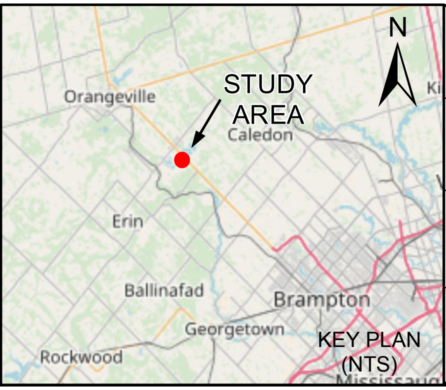
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

| | | | |
|---|---|---|---|
| ⊕ | Monitoring Well | ▨ | Wetlands |
| 🟥 | Site - Development Area | ☐ | Ecological land Classification (ELC) |
| 🟩 | Site - Open Space Area | 🟧 | ELC marshes and swamps |
| — | Roads | | |
| 〰 | Watercourses | | |
| ● | Waterbody | | |

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



KEY PLAN (NTS)

SCALE 1:15,000

150 0 150 300 450 600 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Cross-Section Plan

COLE ENGINEERING
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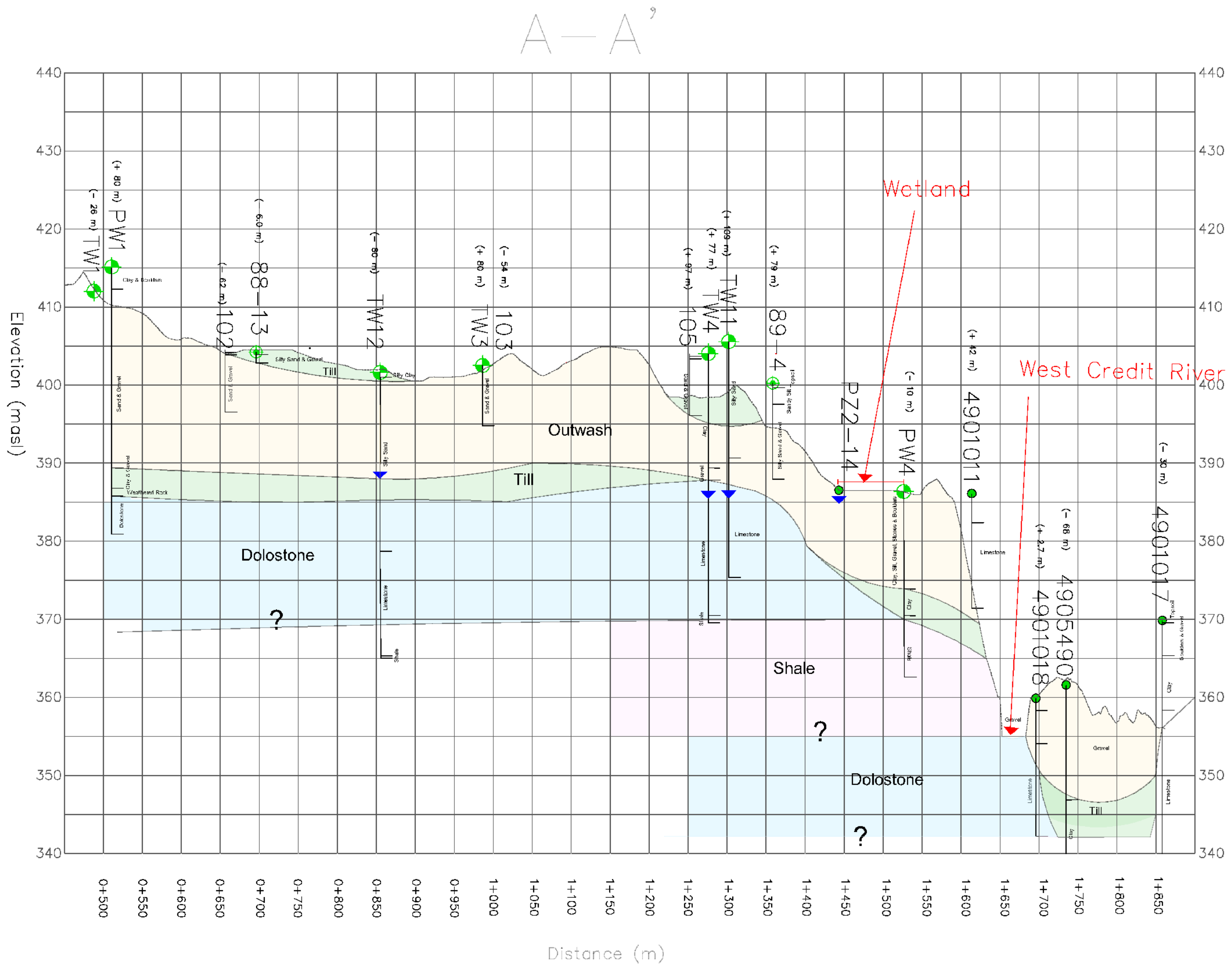
| | | | | |
|---|---|---|---|---|
| DATE: 10/18/2017 | | | PROJECT: 2017-0646 | |
| GIS | C.C. | 10/18/2017 | REV. 0.0 | |
| DESIGN | | | **FIGURE 7** | |
| CHECK | D.B. | 10/18/2017 | | |

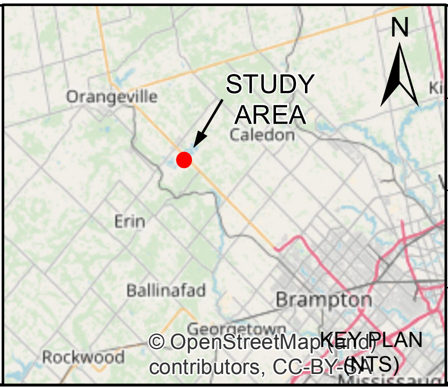


## LEGEND

🟨 Outwash

🟦 Dolostone

🟪 Shale



KEY PLAN (NTS)

SCALE
NTS

PROJECT
Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE
**Cross-Section A-A'**

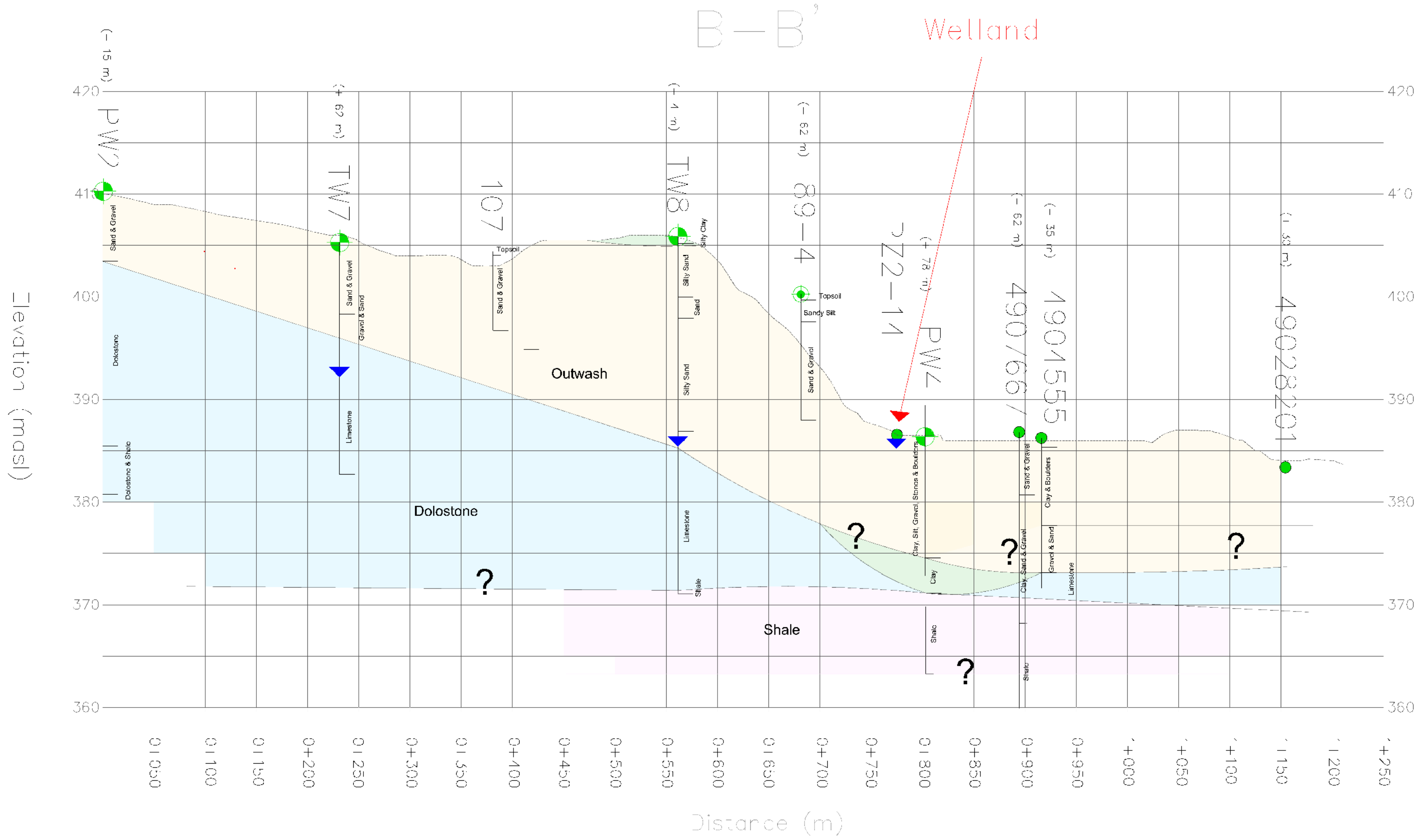
COLE ENGINEERING
Experience Enhancing Excellence

| | | |
|---|---|---|
| DATE: | 10/18/2017 | |
| GIS | C.C. | 10/18/2017 |
| DESIGN | | |
| CHECK | D.B. | 10/18/2017 |

PROJECT: 2017-0646

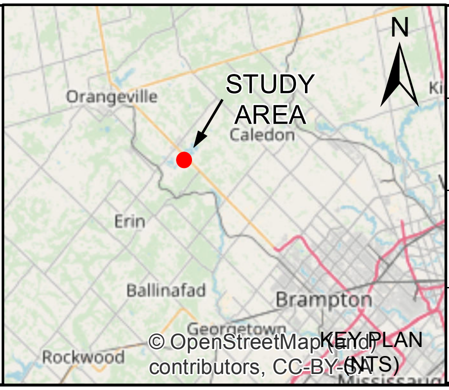
REV. 0.0

**FIGURE 8**



## LEGEND

| | |
|---|---|
| ▨ | Outwash |
| ▨ | Dolostone |
| ▨ | Shale |



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KEY PLAN (NTS)

SCALE

NTS

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

**Cross-Section B-B'**

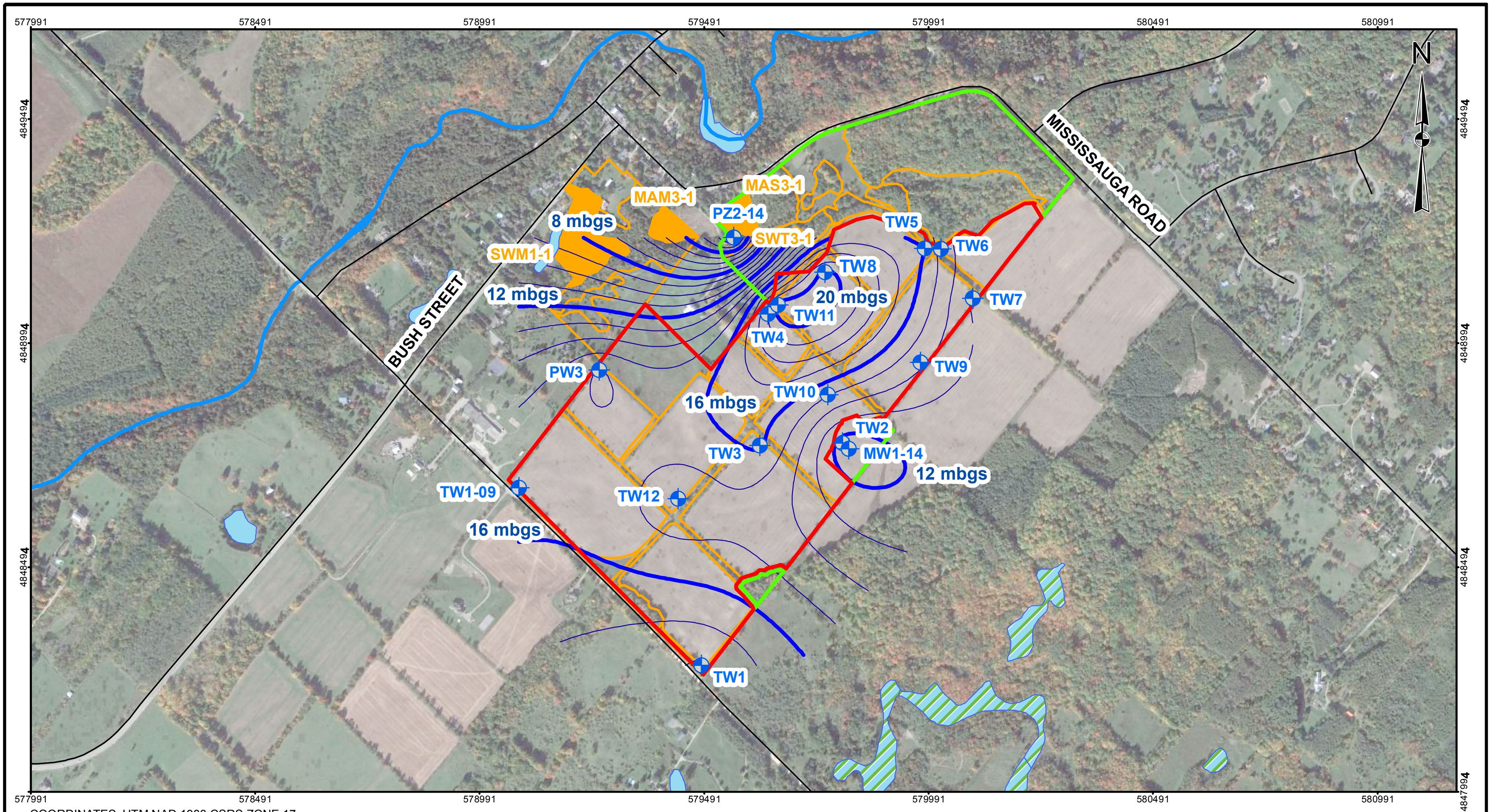
**COLE ENGINEERING**
*Experience Enhancing Excellence*

| | | |
|---|---|---|
| DATE: 10/18/2017 | | |
| GIS | C.C. | 10/18/2017 |
| DESIGN | | |
| CHECK | D.B. | 10/18/2017 |

PROJECT: 2017-0646

REV. 0.0

**FIGURE 9**



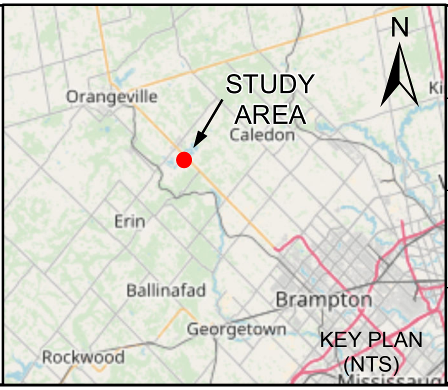
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- ⊕ GW depth on sitePnts
- 🟥 Site - Development Area
- 🟩 Site - Open Space Area
- — Roads
- 〰 Watercourses
- ▨ Waterbody
- ▨ Wetlands
- — Groundwater Depth (4m)
- — Groundwater Depth (1m)
- ☐ Ecological Land Classification (ELC)
- 🟧 ELC marshes and swamps

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



SCALE 1:12,500

125 0 125 250 375 500 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Depth to Groundwater

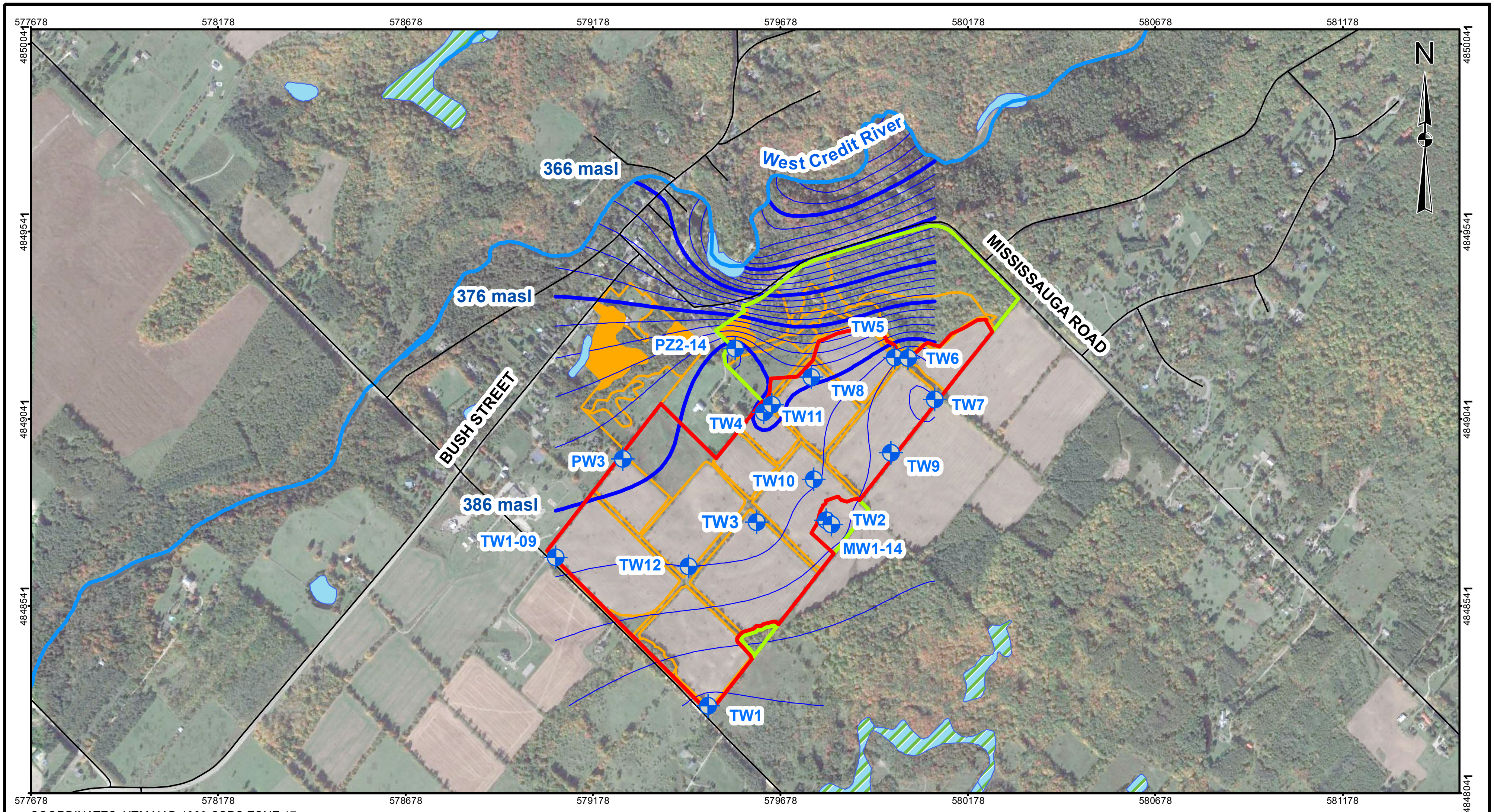
**COLE ENGINEERING**
*Experience Enhancing Excellence*

| | | |
|---|---|---|
| DATE: 10/18/2017 | | |
| GIS | C.C. | 10/18/2017 |
| DESIGN | | |
| CHECK | D.B. | 10/18/2017 |

PROJECT: 2017-0646

REV. 0.0

**FIGURE 10**



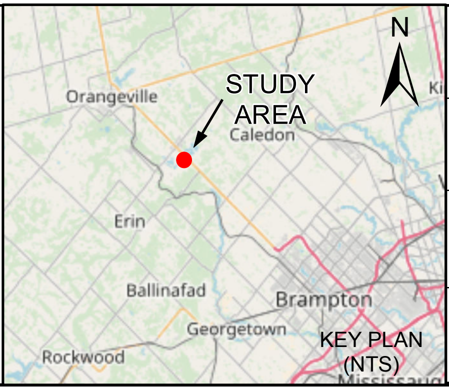
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- ⊕ Monitoring Well
- ▬ Site - Development Area
- ▬ Site - Open Space Area
- — Roads
- 〰 Watercourses
- ▨ Waterbody
- ▨ Wetlands
- ▬ Groundwater Contours (10m)
- — Groundwater Contours (2m)
- ☐ Ecological land Classification (ELC)
- ▬ ELC marshes and swamps

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



SCALE 1:15,000

150 0 150 300 450 600 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Groundwater Elevation Contours

COLE ENGINEERING
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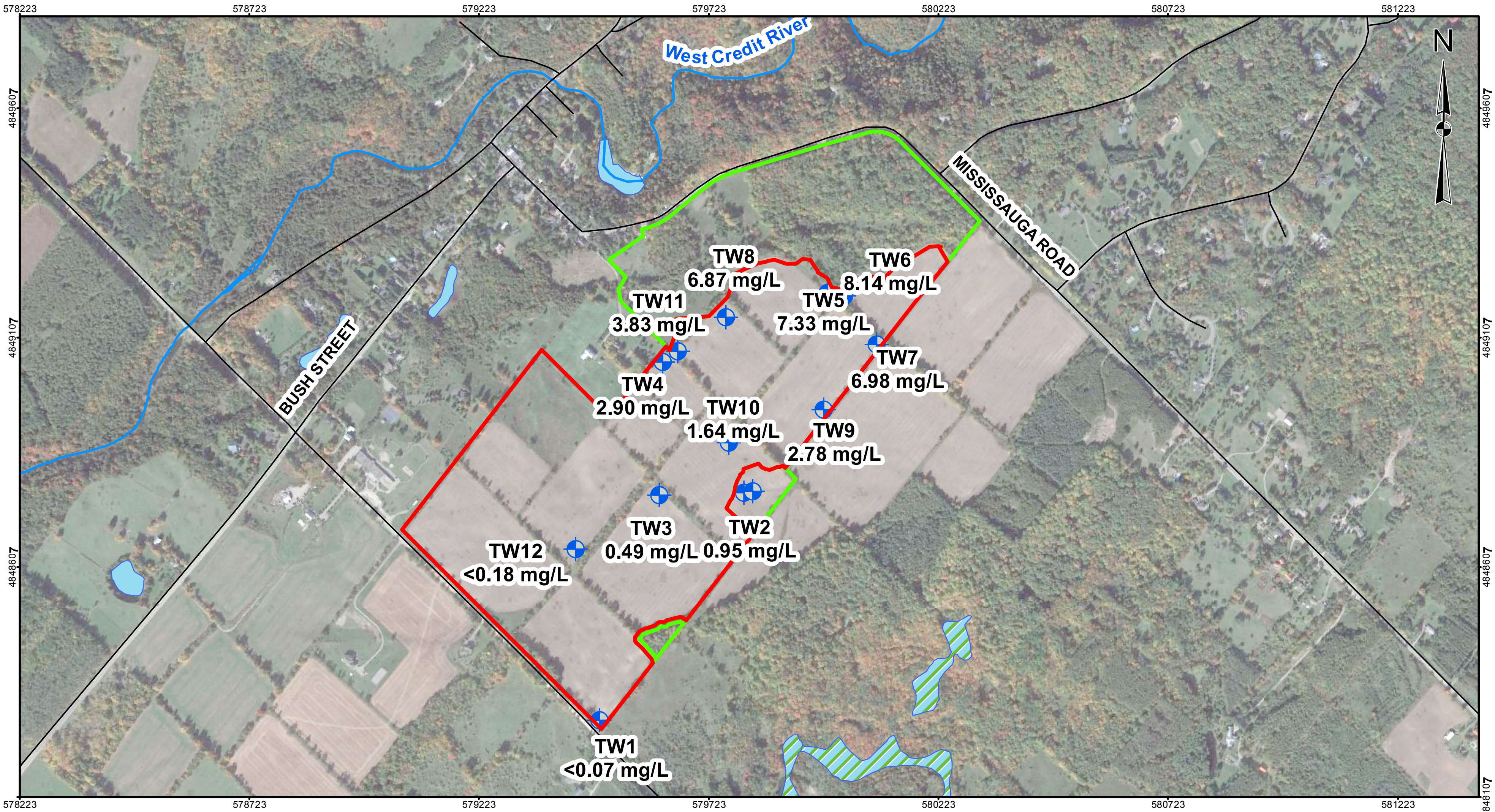
| | | |
|---|---|---|
| DATE: 10/18/2017 | | |
| GIS | C.C. | 10/18/2017 |
| DESIGN | | |
| CHECK | D.B. | 10/18/2017 |

PROJECT: 2017-0646

REV. 0.0

**FIGURE 11**



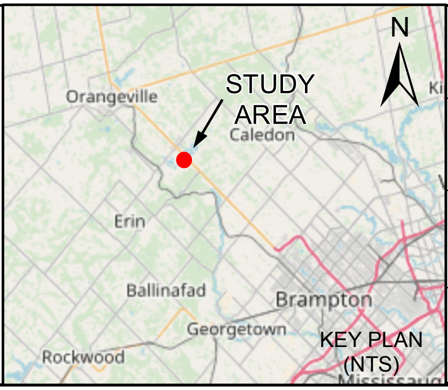
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- ━ Site - Development Area
- ━ Site - Open Space Area
- — Roads
- ⊕ Monitoring Wells
- 〰 Watercourses
- ● Waterbody
- ▨ Wetlands

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



SCALE 1:12,500

125 0 125 250 375 500 Meters

PROJECT

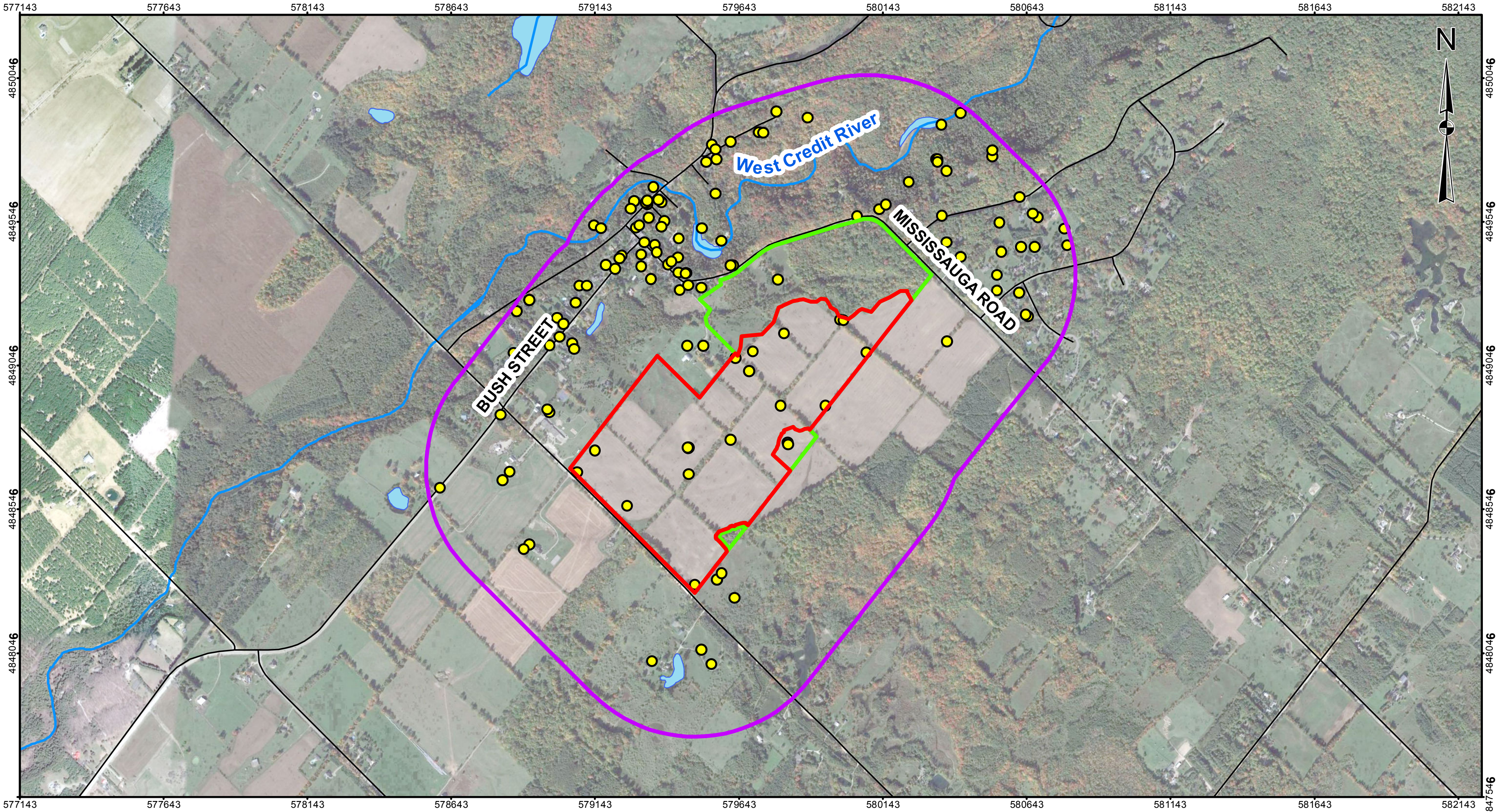
Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Average 2017 Nitrate Concentrations

**COLE ENGINEERING**
*Experience Enhancing Excellence*

| | | | |
|---|---|---|---|
| DATE: | 10/18/2017 | | PROJECT: 2017-0646 |
| GIS | C.C. | 12/14/2017 | REV. 0.0 |
| DESIGN | | | FIGURE 12 |
| CHECK | D.B. | 12/14/2017 | |



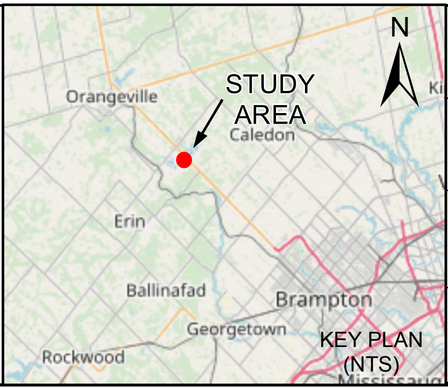
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- 🟥 Site - Development Area
- 🟩 Site - Open Space Area
- ▭ 500 m Buffer of Site
- ● MOECC Well Records
- — Roads
- 〰 Watercourses
- Waterbody

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



KEY PLAN (NTS)

SCALE 1:20,000

200 0 200 400 600 800 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## MOECC Well Records

**COLE ENGINEERING**
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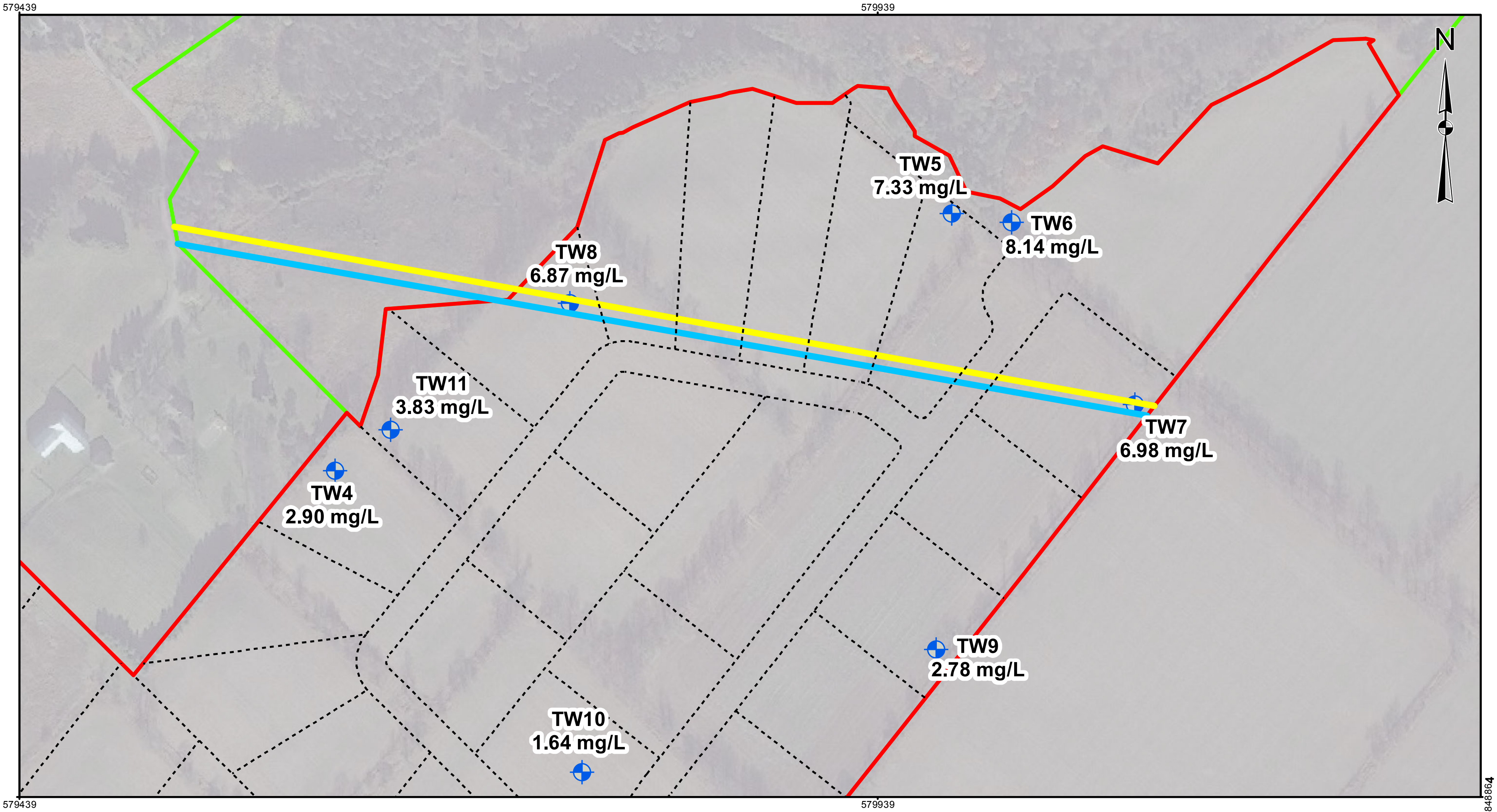
| | | | |
|---|---|---|---|
| DATE: | 10/18/2017 | | PROJECT: 2017-0646 |
| GIS | C.C. | 10/18/2017 | REV. 0.0 |
| DESIGN | | | **FIGURE 13** |
| CHECK | D.B. | 10/18/2017 | |



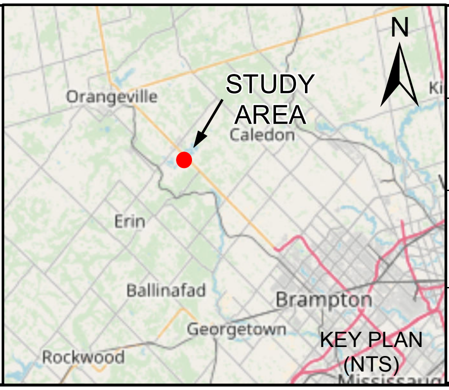
COORDINATES: UTM NAD 1983 CSRS ZONE 17.

## LEGEND

- 🟥 Site - Development Area
- 🟩 Site - Open Space Area
- ---- Lot Layouts
- ⊕ Monitoring Wells
- 🟨 Line of Higher Nitrate Concentrations
- 🟦 7 m Setback Line

**REFERENCE**

**Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA**



KEY PLAN
(NTS)

SCALE 1:3,350

30 0 30 60 90 120 Meters

PROJECT

Hydrogeological Investigation
Manors of Belfountain
Caledon, ON

TITLE

## Line of Higher Nitrate Concentrations

**COLE ENGINEERING**
*Experience Enhancing Excellence*

| | | | |
|---|---|---|---|
| DATE: 10/18/2017 | | | PROJECT: 2017-0646 |
| GIS | C.C. | 12/14/2017 | REV. 0.0 |
| DESIGN | | | **FIGURE 14** |
| CHECK | D.B. | 12/14/2017 | |

# Appendix A

# Draft Plan of Subdivision

# DRAFT PLAN OF SUBDIVISION
# MANORS OF BELFOUNTAIN CORP.

***FILE # 21T-91015C***

*PART OF EAST HALF AND WEST HALF LOT 9,*
*CONCESSION 5, W.H.S.*
*(HAMLET OF BELFOUNTAIN),*
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

## OWNERS CERTIFICATE

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF CALEDON FOR APPROVAL.

SIGNED ______________________ DATE: ____________
JOHN SPINA, ASO
MANORS OF BELFOUNTAIN CORP.

## SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED ______________________ DATE: ____________
ALISTER SANKEY, OLS
DAVID B. SEARLES SURVEYING LTD.
4255 SHERWOODTOWNE BLVD. SUITE 206
MISSISSAUGA, ON, L4Z 1Y5
PHONE: 905-273-6840
EMAIL: info@dbsearles.ca

## ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) SANDY LOAM AND CLAY LOAM
K) SANITARY AND STORM SEWERS TO BE PROVIDED

## NOTES

- Local to local radii - 5.0
- Streets 'A' & 'C' to Shaws Creek Rd. daylight triangles - 15.0 x 15.0
- Pavement illustration is diagrammatic only

## LAND USE SCHEDULE

| LAND USE | LOTS / BLOCKS | AREA (ha) | AREA (ac) | UNITS |
|---|---|---|---|---|
| ESTATE RESIDENTIAL | 1-67 | 42.24 | 104.38 | **67** |
| PARK | 68-72 | 2.60 | 6.42 | |
| OPEN SPACE | 73-75 | 18.92 | 46.75 | |
| 10m BUFFER | 76, 77 | 1.02 | 2.52 | |
| ROAD WIDENING | 78 | 0.18 | 0.44 | |
| 18.0m ROW - (2,886m LENGTH) | | 5.32 | 13.15 | |
| **TOTAL** | **78** | **70.28** | **173.67** | **67** |

Scale 1:2000
(24 x 36)
December 5, 2017

GLEN SCHNARR & ASSOCIATES INC.
URBAN & REGIONAL PLANNERS, LAND DEVELOPMENT CONSULTANTS
SUITE 700 10 KINGSBRIDGE GARDEN CIRCLE,
MISSISSAUGA, ONTARIO, L5R 3K6
TEL (905) 568-8888 FAX (905) 568-8894 www.gsai.ca

# Appendix B

# Borehole Logs

Ontario Ministry of the Environment

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

**Tag #: A165388**

TW1

# Well Record

***Regulation 903 Ontario Water Resources Act***

Page 1 of 1

**Measurements recorded in:** ☒ Metric ☐ Imperial

## Well Owner's Information

First Name: Orb | Last Name / Organization: Property Corporation | E-mail Address: | ☐ Well Constructed by Well Owner

Mailing Address (Street Number/Name): 2121 Olde Baseline Road | Municipality: Caledon | Province: ON | Postal Code: L7K0K7 | Telephone No. *(inc. area code)*:

## Well Location

Address of Well Location (Street Number/Name): | Township: Town of Caledon | Lot: Pt 9 | Concession: 5 WHS

County/District/Municipality: Peel | City/Town/Village: Belfountain | Province: **Ontario** | Postal Code:

UTM Coordinates: NAD 8 3 | Zone: 17 | Easting: 579491 | Northing: 4848283 | Municipal Plan and Sublot Number: | Other:

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/ft) From | Depth (m/ft) To |
|---|---|---|---|---|---|
| Gray | Clay & stones | | | 0 | 8.53 |
| Brown | Clay & stones | | | 8.53 | 29.87 |
| Brown | limestone | | | 29.87 | 39.62 |
| Gray | Limestone | | | 39.62 | 53.03 |
| Blue | shale | | | 53.03 | 53.94 |

## Annular Space

| Depth Set at (m/ft) From | To | Type of Sealant Used (Material and Type) | Volume Placed (m³/ft³) |
|---|---|---|---|
| 0 | 10 | Bentonite Grout | .73 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/in) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/in) | Depth (m/ft) From | Depth (m/ft) To |
|---|---|---|---|---|
| 15.9 | steel | .48 | +.85 | 30.78 |
| 15.4 | open hole | | 30.78 | 53.94 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

Water found at Depth 44 (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☑ Untested ☐ Other, *specify*

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

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

## Hole Diameter

| Depth (m/ft) From | Depth (m/ft) To | Diameter (cm/in) |
|---|---|---|
| 0 | 30.78 | 22.8 |
| 30.78 | 53.94 | 15.6 |

## Well Contractor and Well Technician Information

Business Name of Well Contractor: Well Initiatives Ltd. | Well Contractor's Licence No.: 7221

Business Address (Street Number/Name): 15 Townline Rd. Orangeville | Municipality:

Province: Ont | Postal Code: L9W3R4 | Business E-mail Address: info@wellinitiatives.com

Bus.Telephone No. *(inc. area code)*: 5198468289 | Name of Well Technician (Last Name, First Name): Losch Kim

Well Technician's Licence No.: T 9 2 7 | Signature of Technician and/or Contractor: Losch | Date Submitted: 2 0 Y Y M M 2 8

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 42.6

Pumping rate (l/min / GPM): 45

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 34.76

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

Recommended pump depth (m/ft): 42.6

Recommended pump rate (l/min / GPM): 45

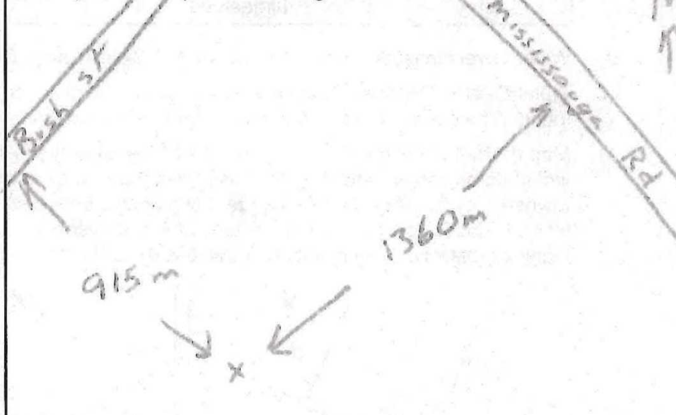
Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

| Draw Down Time (min) | Draw Down Water Level (m/ft) | Recovery Time (min) | Recovery Water Level (m/ft) |
|---|---|---|---|
| Static Level | 19.19 | | 34.76 |
| 1 | 23.47 | 1 | 32.68 |
| 2 | 26.44 | 2 | 30.74 |
| 3 | 28.25 | 3 | 29.10 |
| 4 | 30.29 | 4 | 27.68 |
| 5 | 31.87 | 5 | 26.46 |
| 10 | 33.89 | 10 | 22.70 |
| 15 | 34.23 | 15 | 21.25 |
| 20 | 34.27 | 20 | 20.73 |
| 25 | 34.22 | 25 | 20.50 |
| 30 | 34.43 | 30 | 20.36 |
| 40 | 34.53 | 40 | 20.30 |
| 50 | 34.56 | 50 | 20.19 |
| 60 | 34.60 | 60 | 20.09 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2 0 1 4 0 7 [illegible] 5

**Ministry Use Only**

Audit No. Z 188877

Received

0506E (2007/12)

Well Owner's Copy

Ontario Ministry of the Environment

TW2

# Well Record

*Regulation 903 Ontario Water Resources Act*

**Well Tag No.** *(Place Sticker and/or Print Below)*
Tag #: A165390

Measurements recorded in: ☒ Metric ☐ Imperial

Page 1 of 1

## Well Owner's Information

| | | | |
|---|---|---|---|
| First Name | Last Name / Organization: 2cb Property Corporation | E-mail Address | ☐ Well Constructed by Well Owner |
| Mailing Address (Street Number/Name): 2121 Olde Baseline Road | Municipality: Caledon | Province: ON | Postal Code: L7C0K7 |
| Telephone No. *(inc. area code)* | | | |

## Well Location

| | | | |
|---|---|---|---|
| Address of Well Location (Street Number/Name) | Township: Town of Caledon | Lot: Pt 9 | Concession: 5WHS |
| County/District/Municipality: Peel | City/Town/Village: Belfountain | Province: **Ontario** | Postal Code |
| UTM Coordinates NAD 83 | Zone: 17 | Easting: 579813 | Northing: 4848777 |
| Municipal Plan and Sublot Number | Other | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth *(m/ft)* From | To |
|---|---|---|---|---|---|
| Brn | clay | | | 0 | 2.74 |
| Gray | Clay Boulders | | | 2.74 | 7.62 |
| Grn | Clay & silt | | | 7.62 | 8.22 |
| Gray | Clay & stones | | | 8.22 | 11.88 |
| White | limestone | | | 11.88 | 12.19 |
| Gray | limestone | | | 12.19 | 13.10 |
| Brown | limestone | | | 13.10 | 17.06 |
| Grn | limestone | | | 17.06 | 20.11 |
| | | | | | |

## Annular Space

| Depth Set at *(m/ft)* From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/ft³)* |
|---|---|---|---|
| 0 | 0 | Bentonite Grout | .25 |
| | | | |
| | | | |
| | | | |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

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

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/ft)* | Recovery Time *(min)* | Water Level *(m/ft)* |
|---|---|---|---|
| Static Level | | | |
| 1 | | 1 | |
| 2 | | 2 | |
| 3 | | 3 | |
| 4 | | 4 | |
| 5 | | 5 | |
| 10 | | 10 | |
| 15 | | 15 | |
| 20 | | 20 | |
| 25 | | 25 | |
| 30 | | 30 | |
| 40 | | 40 | |
| 50 | | 50 | |
| 60 | | 60 | |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/in)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth *(m/ft)* From | To |
|---|---|---|---|---|
| 15.9 | steel | .48 | +.60 | 12.49 |
| 15.9 | open hole | | 12.49 | 20.11 |
| | | | | |
| | | | | |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

Water found at Depth 20.11 *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☑ Untested ☐ Other, specify

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

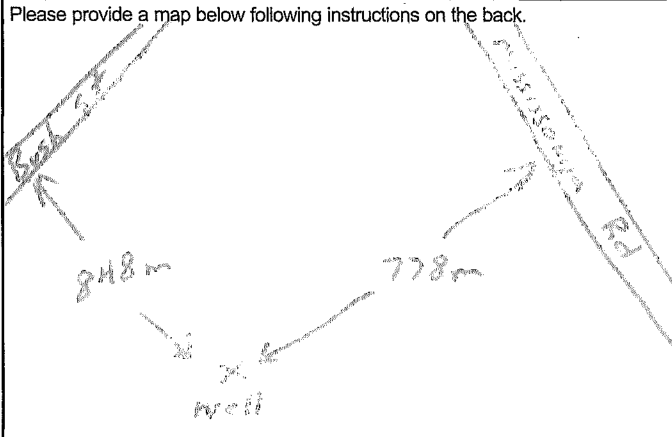
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

## Hole Diameter

| Depth *(m/ft)* From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 12.49 | 22.8 |
| 12.49 | 20.11 | 15.9 |
| | | |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Well Contractor and Well Technician Information

| | | |
|---|---|---|
| Business Name of Well Contractor: Well Initiatives Ltd. | | Well Contractor's Licence No.: 7221 |
| Business Address (Street Number/Name): 15 Townline Rd. Orangeville | | Municipality |
| Province: Ont | Postal Code: L9W3R4 | Business E-mail Address: info@wellinitiatives.com |
| Bus.Telephone No. *(inc. area code)*: 5198468289 | Name of Well Technician (Last Name, First Name): Loeb Kim | |
| Well Technician's Licence No.: 1927 | Signature of Technician and/or Contractor | Date Submitted |

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered Y Y Y Y M M D D

Date Work Completed

**Ministry Use Only**
Audit No. Z188872
Received

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Well Owner's Copy

Ontario Ministry of the Environment

TW3 30K-7N3

# Well Record

**Regulation 903 Ontario Water Resources Act**

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

Tag #: A165393

Measurements recorded in: ☒ Metric ☐ Imperial

Page 1 of 1

## Well Owner's Information

| | | | |
|---|---|---|---|
| First Name | Last Name / Organization: Orb Property Corporation | E-mail Address | ☐ Well Constructed by Well Owner |
| Mailing Address (Street Number/Name): 2121 Olde Baseline Road | Municipality | Province: ON | Postal Code: L7C0K7 |

Telephone No. *(inc. area code)*:

## Well Location

| | | | |
|---|---|---|---|
| Address of Well Location (Street Number/Name) | Township: Town of Caledon | Lot: Pt 9 | Concession: 5 WHS |
| County/District/Municipality: Peel | City/Town/Village: Bolton/Caledon | Province: **Ontario** | Postal Code |
| UTM Coordinates NAD 83, Zone 17, Easting 579995, Northing 4849204 | Municipal Plan and Sublot Number | Other | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/ft) From | To |
|---|---|---|---|---|---|
| Red | Clay + stones | | | 0 | 10.97 |
| Gray | Clay + stones | | | 10.97 | 18.89 |
| Brown | limestone | | | 18.89 | 26.21 |
| Gray | limestone | | | 26.21 | 32.61 |
| Dark Brown | limestone | | | 32.61 | 35.35 |
| Blue | shale | | | 35.35 | 35.96 |

## Annular Space

| Depth Set at (m/ft) From | To | Type of Sealant Used (Material and Type) | Volume Placed (m³/ft³) |
|---|---|---|---|
| 0 | 10 | Bentonite Grout | .75 |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at ([✓ m]/ft): 31.1

Pumping rate ([✓ l/min] / GPM): 94

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping ([✓ m]/ft): 23.62

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

Recommended pump depth ([✓ m]/ft): 31.1

Recommended pump rate ([✓ l/min] / GPM): 90

Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

| Draw Down Time (min) | Water Level ([✓ m]/ft) | Recovery Time (min) | Water Level ([✓ m]/ft) |
|---|---|---|---|
| Static Level | 15.80 | | 23.62 |
| 1 | 19.01 | 1 | 20.01 |
| 2 | 20.77 | 2 | 18.43 |
| 3 | 21.42 | 3 | 17.55 |
| 4 | 21.84 | 4 | 17.09 |
| 5 | 22.22 | 5 | 16.86 |
| 10 | 22.76 | 10 | 16.51 |
| 15 | 23.08 | 15 | 16.38 |
| 20 | 23.22 | 20 | 16.28 |
| 25 | 23.32 | 25 | 16.22 |
| 30 | 23.38 | 30 | 16.16 |
| 40 | 23.46 | 40 | 16.07 |
| 50 | 23.52 | 50 | 16.02 |
| 60 | 23.53 | 60 | 15.99 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/in) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/in) | Depth (m/ft) From | To |
|---|---|---|---|---|
| 15.9 | Steel | .48 | -.98 | 22.8 |
| 15.4 | open hole | | 22.8 | 35.96 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

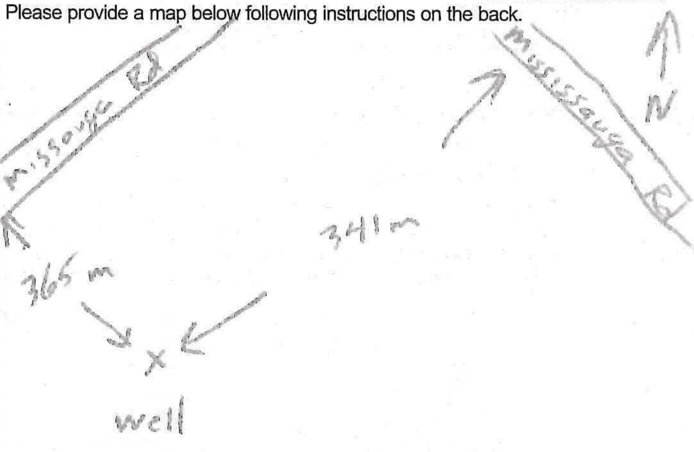
Water found at Depth 33 (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☒ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

## Hole Diameter

| Depth (m/ft) From | To | Diameter (cm/in) |
|---|---|---|
| 0 | 19.81 | 22.8 |
| 19.81 | 35.96 | 15.6 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Well Contractor and Well Technician Information

Business Name of Well Contractor: Well Initiatives Ltd
Well Contractor's Licence No.: 7211
Business Address (Street Number/Name): 15 Townline Rd. Orangeville
Municipality:
Province: Ont.
Postal Code: L9W3R4
Business E-mail Address: info@wellinitiatives.com
Bus. Telephone No. *(inc. area code)*: 5198468289
Name of Well Technician (Last Name, First Name): Losch Kim
Well Technician's Licence No.: T927
Signature of Technician and/or Contractor: Kim Losch
Date Submitted: 2014 0[illegible] [illegible]

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2014 0[illegible] [illegible]

**Ministry Use Only**

Audit No. Z188876

Received

0506E (2007/12)

Well Owner's Copy

Ontario Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

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

Tag #: A165392

TW4

SOK 1N4

# Well Record

***Regulation 903 Ontario Water Resources Act***

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
|  | Orb Property Corporation |  |  |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 Olde Baseline Road | Caledon | ON | L7C0K7 |  |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
|  | Town of Caledon | Pt 9 | 5 WHS |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| Peel | Belfountain | **Ontario** |  |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 579631 | 4849072 |  |  |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth *(m/ft)* From | To |
|---|---|---|---|---|---|
| Gray | Clay & stones |  |  | 0 | 14.63 |
| Brown | Clay |  |  | 14.63 | 15.84 |
|  | Gravel |  |  | 15.84 | 17.37 |
| Brown | limestone |  |  | 17.37 | 34.74 |
| Blue | shale |  |  | 34.74 | 35.66 |

## Annular Space

| Depth Set at *(m/ft)* From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/ft³)* |
|---|---|---|---|
| 0 | 10 | Bentonite Grout | .75 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/in)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth *(m/ft)* From | To |
|---|---|---|---|---|
| 15.9 | steel | .48 | +.60 | 17.67 |
| 15.4 | open hole |  | 17.67 | 35.66 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

Water found at Depth 32 *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☑ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

## Hole Diameter

| Depth *(m/ft)* From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 17.67 | 22.8 |
| 17.67 | 35.66 | 15.6 |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| Well Initiatives Ltd | 7211 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 Townline Rd Orangeville |  |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| Ont | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198468289 | Losch Kim |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| T 927 |  | [illegible] |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)* 30

Pumping rate *(l/min / GPM)* 30.3

Duration of pumping 6 hrs + 0 min

Final water level end of pumping *(m/ft)* 19.71

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

Recommended pump depth *(m/ft)* 30

Recommended pump rate *(l/min / GPM)* 30.3

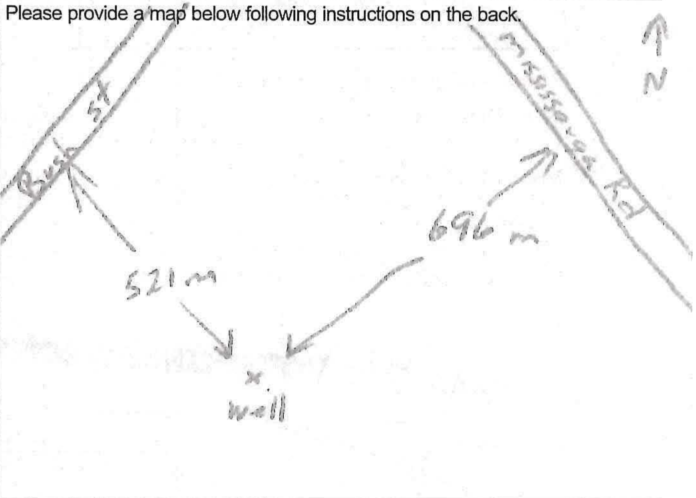
Well production *(l/min / GPM)*

Disinfected? ☑ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/ft)* | Recovery Time *(min)* | Water Level *(m/ft)* |
|---|---|---|---|
| Static Level | 19.56 |  | 19.71 |
| 1 | 19.68 | 1 | 19.59 |
| 2 | 19.69 | 2 | 19.58 |
| 3 | 19.69 | 3 | 19.58 |
| 4 | 19.69 | 4 | 19.58 |
| 5 | 19.69 | 5 | 19.58 |
| 10 | 19.69 | 10 | 19.575 |
| 15 | 19.69 | 15 | 19.575 |
| 20 | 19.69 | 20 | 19.575 |
| 25 | 19.695 | 25 | 19.575 |
| 30 | 19.695 | 30 | 19.575 |
| 40 | 19.695 | 40 | 19.575 |
| 50 | 19.70 | 50 | 19.57 |
| 60 | 19.70 | 60 | 19.57 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered ☐ Yes ☑ No

Date Package Delivered Y Y Y Y M M D D

Date Work Completed 20[illegible]

**Ministry Use Only**

Audit No. Z188874

Received

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Well Owner's Copy

Ontario Ministry of the Environment

Measurements recorded in: ☒ Metric ☐ Imperial

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

Tag #: A165391

TW5

50R - 1 NS

# Well Record

***Regulation 903 Ontario Water Resources Act***

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| Orb Property Corporation | | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 Olde Baseline Road | Caledon | ON | L7K0K7 | |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| | Town of Caledon | Pt 9 | 5 WHS |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| Peel | Belfountain | **Ontario** | |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 579614 | 4848788 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth ([✓ m]/ft) From | To |
|---|---|---|---|---|---|
| Red | Clay & stones | | | 0 | 5.48 |
| Gray | Clay & stones | | | 5.48 | 12.80 |
| Brown | Limestone | | | 12.80 | 31.39 |
| Blue | Shale | | | 31.39 | 32.30 |

## Annular Space

| Depth Set at ([✓ m]/ft) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed ([✓ m³]/ft³) |
|---|---|---|---|
| 0 | 10 | Bentonite Grout | .95 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter ([✓ cm]/in) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness ([✓ cm]/in) | Depth ([✓ m]/ft) From | To |
|---|---|---|---|---|
| 15.9 | steel | .48 | +.60 | 13.41 |
| 15.4 | open hole | | 13.41 | 32.30 |

## Construction Record - Screen

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

## Status of Well

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

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at ([✓ m]/ft): 27.5

Pumping rate (l/min / [✓ GPM]): 20

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping ([✓ m]/ft): 27.12

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

Recommended pump depth ([✓ m]/ft): 27

Recommended pump rate *(l/min / GPM)*: ~~20~~ 18

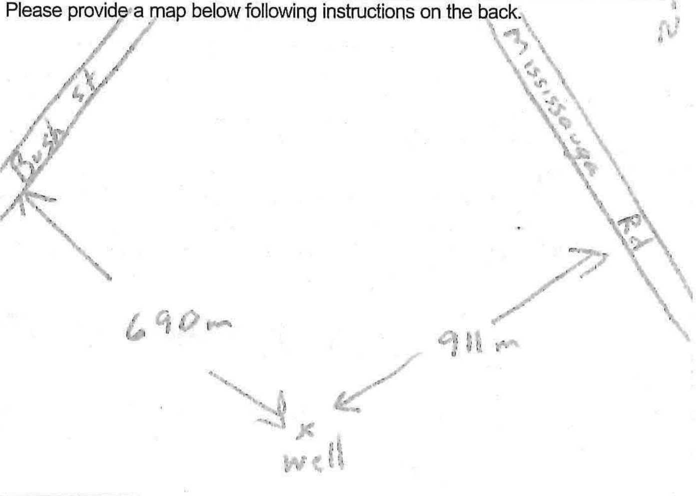
Well production *(l/min / GPM)*:

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level ([✓ m]/ft) | Recovery Time *(min)* | Water Level ([✓ m]/ft) |
|---|---|---|---|
| Static Level | 15.34 | 0 | 27.12 |
| 1 | 16.97 | 1 | 22.01 |
| 2 | 18.73 | 2 | 21.33 |
| 3 | 20.25 | 3 | 19.76 |
| 4 | 22.89 | 4 | 18.67 |
| 5 | 22.89 | 5 | 18.13 |
| 10 | 22.00 | 10 | ~~17.80~~ |
| 15 | 22.22 | 15 | ~~17.19~~ 16.89 |
| 20 | 22.38 | 20 | 16.81 |
| 25 | 22.56 | 25 | 16.76 |
| 30 | 22.65 | 30 | 16.70 |
| 40 | 22.81 | 40 | 16.66 |
| 50 | 22.99 | 50 | 16.63 |
| 60 | 23.06 | 60 | 16.61 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Water Details

| Water found at Depth | Kind of Water |
|---|---|
| 30 ([✓ m]/ft) ☐ Gas | ☐ Fresh ☒ Untested ☐ Other, *specify* |
| (m/ft) ☐ Gas | ☐ Fresh ☐ Untested ☐ Other, *specify* |
| (m/ft) ☐ Gas | ☐ Fresh ☐ Untested ☐ Other, *specify* |

## Hole Diameter

| Depth ([✓ m]/ft) From | To | Diameter ([✓ cm]/in) |
|---|---|---|
| 0 | 13.41 | 22.8 |
| 13.41 | 32.30 | 15.6 |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| Well Initiatives Ltd. | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 Townline Rd. Orangeville | |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| Ont. | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5199468289 | Losch Kim |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| T927 | Kim Losch | 20140727 |

Well owner's information package delivered
☐ Yes
☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 20140704

**Ministry Use Only**

Audit No. Z188875

Received

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Well Owner's Copy

TW6 30K-TW6

Ontario Ministry of the Environment

Measurements recorded in: ☒ Metric ☐ Imperial

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

**A121594**

# Well Record

***Regulation 903 Ontario Water Resources Act***

Page 1 of 1

## Well Owner's Information

| | | | |
|---|---|---|---|
| First Name<br>Orb | Last Name / Organization<br>Property Corporation | E-mail Address | ☐ Well Constructed by Well Owner |
| Mailing Address (Street Number/Name)<br>2121 Olde Baseline Road | Municipality<br>Caledon | Province<br>ON | Postal Code<br>L7C0K7 |

Telephone No. *(inc. area code)*

## Well Location

| | | | |
|---|---|---|---|
| Address of Well Location (Street Number/Name) | Township<br>Town of Caledon | Lot<br>Pt lot 9 | Concession<br>5 WHS |
| County/District/Municipality<br>Peel | City/Town/Village<br>Belfountain | Province<br>**Ontario** | Postal Code |
| UTM Coordinates NAD 83 Zone 17 Easting 580008 Northing 4849203 | Municipal Plan and Sublot Number | Other | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/ft) From | To |
|---|---|---|---|---|---|
| Red | Clay + stones | | | 0 | 6.09 |
| Gray | Clay + stones | | | 6.09 | 12.49 |
| white | limestone | | | 12.49 | 27.12 |
| Brown | limestone | | | 27.12 | 29.26 |
| Gray | limestone | | | 29.26 | 31.08 |
| Blue | Shale | | | 31.08 | 32.30 |

## Annular Space

| Depth Set at (m/ft) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/ft³)* |
|---|---|---|---|
| 0 | 10 | Bentonite Grout | .75 |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 26.2

Pumping rate *(l/min / GPM)*: 18

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 20.57

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

Recommended pump depth (m/ft): 26

Recommended pump rate *(l/min / GPM)*: 18

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

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/ft)* | Recovery Time *(min)* | Water Level *(m/ft)* |
|---|---|---|---|
| Static Level | 14.85 | 0 | 20.57 |
| 1 | 17.02 | 1 | 18.65 |
| 2 | 18.00 | 2 | 17.35 |
| 3 | 18.65 | 3 | 16.54 |
| 4 | | 4 | 16.17 |
| 5 | 19.96 | 5 | 15.98 |
| 10 | 20.52 | 10 | 15.81 |
| 15 | 19.92 | 15 | 15.76 |
| 20 | 19.84 | 20 | 15.74 |
| 25 | 19.84 | 25 | 15.71 |
| 30 | 19.86 | 30 | 15.69 |
| 40 | 19.91 | 40 | 15.66 |
| 50 | 19.95 | 50 | 15.62 |
| 60 | 19.99 | 60 | 15.58 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/in)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth (m/ft) From | To |
|---|---|---|---|---|
| 15.9 | steel | .48 | +.48 | 13.41 |
| 15.4 | open hole | | 13.41 | 32.30 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

Water found at Depth 29 (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

## Hole Diameter

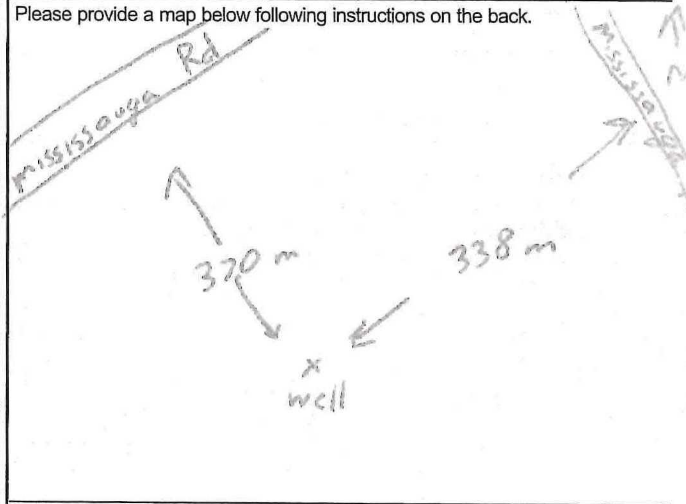
| Depth (m/ft) From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 13.41 | 22.8 |
| 13.41 | 32.30 | 15.4 |

## Well Contractor and Well Technician Information

Business Name of Well Contractor: Well Initiatives Ltd.
Well Contractor's Licence No.: 7221
Business Address (Street Number/Name): 15 Townline Rd. Orangeville
Municipality:
Province: Ont
Postal Code: L9W3R4
Business E-mail Address: info@wellinitiatives.com
Bus.Telephone No. *(inc. area code)*: 5198468269
Name of Well Technician (Last Name, First Name): Losch Kim
Well Technician's Licence No.: T 9 2 7
Signature of Technician and/or Contractor: Kim Losch
Date Submitted: 2014 07 2[illegible]

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered
☐ Yes
☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2014 07 [illegible]

**Ministry Use Only**

Audit No. Z188873

Received

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Well Owner's Copy

MW1-14

Ontario Ministry of the Environment

Measurements recorded in: ☒ Metric ☐ Imperial

**Well Tag No.** *(Place Sticker and/or Print Below)*
**Tag #: A165389**

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | |
|---|---|---|---|
| Orb | Property Corporation | | ☐ Well Constructed by Well Owner |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 Olde Baseline Road | Caledon | ON | L7C0K7 | |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| | Town of Caledon | Pt 9 | 5 WHS |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| Peel | Belfountain | **Ontario** | |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 578814 | 4848771 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth *(m/ft)* From | To |
|---|---|---|---|---|---|
| Brown | Clay | | | 0 | 2.74 |
| Grey | Clay & stones | | | 2.74 | 7.62 |
| Grey | Clay & silt | | | 7.62 | 8.22 |
| Grey | Clay & stones | | | 8.22 | 11.88 |
| | | | | 11.88 | 12.19 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## Annular Space

| Depth Set at *(m/ft)* From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/ft³)* |
|---|---|---|---|
| 12.19 | 9.75 | sand | 0.0415 |
| 9.75 | 7.92 | Bentonite | 0.03 |
| 7.92 | 5.48 | sand | 0.03 |
| 5.48 | 0 | Bentonite | 0.093 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/in)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth *(m/ft)* From | To |
|---|---|---|---|---|
| 3.5 | plastic | .40 | +.61 | 6.09 |
| 3.5 | Plastic | .40 | +.61 | 10.36 |
| | | | | |
| | | | | |

## Construction Record - Screen

| Outside Diameter *(cm/in)* | Material (Plastic, Galvanized, Steel) | Slot No. | Depth *(m/ft)* From | To |
|---|---|---|---|---|
| 4.1 | plastic | 10 | 6.09 | 7.62 |
| 4.1 | Plastic | 10 | 10.36 | 11.88 |

## Status of Well

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

## Water Details

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

## Hole Diameter

| Depth *(m/ft)* From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 12.19 | 15.4 |
| | | |
| | | |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| Well Initiatives Ltd. | 7211 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 Townline Rd. Orangeville | |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| Ont | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198466289 | Losch Kim |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| T927 | | 2014032[illegible] |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping
____ hrs + ____ min

Final water level end of pumping *(m/ft)*

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

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

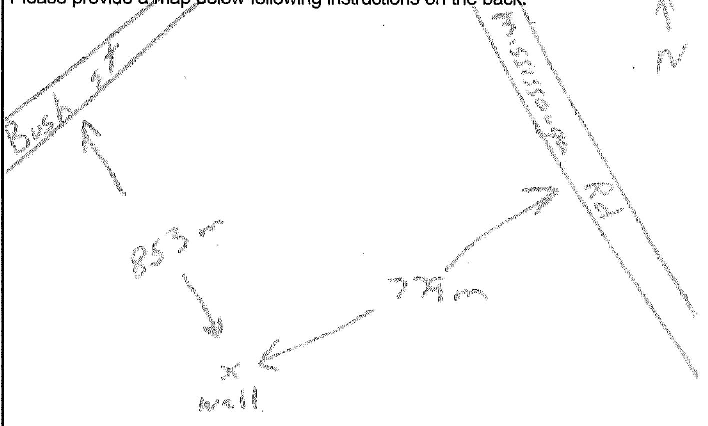
Well production *(l/min / GPM)*

Disinfected?
☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/ft)* | Recovery Time *(min)* | Water Level *(m/ft)* |
|---|---|---|---|
| Static Level | | | |
| 1 | | 1 | |
| 2 | | 2 | |
| 3 | | 3 | |
| 4 | | 4 | |
| 5 | | 5 | |
| 10 | | 10 | |
| 15 | | 15 | |
| 20 | | 20 | |
| 25 | | 25 | |
| 30 | | 30 | |
| 40 | | 40 | |
| 50 | | 50 | |
| 60 | | 60 | |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

| Well owner's information package delivered | Date Package Delivered | Date Work Completed |
|---|---|---|
| ☐ Yes<br>☐ No | YYYYMMDD | 2014[illegible] |

**Ministry Use Only**
Audit No. Z188871
Received

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Well Owner's Copy

Ontario Ministry of the Environment and Climate Change

TW 7-16

Measurements recorded in: ☒ Metric ☐ ~~Imperial~~

Well Tag#: A201495 (ow)

A201495

TW7

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| ORA | PROPERTY CORP | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 OLDE BASELINE ROAD | CALEDON | ON | L7C0K7 | 9058380200 |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| 16800 SHAWS CREEK ROAD | TOWN OF CALEDON | 9 | 5W |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| PEEL | BELFOUNTAIN | Ontario | L7K0E8 |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 580086 | 4849091 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|---|
| BROWN | SAND | GRAVEL, SILT + ROCKS | | 0 | ±7.0 |
| BROWN | GRAVEL | SAND | | 7.0 | 7.9 |
| GREY | LIMESTONE | | | 7.9 | 22.6 |

TOTAL DEPTH - 74 FEET

## Annular Space

| Depth Set at (m/~~ft~~) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/~~ft³~~)* |
|---|---|---|---|
| 0 | 9.8 | BENTONITE HOLE PLUG | .3 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/~~in~~)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.6 | 9.8 |
| 15.6 | OPEN HOLE | [illegible] | 9.8 | 22.6 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

Water found at Depth 17.4 (m/~~ft~~) ☐ Gas | Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*
Water found at Depth 21.3 (m/~~ft~~) ☐ Gas | Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*
Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

## Hole Diameter

| Depth (m/~~ft~~) From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 6.1 | 25.0 |
| 6.1 | 9.8 | 22.2 |
| 9.8 | 22.6 | 15.6 |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| WELL INITIATIVES | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 TOWNLINE | ORANGEVILLE |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| ON | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198467289 | BROADFOOT JIM |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| 0370 | Jim Broadfoot | 20160305 |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*: 18.3m / 60'

Pumping rate *(l/min / GPM)*: 68.1LPM / 18USGPM

Duration of pumping: 2 hrs + 0 min

Final water level end of pumping *(m/ft)*: 14.28m / 46' 10'

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

Recommended pump depth *(m/ft)*: 18.3m / 60'

Recommended pump rate *(l/min / GPM)*: 45.4LPM / 12USGPM

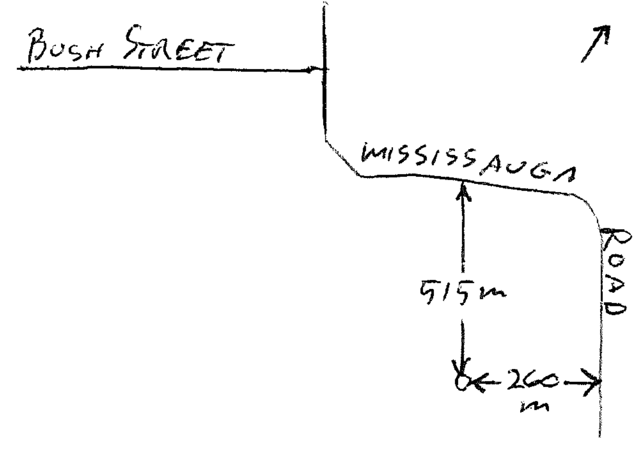
Well production *(l/min / GPM)*:

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/~~ft~~)* | Recovery Time *(min)* | Water Level *(m/~~ft~~)* |
|---|---|---|---|
| Static Level | 13.30 | | 14.24 |
| 1 | 13.84 | 1 | 13.64 |
| 2 | 13.94 | 2 | 13.50 |
| 3 | 14.04 | 3 | 13.46 |
| 4 | 14.07 | 4 | 13.44 |
| 5 | 14.07 | 5 | 13.42 |
| 10 | 14.14 | 10 | 13.36 |
| 15 | 14.17 | 15 | 13.33 |
| 20 | 14.17 | 20 | 13.30 |
| 25 | 14.20 | 25 | 13.30 |
| 30 | 14.20 | 30 | |
| 40 | 14.20 | 40 | |
| 50 | 14.24 | 50 | |
| 60 | 14.24 | 60 | |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered

Date Work Completed 20160219

**Ministry Use Only**

Audit No. Z221731

Received

0506E (2014/11)

Ministry's Copy

Ontario Ministry of the Environment and Climate Change

TW8-16

Well Tag#: A201497 (below)

A201497

TW8

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

Measurements recorded in: ☒ Metric ☐ Imperial

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| CRB | PROPERTY CORP | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 OLDE BASELINE ROAD | CALEDON | ON | L7C0K7 | 9058380200 |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| 16800 SHAWS CREEK ROAD | TOWN OF CALEDON | 9 | 5W |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| PEEL | BELFOUNTAIN | Ontario | L7K0E8 |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 579801 | 4849157 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|---|
| BROWN | SILTY CLAY | STONES | | 0 | .6 |
| BROWN | SILTY SAND | GRAVEL | | .6 | 5.8 |
| BROWN | SAND | | | 5.8 | 7.9 |
| BROWN | SILTY SAND | | | 7.9 | 10.7 |
| BROWN | SILTY SAND | GRAVEL | | 10.7 | 14.9 |
| BROWN | SILTY SAND | | | 14.9 | 18.9 |
| GREY | LIMESTONE | | | 18.9 | 34.4 |
| GREEN | SHALE | | | 34.4 | 34.7 |
| | | TOTAL DEPTH - 114 FEET | | | |

## Annular Space

| Depth Set at (m/~~ft~~) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed (m³/~~ft³~~) |
|---|---|---|---|
| 0 | 19.0 | BENTONITE HOLEPLUG | .3 |
| 33.7 | 34.7 | BENTONITE HOLEPLUG | .02 |
| | | | |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/~~in~~) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/~~in~~) | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.6 | 19.5 |
| | | | | |
| 15.6 | OPEN HOLE | | 19.5 | 34.7 |
| | | | | |

## Status of Well

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

## Construction Record - Screen

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

## Water Details

Water found at Depth 33 (m/~~ft~~) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*

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

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

## Hole Diameter

| Depth (m/~~ft~~) From | To | Diameter (cm/~~in~~) |
|---|---|---|
| 0 | 6.4 | 25.0 |
| 6.4 | 19.5 | 22.2 |
| 19.5 | 34.7 | 15.6 |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft) 30.5m/100'

Pumping rate (l/min / GPM) 11.4LPm/3USGPm

Duration of pumping 2 hrs + 0 min

Final water level end of pumping (m/ft) 25.73m

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft) 30.5m/100'

Recommended pump rate (l/min / GPM) 11.4LPm/3USGPm

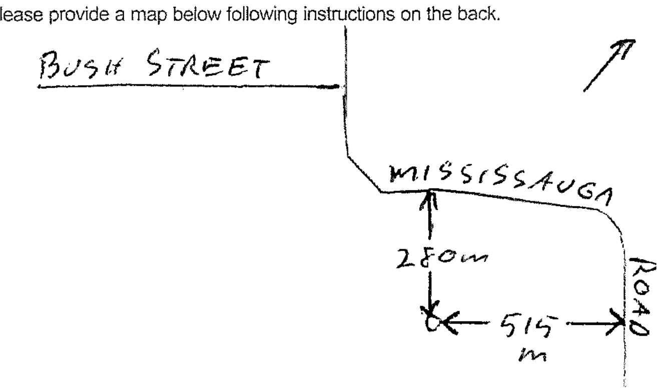
Well production (l/min / GPM)

Disinfected? ☒ Yes ☐ No

| Draw Down Time (min) | Water Level (m/~~ft~~) | Recovery Time (min) | Water Level (m/~~ft~~) |
|---|---|---|---|
| Static Level | 21.08 | | 25.73 |
| 1 | 21.75 | 1 | 24.44 |
| 2 | 22.06 | 2 | 23.88 |
| 3 | 22.32 | 3 | 23.14 |
| 4 | 22.56 | 4 | 22.96 |
| 5 | 22.80 | 5 | 22.60 |
| 10 | 23.30 | 10 | 22.38 |
| 15 | 24.08 | 15 | 21.14 |
| 20 | 24.58 | 20 | 21.11 |
| 25 | 24.96 | 25 | 21.11 |
| 30 | 25.22 | 30 | 21.11 |
| 40 | 25.25 | 40 | 21.11 |
| 50 | 25.47 | 50 | 21.11 |
| 60 | 25.60 | 60 | 21.11 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| WELL INITIATIVES | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 TOWNLINE | ORANGEVILLE |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| ON | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198468289 | BROADFOOT JIM |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| 0370 | Jim Broadfoot | 20160305 |

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered

Date Work Completed 20160223

Ministry Use Only
Audit No. Z221732
Received

0506E (2014/11) Ministry's Copy

Ontario
Ministry of the Environment and Climate Change

Well Tag#: A201496 (ow)
A201496

TW 9

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

TW 9-16
Measurements recorded in: ☒ Metric ☐ ~~Imperial~~

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| GRB | PROPERTY CORP | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 OLDE BASELINE ROAD | CALEDON | ON | L7C0K7 | 9058380200 |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| 16800 SHAWS CREEK ROAD | TOWN OF CALEDON | 9 | 5W |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| PEEL | BELFOUNTAIN | Ontario | L7K0E8 |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 549945 | 4848906 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|---|
| BROWN | SILTY CLAY | STONES | | 0 | .6 |
| BROWN | SILTY SAND | | | .6 | 3.7 |
| BROWN | GRAVEL | SAND & SILT | | 3.7 | 9.8 |
| GREY | LIMESTONE | | | 9.8 | 35.1 |
| GREEN | SHALE | | | 35.1 | 35.4 |

TOTAL DEPTH - 116 FEET

## Annular Space

| Depth Set at (m/~~ft~~) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed (m³/~~ft³~~) |
|---|---|---|---|
| 0 | 11.0 | BENTONITE HOLEPLUG | .24 |
| 34.1 | 35.4 | CUTTINGS | |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*: 22.9m / 75'

Pumping rate *(l/min / GPM)*: 56.8LPM / 15USGPM

Duration of pumping: 2 hrs + 0 min

Final water level end of pumping *(m/ft)*: 16.84m

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

Recommended pump depth *(m/ft)*: 22.9m / 75'

Recommended pump rate *(l/min / GPM)*: 45.4LPM / 12USGPM

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

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level (m/~~ft~~) | Recovery Time *(min)* | Water Level (m/~~ft~~) |
|---|---|---|---|
| Static Level | 14.70 | | 16.84 |
| 1 | 15.38 | 1 | 15.91 |
| 2 | 15.60 | 2 | 15.71 |
| 3 | 15.86 | 3 | 15.56 |
| 4 | 15.98 | 4 | 15.47 |
| 5 | 16.06 | 5 | 15.40 |
| 10 | 16.31 | 10 | 15.23 |
| 15 | 16.42 | 15 | 15.16 |
| 20 | 16.49 | 20 | 15.12 |
| 25 | 16.53 | 25 | 15.09 |
| 30 | 16.57 | 30 | 15.07 |
| 40 | 16.62 | 40 | 15.03 |
| 50 | 16.66 | 50 | 15.00 |
| 60 | 16.70 | 60 | 14.98 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/~~in~~) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/~~in~~) | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.6 | 11.6 |
| 12.8 | PERFORATED PLASTIC | .6 | 10.1 | 34.1 |
| 15.6 | OPEN HOLE | | 34.1 | 35.4 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

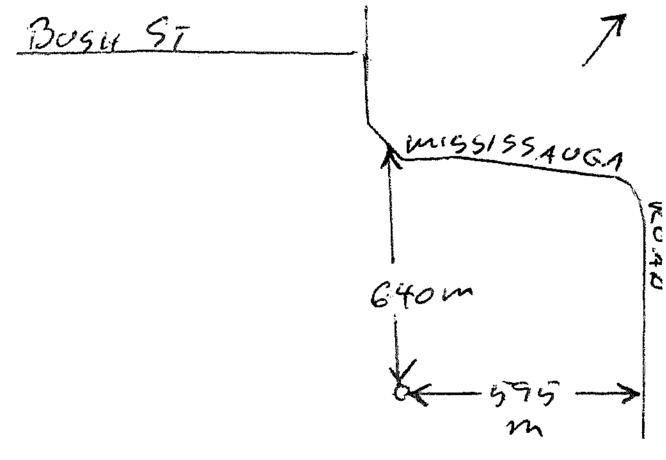
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

## Hole Diameter

| Depth (m/~~ft~~) From | To | Diameter (cm/~~in~~) |
|---|---|---|
| 0 | 6.4 | 25.0 |
| 6.4 | 11.6 | 22.2 |
| 11.6 | 35.4 | 15.6 |

## Map of Well Location

Please provide a map below following instructions on the back.



## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| WELL INITIATIVES | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 TOWNLINE | ORANGEVILLE |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| ON | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198468289 | BROADFOOT JIM |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| 0370 | Jim Broadfoot | 20160305 |

Comments:
VOID FROM 12.8M TO 14.0M
PLASTIC LINER INSTALLED

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered: YYYYMMDD

Date Work Completed: 20160225

**Ministry Use Only**
Audit No. Z221733
Received

0506E (2014/11)

Ministry's Copy

Ontario
Ministry of the Environment and Climate Change

TW 10-16

Measurements recorded in: ☒ Metric ☐ Imperial

Well Tag#: A201493 (low)

A201493

TW 10

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| | | | |
|---|---|---|---|
| First Name<br>ORB | Last Name / Organization<br>PROPERTY CORP | E-mail Address | ☐ Well Constructed by Well Owner |

| | | | | |
|---|---|---|---|---|
| Mailing Address (Street Number/Name)<br>2121 OLDE BASELINE ROAD | Municipality<br>CALEDON | Province<br>ON | Postal Code<br>L7C0K7 | Telephone No. *(inc. area code)*<br>9058380200 |

## Well Location

| | | | |
|---|---|---|---|
| Address of Well Location (Street Number/Name)<br>16800 SHAWS CREEK ROAD | Township<br>TOWN OF CALEDON | Lot<br>9 | Concession<br>5W |
| County/District/Municipality<br>PEEL | City/Town/Village<br>BELFOUNTAIN | Province<br>Ontario | Postal Code<br>L7K0E8 |
| UTM Coordinates NAD 83 Zone 17 Easting 579789 Northing 4848906 | Municipal Plan and Sublot Number | Other | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/ft) From | Depth (m/ft) To |
|---|---|---|---|---|---|
| BROWN | SILTY SAND | STONES | | 0 | .6 |
| BROWN | SILTY SAND | | | .6 | 3.7 |
| BROWN | GRAVEL+SAND | SILT | | 3.7 | 9.4 |
| BROWN | SILTY SAND | | | 9.4 | 12.8 |
| BROWN | SAND | | | 12.8 | 14.9 |
| GREY | LIMESTONE | | | 14.9 | 30.2 |
| | | | | | |
| | | | | | |
| | | TOTAL | DEPTH - 99 FEET | | |

## Annular Space

| Depth Set at (m/ft) From | To | Type of Sealant Used (Material and Type) | Volume Placed (m³/ft³) |
|---|---|---|---|
| 0 | 11.0 | BENTONITE HOLEPLUG | .24 |
| | | | |
| | | | |
| | | | |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)* 22.9m/75'

Pumping rate *(l/min / GPM)* 113.6LPM/30USGPM

Duration of pumping 2 hrs + 0 min

Final water level end of pumping *(m/ft)* 16.54

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

Recommended pump depth *(m/ft)* 22.9m/75'

Recommended pump rate *(l/min / GPM)* 45.4LPM/12USGPM

Well production *(l/min / GPM)*

Disinfected? ☒ Yes ☐ No

| Draw Down Time (min) | Draw Down Water Level (m/ft) | Recovery Time (min) | Recovery Water Level (m/ft) |
|---|---|---|---|
| Static Level | 15.07 | | 16.54 |
| 1 | 15.50 | 1 | 15.17 |
| 2 | 15.84 | 2 | 15.14 |
| 3 | 15.99 | 3 | 15.13 |
| 4 | 16.10 | 4 | 15.13 |
| 5 | 16.15 | 5 | 15.13 |
| 10 | 16.26 | 10 | 15.12 |
| 15 | 16.33 | 15 | 15.12 |
| 20 | 16.38 | 20 | 15.12 |
| 25 | 16.40 | 25 | 15.12 |
| 30 | 16.42 | 30 | 15.11 |
| 40 | 16.44 | 40 | 15.11 |
| 50 | 16.45 | 50 | 15.10 |
| 60 | 16.46 | 60 | 15.10 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/in) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/in) | Depth (m/ft) From | Depth (m/ft) To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.78 | 16.8 |
| 15.6 | OPEN HOLE | | 16.8 | 30.2 |

## Construction Record - Screen

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

## Status of Well

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

## Water Details

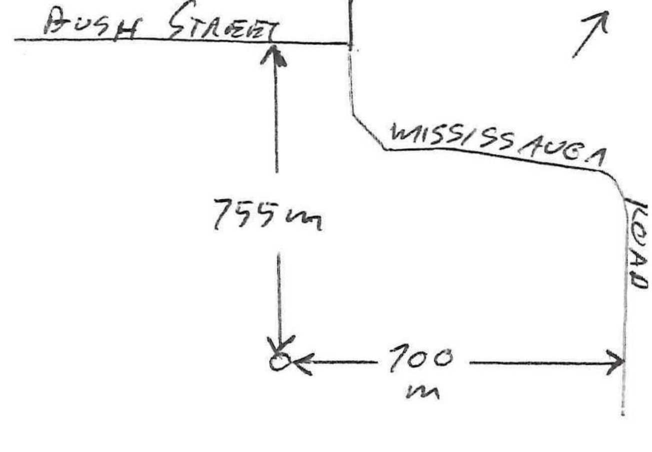
Water found at Depth 25.0 (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*
Water found at Depth 26.8 (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*
Water found at Depth 29.0 (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*

## Hole Diameter

| Depth (m/ft) From | Depth (m/ft) To | Diameter (cm/in) |
|---|---|---|
| 0 | 6.4 | 25.0 |
| 6.4 | 16.8 | 22.2 |
| 16.8 | 30.2 | 15.6 |

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Well Contractor and Well Technician Information

| | |
|---|---|
| Business Name of Well Contractor<br>WELL INITIATIVES | Well Contractor's Licence No.<br>7221 |
| Business Address (Street Number/Name)<br>15 TOWNLINE | Municipality<br>ORANGEVILLE |

| | | |
|---|---|---|
| Province<br>ON | Postal Code<br>L9W3R4 | Business E-mail Address<br>info@wellinitiatives.com |

| | |
|---|---|
| Bus.Telephone No. *(inc. area code)*<br>5198468289 | Name of Well Technician (Last Name, First Name)<br>BROADFOOT JIM |

| | | |
|---|---|---|
| Well Technician's Licence No.<br>0370 | Signature of Technician and/or Contractor<br>Jim Broadfoot | Date Submitted<br>20160305 |

| | | |
|---|---|---|
| Well owner's information package delivered<br>☐ Yes<br>☒ No | Date Package Delivered<br>Y Y Y Y M M D D | **Ministry Use Only**<br>Audit No. Z221734 |
| | Date Work Completed<br>20160225 | Received |

0506E (2014/11)

Ministry's Copy

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Ontario Ministry of the Environment and Climate Change

TW11-16

Measurements recorded in: ☒ Metric ☐ ~~Imperial~~

Well Tag#: A201494 ow)

A201494

TW 11 **Well Record**

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| ORB | PROPERTY CORP | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. (inc. area code) |
|---|---|---|---|---|
| 2121 OLDE BASELINE ROAD | CALEDON | ON | L7C0K7 | 9058380200 |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| 16800 SHAWS CREEK ROAD | TOWN OF CALEDON | 9 | 5W |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| PEEL | BELFOUNTAIN | Ontario | L7K0E8 |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 579692 | 4849093 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|---|
| BROWN | SILTY SAND | STONES | | 0 | .6 |
| BROWN | SILTY SAND | | | .6 | 3.7 |
| BROWN | GRAVEL | SAND | SILT | 3.7 | 9.4 |
| BROWN | SILTY SAND | | | 9.4 | 12.8 |
| BROWN | SAND | | | 12.8 | 14.9 |
| GREY | LIMESTONE | | | 14.9 | 30.2 |

TOTAL DEPTH - 104 FEET

## Annular Space

| Depth Set at (m/~~ft~~) From | To | Type of Sealant Used (Material and Type) | Volume Placed (m³/~~ft³~~) |
|---|---|---|---|
| 0 | 11.0 | BENTONITE HOLEPLUG | .24 |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 22.9m / 75'

Pumping rate (l/min / GPM): 56.8LPM / 15USGPM

Duration of pumping: 2 hrs + 0 min

Final water level end of pumping (m/~~ft~~): 21.25

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

Recommended pump depth (m/ft): 22.9m / 75'

Recommended pump rate (l/min / GPM): 45.4LPM / 12USGPM

Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

| Draw Down Time (min) | Water Level (m/~~ft~~) | Recovery Time (min) | Water Level (m/~~ft~~) |
|---|---|---|---|
| Static Level | 20.88 | | 21.25 |
| 1 | 21.21 | 1 | 20.86 |
| 2 | 21.23 | 2 | 20.89 |
| 3 | 21.24 | 3 | 20.89 |
| 4 | 21.24 | 4 | 20.89 |
| 5 | 21.24 | 5 | 20.89 |
| 10 | 21.24 | 10 | 20.88 |
| 15 | 21.25 | 15 | 20.87 |
| 20 | 21.25 | 20 | 20.87 |
| 25 | 21.25 | 25 | 20.87 |
| 30 | 21.25 | 30 | 20.87 |
| 40 | 21.25 | 40 | 20.87 |
| 50 | 21.25 | 50 | 20.87 |
| 60 | 21.25 | 60 | 20.87 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter (cm/~~in~~) | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness (cm/~~in~~) | Depth (m/~~ft~~) From | To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.8 | 20.7 |
| 15.6 | OPENHOLE | | 20.7 | 30.2 |

## Status of Well

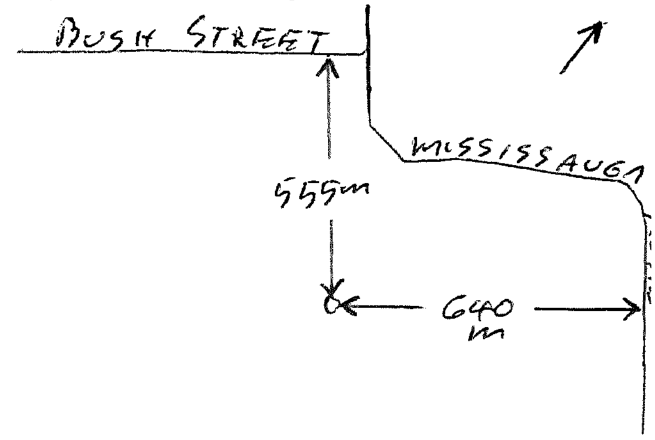
☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

## Construction Record - Screen

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

## Map of Well Location

Please provide a map below following instructions on the back.



## Water Details

Water found at Depth 24-30 (m/~~ft~~) ☐ Gas | Kind of Water: ☐ Fresh ☒ Untested ☐ Other, specify

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

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

## Hole Diameter

| Depth (m/~~ft~~) From | To | Diameter (cm/in) |
|---|---|---|
| 0 | 6.4 | 25.0 |
| 6.4 | 20.7 | 22.2 |
| 20.7 | 30.2 | 15.6 |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| WELL INITIATIVES | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 TOWNLINE | ORANGEVILLE |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| ON | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. (inc. area code) | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198468289 | BROADFOOT JIM |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| 0370 | Jim Broadfoot | 20160305 |

Comments:

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered

Date Work Completed 20160226

**Ministry Use Only**

Audit No. Z221735

Received

0506E (2014/11)

Ministry's Copy

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Ontario

Ministry of the Environment
and Climate Change

TW12-16

Measurements recorded in: ☒ Metric ☐ Imperial

Well Tag#: A201492 ow)

A201492

TW12

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| First Name | Last Name / Organization | E-mail Address | ☐ Well Constructed by Well Owner |
|---|---|---|---|
| ORB | PROPERTY CORP | | |

| Mailing Address (Street Number/Name) | Municipality | Province | Postal Code | Telephone No. *(inc. area code)* |
|---|---|---|---|---|
| 2121 OLD BASELINE ROAD | CALEDON | ON | L7C0K7 | 9058380206 |

## Well Location

| Address of Well Location (Street Number/Name) | Township | Lot | Concession |
|---|---|---|---|
| 16800 SHAWS CREEK ROAD | TOWN OF CALEDON | 9 | 5W |

| County/District/Municipality | City/Town/Village | Province | Postal Code |
|---|---|---|---|
| PEEL | BELFOUNTAIN | Ontario | L7K0E8 |

| UTM Coordinates | Zone | Easting | Northing | Municipal Plan and Sublot Number | Other |
|---|---|---|---|---|---|
| NAD 83 | 17 | 579469 | 4848667 | | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth (m) From | Depth (m) To |
|---|---|---|---|---|---|
| BROWN | SILTY CLAY | | | 0 | .6 |
| BROWN | SILTY SAND | GRAVEL | | .6 | 2.7 |
| BROWN | SAND | GRAVEL | | 2.7 | 7.6 |
| BROWN | SILTY SAND | | | 7.6 | 11.6 |
| BROWN | SILTY SAND | GRAVEL | | 11.6 | 17.4 |
| BROWN | SILTY SAND | GREY CLAY | | 17.4 | 22.9 |
| BROWN GREY | LIMESTONE | | INTERMIXED | 22.9 | 36.3 |
| GRY | SHALE/LIMESTONE | | | 36.3 | 36.6 |
| | | TOTAL DEPTH - 120 FEET | | | |

## Annular Space

| Depth Set at (m) From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³)* |
|---|---|---|---|
| 0 | 11 | BENTONITE HOLEPLUG | .24 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm)* | Depth (m) From | To |
|---|---|---|---|---|
| 16.0 | STEEL | .5 | +.8 | 23.6 |
| | | | | |
| 15.6 | OPEN HOLE | | 23.6 | 36.6 |

## Status of Well

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

## Construction Record - Screen

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

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)* 30.5m/100'

Pumping rate *(l/min / GPM)* 45.4LPM/12USGPM

Duration of pumping 2 hrs + 0 min

Final water level end of pumping (m) 27.72

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

Recommended pump depth *(m/ft)* 30.5m/100'

Recommended pump rate *(l/min / GPM)* 45.4LPM/12USGPM

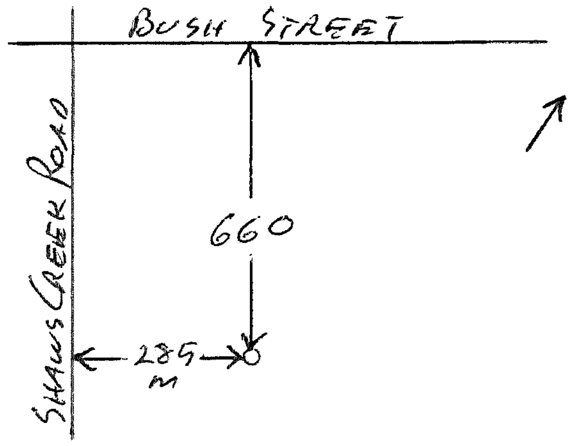
Well production *(l/min / GPM)*

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m)* | Recovery Time *(min)* | Water Level *(m)* |
|---|---|---|---|
| Static Level | 14.90 | | 27.72 |
| 1 | 17.70 | 1 | 23.70 |
| 2 | 19.28 | 2 | 21.67 |
| 3 | 19.86 | 3 | 20.23 |
| 4 | 20.08 | 4 | 19.56 |
| 5 | 20.27 | 5 | 19.03 |
| 10 | 20.52 | 10 | 17.47 |
| 15 | 26.91 | 15 | 16.70 |
| 20 | 27.20 | 20 | 16.25 |
| 25 | 27.25 | 25 | 15.99 |
| 30 | 27.40 | 30 | 15.79 |
| 40 | 27.52 | 40 | 15.47 |
| 50 | 27.56 | 50 | 15.21 |
| 60 | 27.58 | 60 | 15.08 |

## Map of Well Location

Please provide a map below following instructions on the back.



## Water Details

Water found at Depth 33.0 (m) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*

Water found at Depth 35.4 (m) ☐ Gas — Kind of Water: ☐ Fresh ☒ Untested ☐ Other, *specify*

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

## Hole Diameter

| Depth (m) From | To | Diameter *(cm)* |
|---|---|---|
| 0 | 6.4 | 25.0 |
| 6.4 | 23.6 | 22.2 |
| 23.6 | 36.6 | 15.6 |

## Well Contractor and Well Technician Information

| Business Name of Well Contractor | Well Contractor's Licence No. |
|---|---|
| WELL INITIATIVES | 7221 |

| Business Address (Street Number/Name) | Municipality |
|---|---|
| 15 TOWNLINE | ORANGEVILLE |

| Province | Postal Code | Business E-mail Address |
|---|---|---|
| ON | L9W3R4 | info@wellinitiatives.com |

| Bus.Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name) |
|---|---|
| 5198468289 | BROADFOOT JIM |

| Well Technician's Licence No. | Signature of Technician and/or Contractor | Date Submitted |
|---|---|---|
| 0370 | Jim Broadfoot | 20160305 |

Comments:

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered

Date Work Completed 20160301

**Ministry Use Only**

Audit No. Z221736

Received

Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well t Below)
**A 075156**

# Well Record

*Regulation 903 Ontario Water Resources Act*

Page 1 of 1

## Well Owner's Information

| | | | |
|---|---|---|---|
| First Name / Last Name / Organization: Orb Properties Corp | E-mail Address: | ☐ Well Constructed by Well Owner | |
| Mailing Address (Street Number/Name): | Municipality: | Province: | Postal Code: / Telephone No. *(inc. area code)*: |

## Well Location

| | | | |
|---|---|---|---|
| Address of Well Location (Street Number/Name): Shaws Creek Rd | Township: Caledon | Lot: 9 | Concession: 5 HSW |
| County/District/Municipality: Peel | City/Town/Village: Belfountain | Province: **Ontario** | Postal Code: |
| UTM Coordinates NAD 83, Zone 17, Easting 579080, Northing 4848673 | Municipal Plan and Sublot Number: | Other: | |

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

| General Colour | Most Common Material | Other Materials | General Description | Depth *(m/ft)* From | To |
|---|---|---|---|---|---|
| Brown | Topsoil | | | 0 | 1 |
| Brown | Sand | gravel Stones | | 1 | 43 |
| Brown | fine Sand | | | 43 | 59 |
| Brown | Sand | gravel | | 59 | 65 |
| Brown | clay | gravel | | 65 | 72 |
| Grey | Limstone | | | 72 | 112 |

## Annular Space

| Depth Set at *(m/ft)* From | To | Type of Sealant Used *(Material and Type)* | Volume Placed *(m³/ft³)* |
|---|---|---|---|
| 0 | 73 | Bentonite Grout | |

## Results of Well Yield Testing

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

If pumping discontinued, give reason:

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

Pumping rate *(l/min / GPM)*: 45

Duration of pumping: 2 hrs + 0 min

Final water level end of pumping *(m/ft)*: 92.3

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

Recommended pump depth *(m/ft)*:

Recommended pump rate *(l/min / GPM)*: 40

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

Disinfected? ☒ Yes ☐ No

| Draw Down Time *(min)* | Water Level *(m/ft)* | Recovery Time *(min)* | Water Level *(m/ft)* |
|---|---|---|---|
| Static Level | 52.8 | | 92.3 |
| 1 | 64.8 | 1 | 82.4 |
| 2 | 68.7 | 2 | 78.8 |
| 3 | 71.6 | 3 | 75.9 |
| 4 | 73.8 | 4 | 73.6 |
| 5 | 75.6 | 5 | 71.7 |
| 10 | 81.4 | 10 | 65.3 |
| 15 | 84.6 | 15 | 61.8 |
| 20 | 86.4 | 20 | 59.6 |
| 25 | 87.7 | 25 | 58.2 |
| 30 | 88.4 | 30 | 57.2 |
| 40 | 89.4 | 40 | 55.8 |
| 50 | 91.1 | 50 | 55.0 |
| 60 | 91.6 | 60 | 54.4 |

## Method of Construction

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

## Well Use

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

## Construction Record - Casing

| Inside Diameter *(cm/in)* | Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) | Wall Thickness *(cm/in)* | Depth *(m/ft)* From | To |
|---|---|---|---|---|
| 6 1/4 | Steel | .188 | 0 | 73 |

## Status of Well

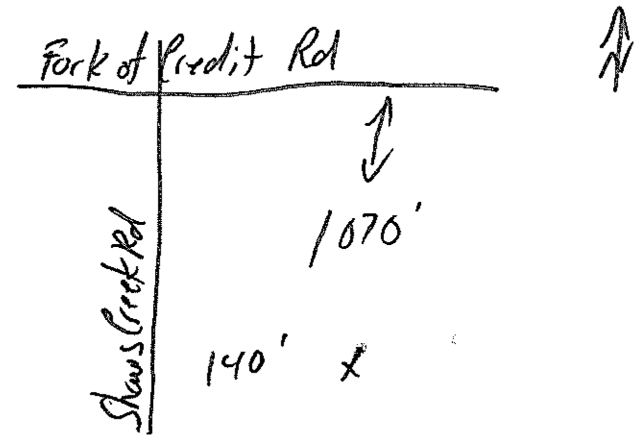
☐ Water Supply
☐ Replacement Well
☒ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

## Construction Record - Screen

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

## Map of Well Location

Please provide a map below following instructions on the back.



Comments:

## Water Details

| Water found at Depth | Kind of Water |
|---|---|
| 93 *(m/ft)* ☐ Gas | ☐ Fresh ☒ Untested ☐ Other, *specify* |
| 97 *(m/ft)* ☐ Gas | ☐ Fresh ☒ Untested ☐ Other, *specify* |
| 102 *(m/ft)* ☐ Gas | ☐ Fresh ☒ Untested ☐ Other, *specify* |

## Hole Diameter

| Depth *(m/ft)* From | To | Diameter *(cm/in)* |
|---|---|---|
| 0 | 73 | 8 1/2 |
| 73 | 112 | 6 1/8 |

## Well Contractor and Well Technician Information

Business Name of Well Contractor: FRED CONSTABLE & SON LTD

Well Contractor's Licence No.: 1663

Business Address (Street Number/Name): 3519 5TH LINE

Municipality:

Province / Postal Code: BRADFORD ON. L3Z 2A4

Business E-mail Address:

Bus.Telephone No. *(inc. area code)*:

Name of Well Technician (Last Name, First Name): Thompson Steve

Well Technician's Licence No.: 2120

Signature of Technician and/or Contractor:

Date Submitted: 2009 11 25

Well owner's information package delivered: ☐ Yes ☒ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2009 10 20

**Ministry Use Only**

Audit No. Z 94130

MAR 01 2010
Received

**Terraprobe**

# LOG OF BOREHOLE PW-1

**PROJECT:** Proposed Subdivision
**LOCATION:** Belfountain
**CLIENT:** Enterac

**DATE:** May 27 to June 2, 1988
**EQUIPMENT:** -
**ELEVATION DATUM:** Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10<br>WATER CONTENT PERCENT 10 20 30 40 | ELEV. DEPTH | DETAILS OF INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | | PW-1 |
| 415.0 | GROUND SURFACE | | | | | | | | |
| | CLAY AND BOULDERS | | | | | | | | |
| 412.3<br>2.7 | SAND AND GRAVEL, some boulders (OUTWASH) | | | | | | | 410<br>405 | |
| 403.8<br>11.2 | SAND, GRAVEL, BOULDERS | | | | | | | 400 | |
| 397.6<br>17.4 | SAND AND GRAVEL | | | | | | | 395<br>390 | |
| 389.4<br>25.6 | CLAY AND GRAVEL (TILL) | | | | | | | | |
| 386.8<br>28.2 | Continued...... | | | | | | | 385 | |

**NOTES:**

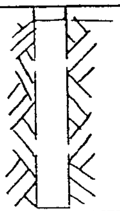
Field Supervisor: ______
Drawn by: ______
Checked by: ______

**Terraprobe**

# LOG OF BOREHOLE PW-1
CON'T

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: May 27 to June 2, 1988
EQUIPMENT: -
ELEVATION DATUM: Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10 / WATER CONTENT PERCENT 10 20 30 40 | | DETAILS OF INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | ELEV. DEPTH | |
| 385.8 | **WEATHERED ROCK** | | | | | | | | |
| 29.2<br>380.9 | **DOLOSTONE** | | | | | | | |  |
| 34.1 | End of Borehole | | | | | | | 380 | |

**NOTES:** Water found at 29.2m

Field Supervisor: ____________
Drawn by: ____________
Checked by: ____________

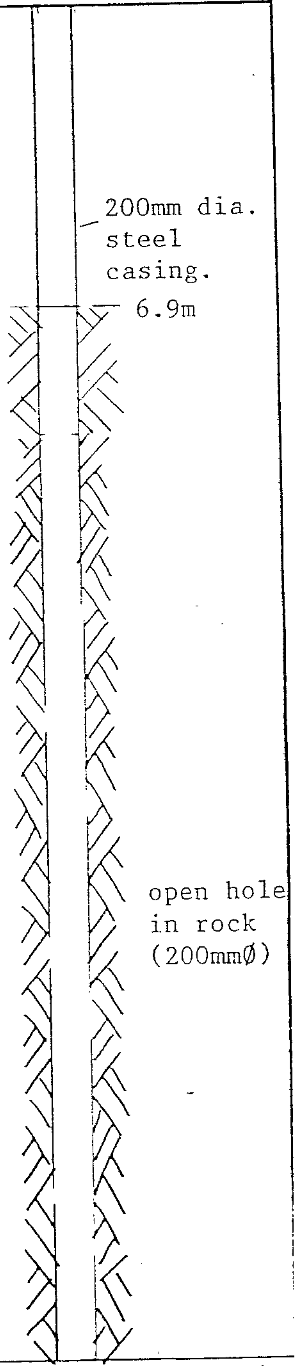
**Terraprobe**

# LOG OF BOREHOLE PW-2

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: June 3 to June 10, 1988
EQUIPMENT: -
ELEVATION DATUM: Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10<br>WATER CONTENT PERCENT 10 20 30 40 | | DETAILS OF INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | ELEV. DEPTH | |
| 413.0 | **SAND AND GRAVEL**<br>(not Logged) | | | | | | | 410 | |
| 406.1<br>6.9 | **DOLOSTONE**<br>(Amabel Formation) | | | | | | | 405<br>400<br>395<br>390 | |
| 388.1<br>24.9 | **DOLOSTONE AND SHALE**<br>(Manitoulin formation) | | | | | | | 385 | |
| 383.4<br>29.6 | End of Borehole | | | | | | | | |



NOTES:

Field Supervisor: 
Drawn by: 
Checked by:

# Terraprobe

# LOG OF BOREHOLE PW-3

PROJECT: Enterac Belfountain
LOCATION: Belfountain
CLIENT: Enterac

DATE: July 2, 1989
EQUIPMENT:
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40<br>SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○<br>Wp WI<br>10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 402.4 | Ground Surface | | | | | | | | |
| 402.1 | TOPSOIL | | | | | | 402 | | |
| 0.3 | Brown<br>SAND AND GRAVEL AND STONES<br>(logged by Well Drillers) | | | | | | 401<br>400<br>399<br>398<br>397<br>396<br>395<br>394<br>393<br>392 | | |
| 391.7<br>10.7 | Brown<br>CLAY, GRAVEL AND SILT | | | | | | 391 | | |
| 390.2<br>12.2 | Continued ... | | | | | | 390 | | |

NOTES:
1) Water encountered at 24.4 m and 33.5 m depth.
2) Water level at 385.5 m (elevation) on September 10, 1989.
3) Hole logged by well driller.

**Terraprobe**

# LOG OF BOREHOLE PW–3

PROJECT: Enterac Belfountain
LOCATION: Belfountain
CLIENT: Enterac

DATE: July 2, 1989
EQUIPMENT:
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40 | WATER CONTENT PERCENT ○ |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | SHEAR STRENGTH, kPa | Wp Wl 10 20 30 |
| 402.4 | Ground Surface | | | | | | | | |
| 402.1 | TOPSOIL | | | | | | | | |
| 0.3 | Brown<br>SAND AND GRAVEL AND STONES<br>(logged by Well Drillers) | | | | | | 402<br>401<br>400<br>399<br>398<br>397<br>396<br>395<br>394<br>393<br>392 | | |
| 391.7<br>10.7 | Brown<br>CLAY, GRAVEL AND SILT | | | | | | 391 | | |
| 390.2<br>12.2 | Continued ... | | | | | | 390 | | |

**NOTES:**

1) Water encountered at 24.4 m and 33.5 m depth.
2) Water level at 385.5 m (elevation) on September 10, 1989.

**Terraprobe**

# LOG OF BOREHOLE PW-3

CONT...

PROJECT: Enterac Belfountain

LOCATION: Belfountain

CLIENT: Enterac

DATE: July 2, 1989

EQUIPMENT:

ELEVATION DATUM: Geodetic

FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40 SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○ Wp Wl 10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 390.2 | | | | | | | | | |
| | brown<br>CLAY, GRAVEL & SILT | | | | | | 390 | | |
| | | | | | | | 389 | | |
| | | | | | | | 388 | | |
| | | | | | | | 387 | | |
| | | | | | | | 386 | | |
| | | | ▼ | | | | | | |
| | | | | | | | 385 | | |
| | | | | | | | 384 | | |
| | | | | | | | 383 | | |
| | | | | | | | 382 | | |
| | | | | | | | 381 | | |
| | | | | | | | 380 | | |
| | | | | | | | 379 | | |
| 378.3<br>24.1 | grey-brown<br>DOLOSTONE | | | | | | | | |
| 378.0<br>24.4 | Continued ... | | | | | | 378 | | |
| | | | | | | | 377 | | |

NOTES:

**Terraprobe**

# LOG OF BOREHOLE PW–3

CONT...

PROJECT: Enterac Belfountain

LOCATION: Belfountain

CLIENT: Enterac

DATE: July 2, 1989

EQUIPMENT:

ELEVATION DATUM: Geodetic

FILE: 88164

| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES |
|---|---|---|---|---|---|---|
| 378.0 | | | | | | |
| | grey brown<br>DOLOSTONE | | | | | |
| 371.0<br>31.4 | grey<br>DOLOSTONE | | | | | |
| 369.5<br>32.9 | brown<br>DOLOSTONE | | | | | |
| 367.0<br>35.4 | blue<br>SHALE | | | | | |
| 366.1<br>36.3 | End of Borehole | | | | | |

STRATIGRAPHY

SAMPLES

m. ELEVATION SCALE: 377, 376, 375, 374, 373, 372, 371, 370, 369, 368, 367, 366

PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40

SHEAR STRENGTH, kPa

WATER CONTENT PERCENT ○ Wp Wl 10 20 30

NOTES:

**Terraprobe**

# LOG OF BOREHOLE PW–4

**PROJECT:** Enterac - Belfountain
**LOCATION:** Belfountain
**CLIENT:** Enterac

**DATE:** July 4, 1989
**EQUIPMENT:**
**ELEVATION DATUM:** Geodetic
**FILE:** 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40<br>SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○<br>Wp Wl<br>10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 386.2 | Ground Surface | | | | | | | | |
| 385.9 | TOPSOIL | | | | | | 386 | | |
| 0.3 | brown<br>CLAY, SILT, GRAVEL, STONES & BOULDERS<br>(logged by well driller) | | | | | | 385<br>384<br>383<br>382<br>381<br>380<br>379<br>378<br>377<br>376<br>375 | | |
| | | | ▼ | | | | | | |
| 374.0 | | | | | | | 374 | | |
| 12.2 | Continued ... | | | | | | 373 | | |

**NOTES:** 1) Water encountered at 26.2 m depth.
2) Water level at 374.5 m (elevation) on September 10, 1989.
3) Hole logged by well driller.

**Terraprobe**

# LOG OF BOREHOLE PW–4
CONT...

PROJECT: Enterac - Belfountain
LOCATION: Belfountain
CLIENT: Enterac

DATE: July 4, 1989
EQUIPMENT:
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40 SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○ Wp Wl 10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m.<br>374.0 | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 371.3 | brown<br>CLAY, SILT, GRAVEL STONES & BOULDERS | | | | | | 373<br>372 | | |
| 14.9<br>367.9 | blue<br>CLAY | | | | | | 371<br>370<br>369<br>368 | | |
| 18.3<br>367.0 | red<br>SHALE | | | | | | | | |
| 19.2<br>364.9 | blue<br>SHALE | | | | | | 367<br>366<br>365 | | |
| 21.3 | Continued ... | | | | | | | | |

NOTES:

**Terraprobe**

# LOG OF BOREHOLE PW-4
CONT...

PROJECT: Enterac - Belfountain
LOCATION: Belfountain
CLIENT: Enterac

DATE: July 4, 1989
EQUIPMENT:
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x<br>10 20 30 40<br>SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○<br>Wp Wl<br>10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 364.9 | | | | | | | | | |
| 363.3 | red<br>SHALE | | | | | | 364 | | |
| 22.9 | Blue<br>SHALE | | | | | | 363<br>362<br>361 | | |
| 360.0 | | | | | | | 360 | | |
| 26.2 | End of Borehole | | | | | | 359 | | |

NOTES:

**Terraprobe**

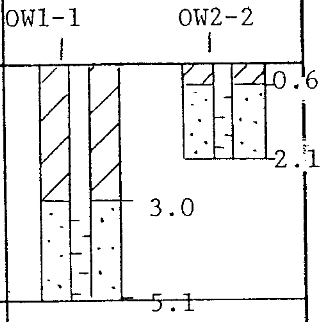
# LOG OF BOREHOLE OW-1

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: April 24 - 25, 1988
EQUIPMENT: Mobile B-61 - rotary
ELEVATION DATUM: Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10 / WATER CONTENT PERCENT 10 20 30 40 | ELEV. DEPTH |
|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | |
| 390.0 | **GROUND SURFACE** | | | | | | | |
| | Dense **SAND AND GRAVEL,** numerous boulders **(OUTWASH)** | | 1 | AS | - | | | |
| 387.9<br>2.1 | Grey **DOLOSTONE,** weakly fractured (Amabel Formation) | | 2 | AS | - | | | |
| 284.9 | | | 3 | CS | - | | | 285 |
| 5.1 | End of Borehole | | | | | | | |
| | | | | | | | | 280 |

DETAILS OF INSTALLATION



NOTES: Concrete seal and protective pipe at grade.
Installations in separate holes.

Field Supervisor:
Drawn by:
Checked by:

**Terraprobe**

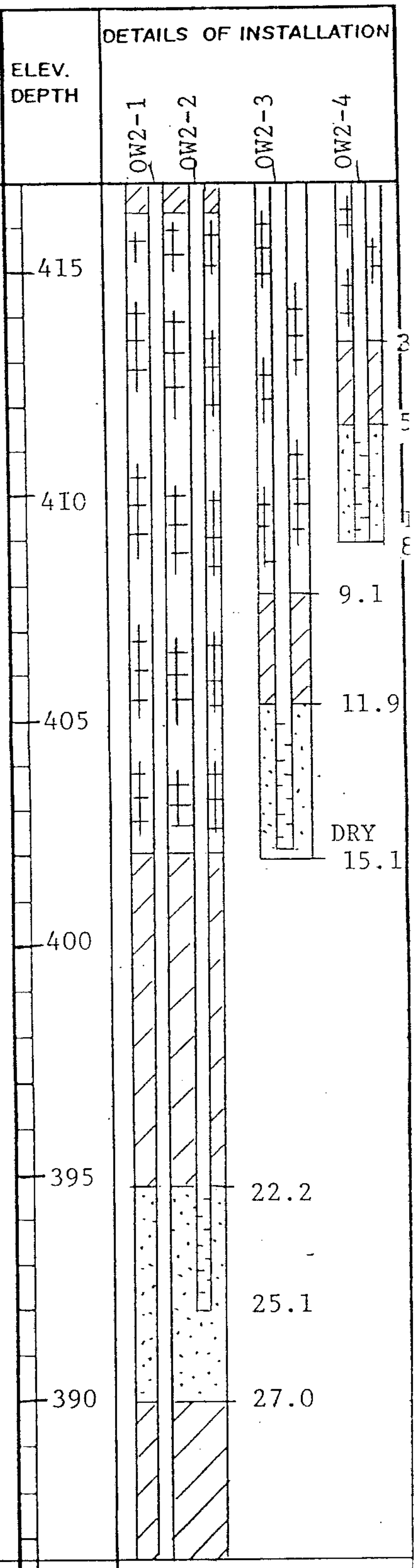
# LOG OF BOREHOLE OW-2

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: March 24 - April 7, 1988
EQUIPMENT: Mobile B-G1 - rotary
ELEVATION DATUM: Geodetic

HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10
WATER CONTENT PERCENT 10 20 30 40

| STRATIGRAPHY |  | SAMPLES |  |  |  |
|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | NUMBER | TYPE | 'N' VALUES | RECOVERY |
| 417.0 | **GROUND SURFACE** |  |  |  |  |
|  | Brown Dense<br>**SAND AND GRAVEL,**<br>**(OUTWASH)**<br>numerous cobbles and boulders.<br>Very difficult drilling.<br>6.8 to 8.8m<br>12.1 to 14.0m<br>loss of mud circulation at 8.0 to 9.5m and 12.1 to 15m. | 1<br>2 | CS<br>CS |  |  |
| 402.0<br>15.0 | Grey-Brown Damp<br>**SAND, SILT,**<br>some gravel and cobbles<br>**(TILL)**<br>water encountered at 25m. | 3<br>4 | CS<br>CS |  |  |
| 391.0<br>26.0 | **SAND AND GRAVEL,**<br>loss of mud circulation 27 to 29m. | 5<br>6 | CS<br>CS |  |  |
| 386.7<br>30.3 | Continued ...... |  |  |  |  |



NOTES: OW2 - 1 and 2-2 in same hole.
OQ2 - 3 and 2-4 in separate holes.

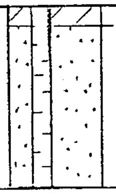
Field Supervisor: ______
Drawn by: ______
Checked by: ______

**Terraprobe**

# LOG OF BOREHOLE OW-2
CON'T

**PROJECT:** Proposed Sudivision
**LOCATION:** Belfountain
**CLIENT:** Enterac

**DATE:** March 24 - April 7, 1988
**EQUIPMENT:** Mobile B-G1 - rotary
**ELEVATION DATUM:** Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1×10 1×10 1×10 1×10 / WATER CONTENT PERCENT 10 20 30 40 | ELEV. DEPTH | DETAILS OF INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | | |
| 386.7 | Continued ... | | | | | | | | |
| 30.3 | Grey<br>**DOLOSTONE**<br>(Amabel Formation)<br>loss of mud<br>circulation | | | | | | | 385 |  |
| 383.0<br>34.0 | End of Borehole | | | | | | | | |

**NOTES:**
OW2 - 1 and 2-2 in same hole.
OW2 - 3 and 2-4 in separate holes.

Field Supervisor:
Drawn by:
Checked by:

**Terraprobe**

# LOG OF BOREHOLE OW-3

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: April 7 - 11, 1988
EQUIPMENT: Mobile B-61 - rotary
ELEVATION DATUM: Geodetic

| ELEV. DEPTH | DESCRIPTION |
|---|---|
| 413.0 | |
| 406.0 | Brown Dense **SAND AND GRAVEL,** numerous boulders<br>**(OUTWASH)** |
| 387.7<br>7.0 | Grey **DOLOSTONE** (Amabel Formation)<br>loss of mud circulation below 9m; switch to air rotary, appears highly fractured<br>water encountered at 21m. |
| 383.9<br>25.3 | Black to Grey **DOLOSTONE AND SHALE**<br>(Manitoulin Formation) |
| 29.1 | End of Borehole |

SAMPLES

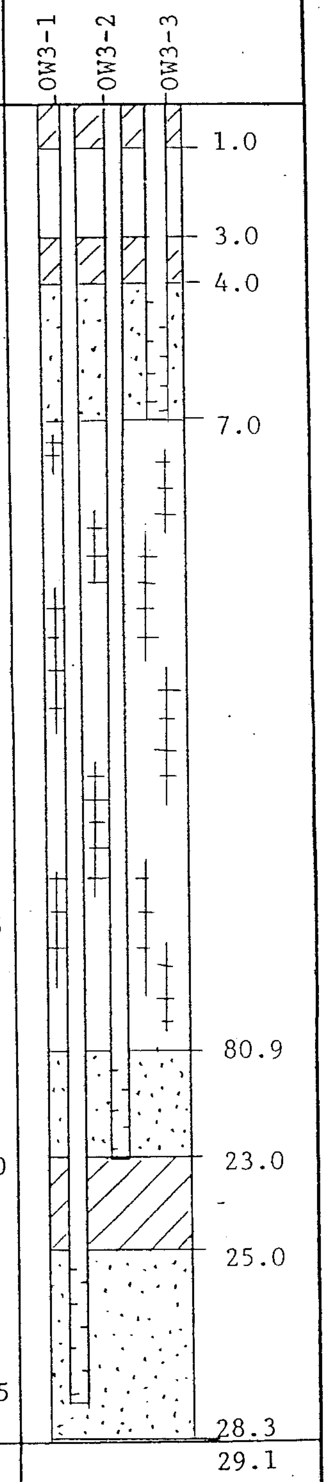
| NUMBER | TYPE | 'N' VALUES | RECOVERY |
|---|---|---|---|
| 1 | CS | | |
| 2 | CS | | |
| 3 | CS | | |
| 4 | CS | | |
| 5 | CS | | |
| 6 | CS | | |
| 7 | CS | | |

HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10

WATER CONTENT PERCENT 10 20 30 40

ELEV. DEPTH 410 405 400 395 390 385

DETAILS OF INSTALLATION



NOTES: Concrete seal and protective pipe at grade.
All wells installed in same hole.

Field Supervisor:
Drawn by:
Checked by:

Terraprobe

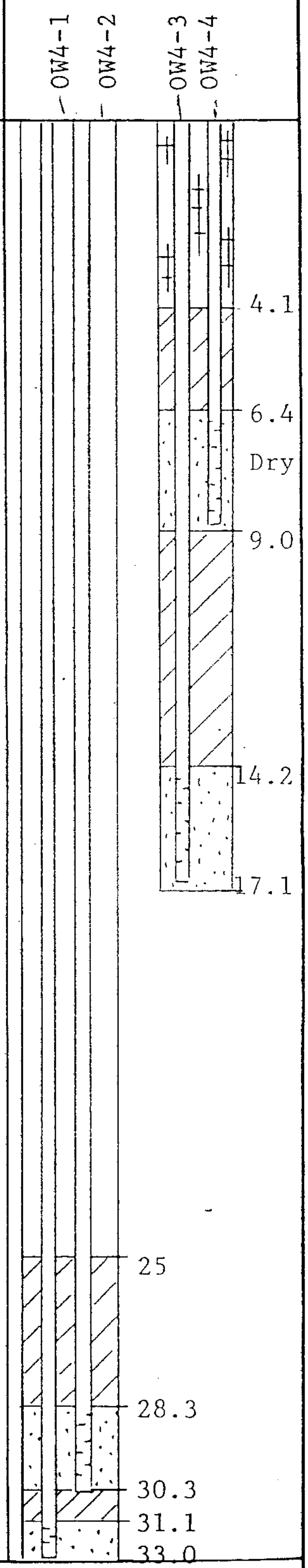
# LOG OF BOREHOLE OW-4

PROJECT: Proposed Sudivision
LOCATION: Belfountain
CLIENT: Enterac

DATE: April 20 - 24, 1988
EQUIPMENT: Mobile B-61
ELEVATION DATUM: Geodetic

| STRATIGRAPHY | | | SAMPLES | | | | HYDRAULIC CONDUCTIVITY K., CM/SEC 1x10 1x10 1x10 1x10<br>WATER CONTENT PERCENT 10 20 30 40 | |
|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH 441.0 | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES | RECOVERY | | ELEV. DEPTH |
| | Brown Dense<br>**SAND AND GRAVEL,**<br>numerous cobbles and boulders<br>**(OUTWASH)** | | | | | | | 440 |
| | | | 1 | CS | | | | 435 |
| | — — increasing content of fines below 7m. | | | | | | | |
| | loss of mud circulation at 8-9m, 15.1 to 16.2m 30.1 to base at hole | | 2 | CS | | | | 430 |
| 426.0<br>15.0 | | | | | | | | |
| | **SAND AND GRAVEL, SILT,**<br>numerous cobbles and boulders<br>**(TILL)** | | 3 | CS | | | | 425 |
| | | | 4 | CS | | | | 420 |
| | | | 5 | CS | | | | 419 |
| 411.0<br>30.0 | **SAND AND GRAVEL** | | 6 | CS | | | | |
| 409.7<br>408.0 | **AMABEL DOLOSTONE** | | 7 | CS | | | | 410 |
| 33.0 | End of Borehole | | | | | | | |

DETAILS OF INSTALLATION



NOTES: OW4-1 and 4-2 installed in same hole. OW4-3 and 4-4 installed in same hole. Concrete seal and protective pipe at grade.

Field Supervisor: ________
Drawn by: ________
Checked by: ________

# Terraprobe

# LOG OF BOREHOLE 88–13

PROJECT: Proposed Sudivision

LOCATION: Belfountain

CLIENT: Enterac

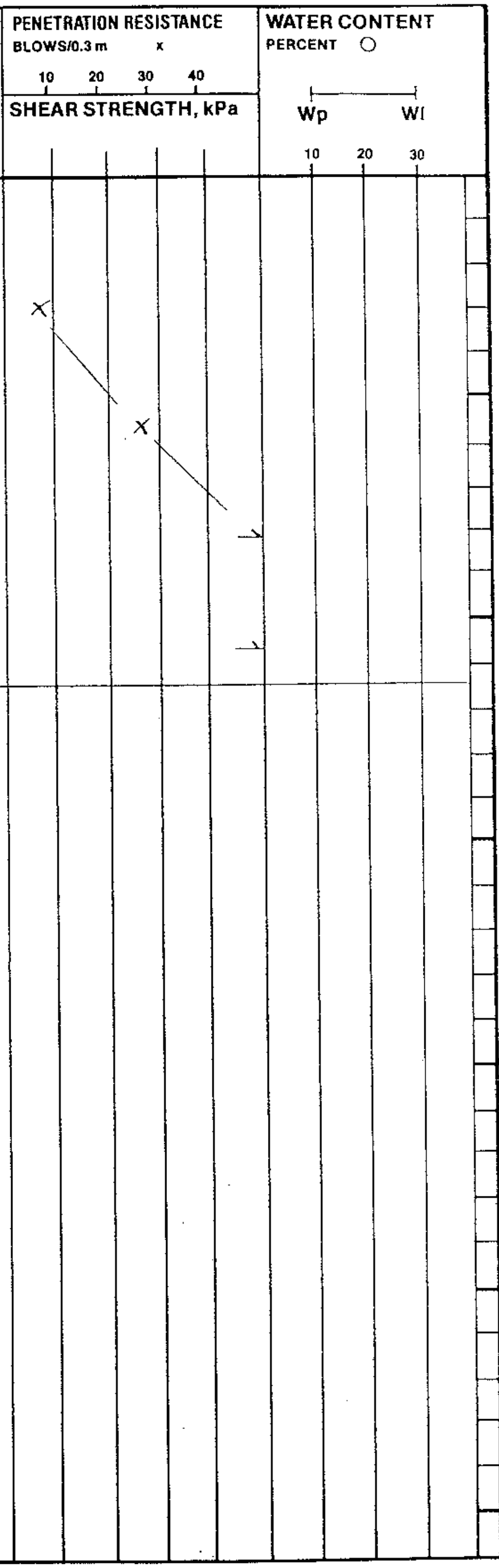
DATE: April 28, 1988

EQUIPMENT: CME 55

ELEVATION DATUM: –

FILE: 88164

| STRATIGRAPHY | | SAMPLES | | |
|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION<br>Ground Surface | NUMBER | TYPE | 'N' VALUES |
| | **TOPSOIL** | | | |
| 0.3 | Brown Loose Damp<br>**SILT,** trace sand | 1 | SS | 8 |
| 1.4 | Brown Dense Damp<br>**SILTY SAND AND GRAVEL,**<br>occasional cobbles<br>**(TILL)** | 2 | SS | 27 |
| | | 3 | SS | 62 |
| | — thin layers clean sand | 4 | SS | 82/11" |
| 3.5 | End of Borehole | | | |



**NOTES:**

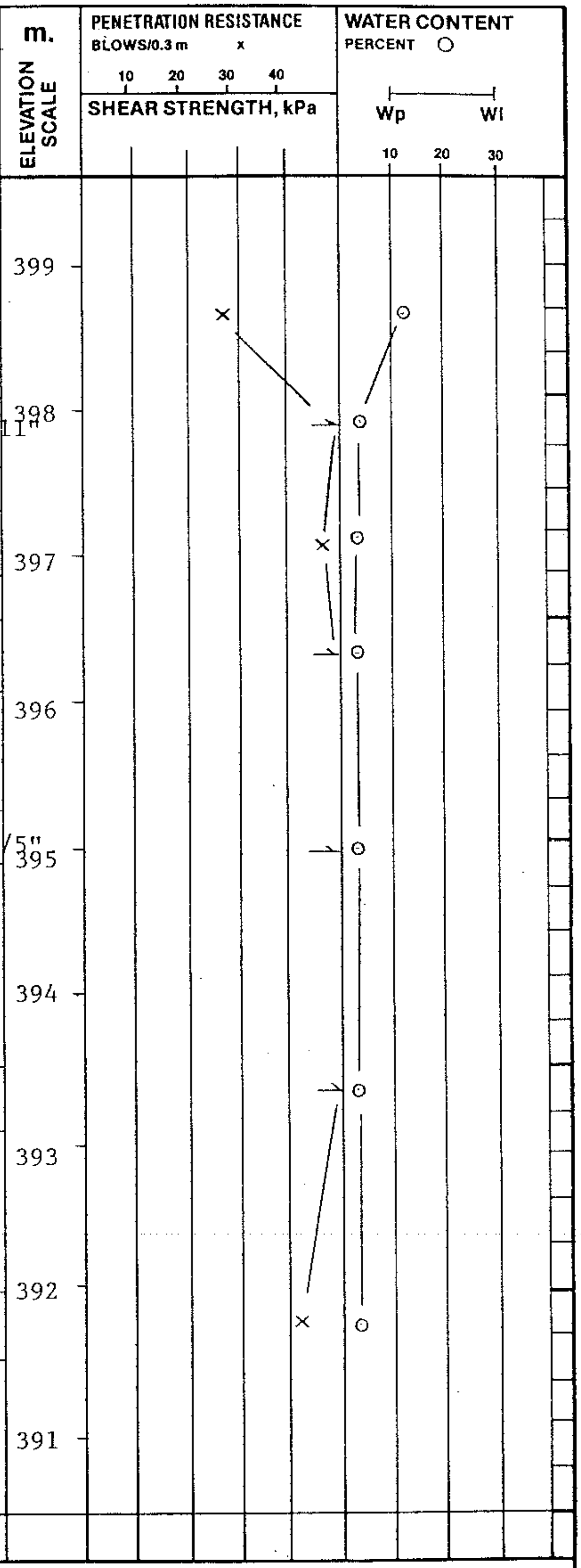
1. Borehole caving at 3.0m depth and dry on completion of drilling.
2. Standpipe dry on May 12, July 7, 1988.

**Terraprobe**

# LOG OF BOREHOLE 89-4

PROJECT: Belfountain Subdivision
LOCATION: Belfountain
CLIENT: Enterac
DATE: August 22, 1989
EQUIPMENT: CME 55
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | SAMPLES | | |
|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | NUMBER | TYPE | 'N' VALUES |
| 399.6 | Ground Surface | | | | |
| | **TOPSOIL** | | | | |
| 399.0<br>0.6 | Brown Dense to Very Dense Moist **SANDY SILT,** some clay, trace gravel **(TILL)** | | 1 | SS | 27 |
| | | | 2 | SS | 68/11" |
| | | | 3 | SS | 47 |
| 396.9<br>2.7 | Brown Very Dense Moist **SAND AND GRAVEL,** some silt **OUTWASH** | | 4 | SS | 83 |
| | | | 5 | SS | 100/5" |
| | | | 6 | SS | 85 |
| | | | 7 | SS | 42 |
| 390.5<br>9.1 | Continued..... | | | | |



NOTES:
1. Borehole open and dry on completion of drilling.
2. Standpipe dry at a 12.0m depth on September 10, 1989.

**Terraprobe**

# LOG OF BOREHOLE 89–4
CON'T

PROJECT: Belfountain Subdivision
LOCATION: Belfountain
CLIENT: Enterac
DATE: August 22, 1989
EQUIPMENT: CME 55
ELEVATION DATUM: Geodetic
FILE: 88164

| STRATIGRAPHY | | | | SAMPLES | | | m. | PENETRATION RESISTANCE BLOWS/0.3 m x 10 20 30 40 / SHEAR STRENGTH, kPa | WATER CONTENT PERCENT ○ Wp Wl 10 20 30 |
|---|---|---|---|---|---|---|---|---|---|
| ELEV. DEPTH m. | DESCRIPTION | STRAT. PLOT | GROUND WATER | NUMBER | TYPE | 'N' VALUES | ELEVATION SCALE | | |
| 390.5 | Continued..... | | | | | | | | |
| 9.1 | Brown Very Dense Moist<br>SAND AND GRAVEL,<br>trace to some silt | | | 8 | SS | 60 | 390 | | |
| | | | | 9 | SS | 65 | 389 | | |
| | OUTWASH | | | | | | 388 | | |
| 387.3 | | | | 10 | SS | 100/5" | | | |
| 12.3 | End of Borehole<br>Auger Refusal | | | | | | 387 | | |

NOTES:

UTM 17 Z 579290 E

5 R 4849168 N

Elev. 5 R 1260

Basin 24

WATER RESOURCES DIVISION
AUG 49 1965
ONTARIO WATER RESOURCES COMMISSION

№ 1010

The Ontario Water Resources Commission Act

# WATER WELL RECORD

County or District PEEL

Township, Village, Town or City CALEDON

Con. V W.H.-ST. Lot 9

Date completed 29 (day) March (month) 1965 (year)

Owner Corner Sandstone Quaries Ltd. (print in block letters)

Address Belfountain, Ontario.

## Casing and Screen Record

Inside diameter of casing 5"

Total length of casing 38'

Type of screen —

Length of screen —

Depth to top of screen —

Diameter of finished hole 5"

## Pumping Test

Static level 20'

Test-pumping rate 5 G.P.M.

Pumping level 90'

Duration of test pumping 2 hrs.

Water clear or cloudy at end of test clear

Recommended pumping rate 4 G.P.M.

with pump setting of 100 feet below ground surface

## Well Log

| Overburden and Bedrock Record | From ft. | To ft. | Water Record: Depth(s) at which water(s) found | Water Record: Kind of water (fresh, salty, sulphur) |
|---|---|---|---|---|
| Hardpan and boulders | 0 | 25 | | |
| Gravel | 25 | 36 | | |
| Red and blue shale | 36 | 120 | 90-115 | fresh |

For what purpose(s) is the water to be used? D

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm **Water Well Drilling**

Address R. H. GADKE - PHONE 123W1
R.R. 1 - CLIFFORD, ONTARIO

Licence Number

Name of Driller or Borer Donald Goll

Address Harriston, Ont.

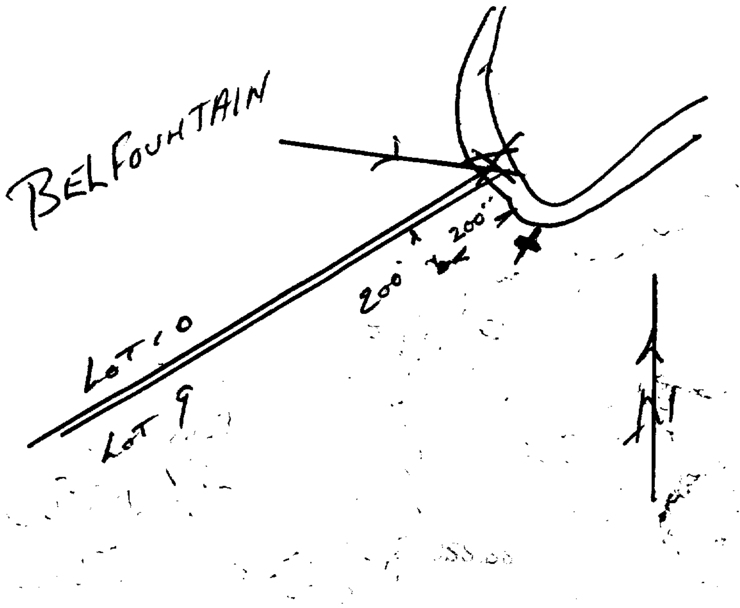
Date

H. Gadke

(Signature of Licensed Drilling or Boring Contractor)

## Location of Well

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



Form 7 15M-60-4138

**OWRC COPY**

A

UTM 17 Z 579608 E

5 R 4849171 N

Elev. 6~~5~~ R 1255

Basin 24

**The Ontario Water Resources Commission Act**

# WATER WELL RECORD

49 № 1011

~~County or District~~ ~~CALEDON~~ PEEL Township, ~~Village, Town or City~~ ~~PEEL~~ CALEDON

Con. V H.ST.W. Lot 9 Date completed 21 (day) JUNE month 1965 year)

[redacted]ress 193 GLASGOW ST NORTH GUELPH

## Casing and Screen Record

Inside diameter of casing 4"

Total length of casing 14 FT

Type of screen NONE

Length of screen

Depth to top of screen

Diameter of finished hole 4"

## Pumping Test

Static level 38 FT

Test-pumping rate 3 G.P.M.

Pumping level 42 FT

Duration of test pumping 1 hr

Water clear or cloudy at end of test CLEAR

Recommended pumping rate 3 G.P.M.

with pump setting of 46 feet below ground surface

## Well Log

| Overburden and Bedrock Record | From ft. | To ft. | Depth(s) at which water(s) found | Kind of water (fresh, salty, sulphur) |
|---|---|---|---|---|
| OLD WELL | 0 | 12 | | |
| LIGHT GREY LIMESTONE | 12 | 48 | 40 FT | FRESH |

For what purpose(s) is the water to be used? HOUSE

Is well on upland, in valley, or on hillside? upland.

Drilling or Boring Firm LADCO DRILLING AND EXPLORATION CO

Address R.R.#1 HILLSBURGH

Licence Number 1874

Name of Driller or Borer THOMAS LANG

Address HILLSBURGH, R.R. 1

Date June 22/65

T. Lang.

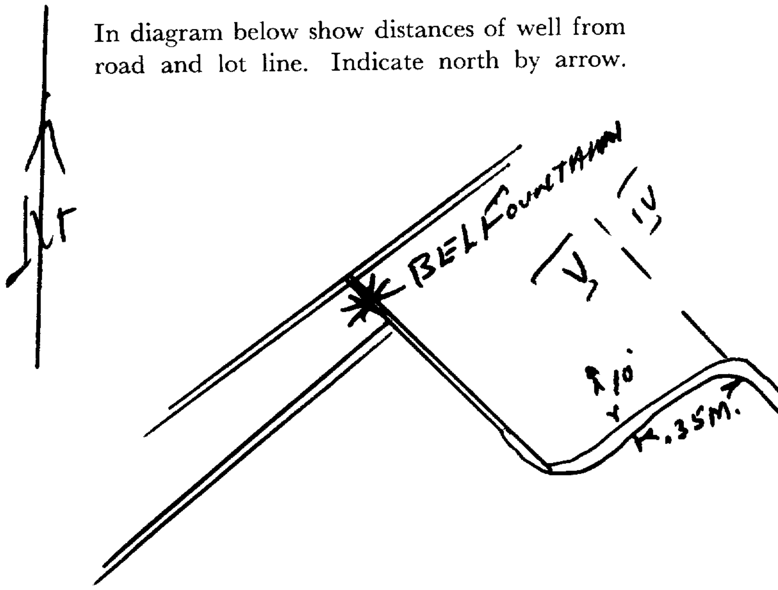
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

**OWRC COPY**

## Location of Well

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



CSS.S8

UTM 5 | 17 | Z | 5 7 9 5 4 7 | E
5 | R | 4 8 4 9 4 2 0 | N
Elev Well # 1 1 2 4 5
7 8
dry Hole
Basin 2 4

GROUND WATER BRANCH
JUL 9 1962 No 1017
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act

# WATER WELL RECORD

County or District ~~Peel~~ Township, Village, Town or City Caledon
Con V W.H.S.T. Lot 10 Date completed 10 (day) May month 1962 year)
[redacted] ress Toronto Ont.

## Casing and Screen Record

Inside diameter of casing 6¼ inch
Total length of casing 22 ft
Type of screen none
Length of screen none
Depth to top of screen nil
Diameter of finished hole 6¼ inch

## Pumping Test

Static level -
Test-pumping rate - G.P.M.
Pumping level -
Duration of test pumping -
Water clear or cloudy at end of test -
Recommended pumping rate * G.P.M.
with pump setting of - feet below ground surface

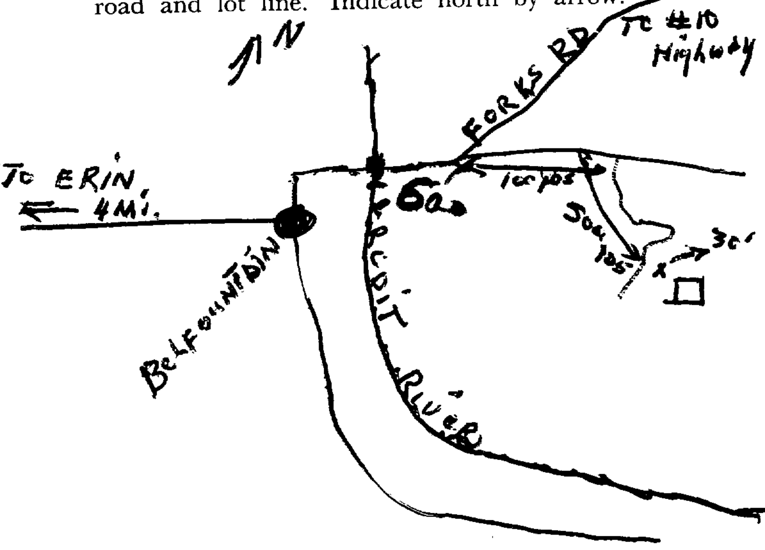
## Well Log

| Overburden and Bedrock Record | From ft. | To ft. | Depth(s) at which water(s) found | Kind of water (fresh, salty, sulphur) |
|---|---|---|---|---|
| top soil | 0 | 1 | dry hole | nil |
| boulders gravel | 1 | 15 | | |
| gray clay, gravel | 15 | 22 | | |
| rock lt. gray | 22 | 62 | | |
| red shale | 62 | 100 | | |
| Total depth - 100 ft. | | | | |

For what purpose(s) is the water to be used? domestic
Is well on upland, in valley, or on hillside? hillside
Drilling or Boring Firm J L Graham Drilling Contractor
Address 119 Renfield St. Guelph Ont.
Licence Number 481
Name of Driller or Borer Robert Graham
Address 210 Waverley Street, Guelph Ont.
Date June 12th 1962.
J L Graham per
(Signature of Licensed Drilling or Boring Contractor)

## Location of Well

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



Form 7 15M Sets 60-5930

OWRC COPY

GROUND WATER BRANCH
49 JUL No 1962 4018
ONTARIO WATER RESOURCES COMMISSION

H.S.W.
UTM ~~4~~ 7 Z 5 7 9 5 6 7 E
8 R 4 8 4 9 2 5 6 N
Well # 2.
Elev 9 R

The Ontario Water Resources Commission Act

# WATER WELL RECORD

Basin 2 1
County or District Peel
Township, Village, Town or City Caledon
Con v W.H. St. Lot 10
Date completed 16th (day) May (month) 1962 (year)
[redacted]ress Toronto Ont.

## Casing and Screen Record

Inside diameter of casing 6¼ inch
Total length of casing 20 ft
Type of screen nil
Length of screen nil
Depth to top of screen nil
Diameter of finished hole 6¼ inch

## Pumping Test

Static level 50 ft
Test-pumping rate 1 G.P.M.
Pumping level 60 ft
Duration of test pumping 2 hrs.
Water clear or cloudy at end of test clear
Recommended pumping rate 1 G.P.M.
with pump setting of 70 ft feet below ground surface

## Well Log

| Overburden and Bedrock Record | From ft. | To ft. | Depth(s) at which water(s) found | Kind of water (fresh, salty, sulphur) |
|---|---|---|---|---|
| gravel and stones | 0 | 5 | 75 ft | fresh |
| gravel gray clay | 5 | 19 | | |
| light gray rock | 19 | 58 | | |
| red shale | 58 | 75 | | |

For what purpose(s) is the water to be used? domestic

Is well on upland, in valley, or on hillside? hillside

Drilling or Boring Firm J L Graham Drilling Contractor

Address 119 Renfield St. Guelph Ont.

Licence Number 481

Name of Driller or Borer Robert Graham

Address 210 Waverley Drive Guelph Ont.

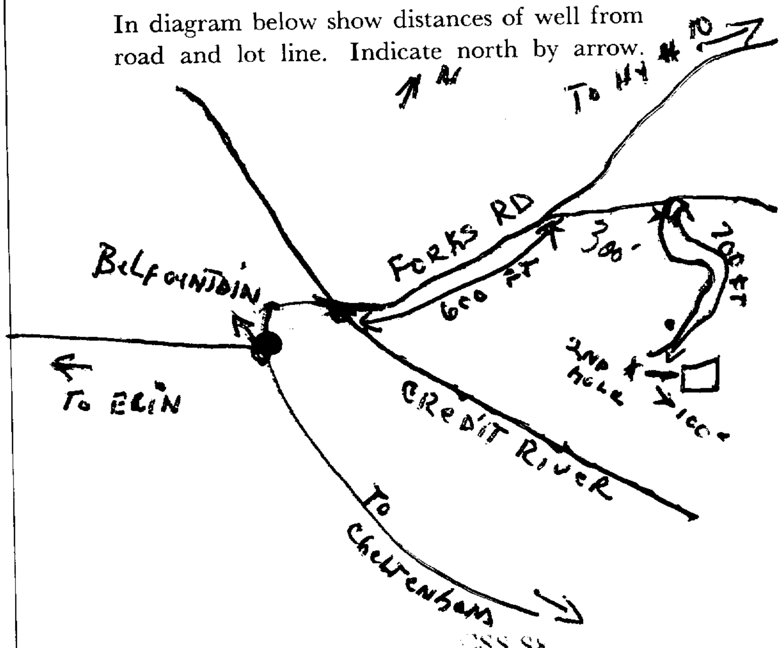
Date June 12th 1962

J L Graham per

(Signature of Licensed Drilling or Boring Contractor)

## Location of Well

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



CSS.S8

Form 7 15M Sets 60-5930

**OWRC COPY**

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

# WATER WELL RECORD

40 P/16 E

ONTARIO

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

11

4904555

MUNICIP. 49002 CON. HS W C 05

| COUNTY OR DISTRICT | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE | CON., BLOCK, TRACT, ~~SURVEY, ETC.~~ | LOT 25-27 |
|---|---|---|---|
| [redacted] | CALEDON | V V | 009 |

[redacted] ALEDON ONT.

DATE COMPLETED 48-53 DAY 09 MO. 04 YR. 74

[redacted] 849084 RC. 4 ELEVATION 1262 RC. 5 BASIN CODE 24

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH - FEET FROM | TO |
|---|---|---|---|---|---|
| BROWN | TOPSOIL | | | 0 | 3 |
| BROWN | CLAY | & BOULDERS | | 3 | 28 |
| WHITE | GRAVEL | & SAND | | 28 | 43 |
| WHITE | LIMESTONE | (SOFT) | | 43 | 48 |

OWRC
P-9

31 0003602 0028695 13 0043 1128 0048 15
32

## 41 WATER RECORD

| WATER FOUND AT - FEET | KIND OF WATER |
|---|---|
| 0043 ~~43-48~~ | 1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |

## 51 CASING & OPEN HOLE RECORD

| INSIDE DIAM. INCHES | MATERIAL | WALL THICKNESS INCHES | DEPTH - FEET FROM | TO |
|---|---|---|---|---|
| 5" 05 | 1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE | 188 | 0 | 0044 |
| 05 | 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE | | 44 | 0048 |
| | 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE | | | |

## SCREEN

| SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET |
|---|---|---|
| | | |

MATERIAL AND TYPE
DEPTH TO TOP OF SCREEN FEET

## 61 PLUGGING & SEALING RECORD

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

## 71 PUMPING TEST

PUMPING TEST METHOD 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE 0005 GPM
DURATION OF PUMPING 02 HOURS 00 MINS

| STATIC LEVEL | WATER LEVEL END OF PUMPING | 15 MINUTES | 30 MINUTES | 45 MINUTES | 60 MINUTES |
|---|---|---|---|---|---|
| 009 FEET | 032 FEET | 020 FEET | 012 FEET | 009 FEET | FEET |

WATER LEVELS DURING 1 ☐ PUMPING 2 ☑ RECOVERY
IF FLOWING GIVE RATE GPM
PUMP INTAKE SET AT FEET
WATER AT END OF TEST 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING 045 FEET
RECOMMENDED PUMPING RATE 0005 GPM.
000.2 GPM./FT. SPECIFIC CAPACITY

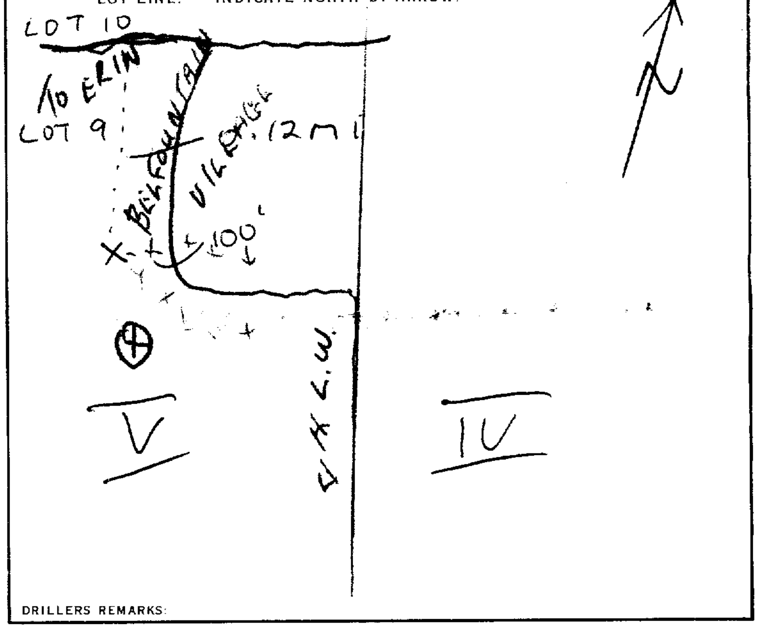
**FINAL STATUS OF WELL**
1 ☑ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

**WATER USE** 01
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

**METHOD OF DRILLING**
1 ☑ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

## LOCATION OF WELL

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



DRILLERS REMARKS:

**CONTRACTOR**
NAME OF WELL CONTRACTOR Keith McClure LICENCE NUMBER ~~35~~3513
ADDRESS Inglewood Ont.
NAME OF DRILLER OR BORER Same LICENCE NUMBER 3513
SIGNATURE OF CONTRACTOR Keith McClure SUBMISSION DATE DAY 9 MO. 4 YR. 72

**OFFICE USE ONLY**
DATA SOURCE 1 CONTRACTOR 3513 DATE RECEIVED 240175
DATE OF INSPECTION 14/3/75 INSPECTOR J.B.
REMARKS:
P 16
WI
CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

# WATER WELL RECORD

40 P/16E

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

11 4905490 49002 HS W 05

COUNTY OR DISTRICT: PEEL
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: CALEDONE
CON., BLOCK, TRACT, SURVEY, ETC.: 5 WHS
LOT: ~~009~~

[redacted] USH ST. / BELFOUNTAIN

DATE COMPLETED: DAY 18 MO. 10 ~~07~~ YR. 77

[redacted] 849300 5 ELEVATION 1175 5 BASIN CODE 24

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH - FEET FROM | DEPTH - FEET TO |
|---|---|---|---|---|---|
| BROWN | (GRAVEL | - STONES - ROCKS | | 0 | 48 |
| GREY | CLAY | STONES | | 48 | 80 |
| GREY | CLAY | | SOFT | 80 | 95 |
| GREY | CLAY | GREY ROCK | | 95 | 112 |
| GREY | ROCK | GREY-CLAY RIDGES | | 112 | 143 |
| RED | SHALE | | | 143 | 180 |

31 004863112 008020512 009520585 011220526 014322605 0180717

32

## 41 WATER RECORD

| WATER FOUND AT - FEET | KIND OF WATER |
|---|---|
| 0155 ~~180~~ | 5 — 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |
| | 1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL |

## 51 CASING & OPEN HOLE RECORD

| INSIDE DIAM INCHES | MATERIAL | WALL THICKNESS INCHES | DEPTH - FEET FROM | DEPTH - FEET TO |
|---|---|---|---|---|
| 04 | 1 ☒ STEEL<br>2 ☐ GALVANIZED<br>3 ☐ CONCRETE<br>4 ☐ OPEN HOLE | .188 | 0 | 0119 |
| 04 | 1 ☐ STEEL<br>2 ☐ GALVANIZED<br>3 ☐ CONCRETE<br>4 ☒ OPEN HOLE | | 119 | 0180 |
| | 1 ☐ STEEL<br>2 ☐ GALVANIZED<br>3 ☐ CONCRETE<br>4 ☐ OPEN HOLE | | | |

## SCREEN

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

## 61 PLUGGING & SEALING RECORD

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

## 71 PUMPING TEST

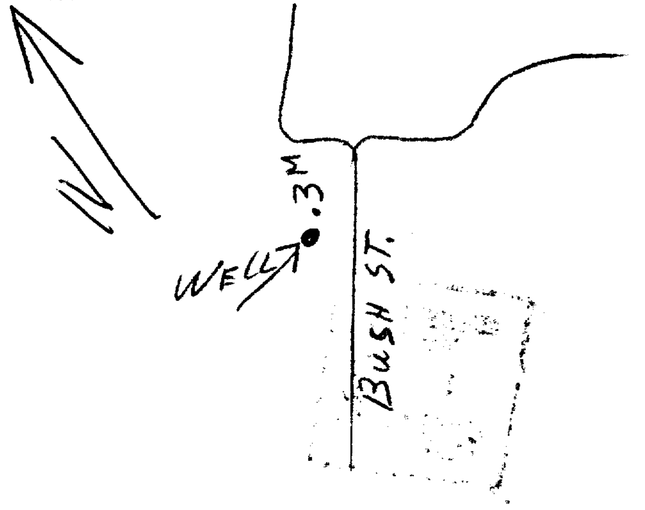
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 0005 GPM
DURATION OF PUMPING: 03 HOURS 00 MINS

| STATIC LEVEL | WATER LEVEL END OF PUMPING | WATER LEVELS DURING 15 MINUTES | 30 MINUTES | 45 MINUTES | 60 MINUTES |
|---|---|---|---|---|---|
| 057 FEET | 070 FEET | 060 FEET | 057 FEET | 057 FEET | 057 FEET |

WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 90 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 090 FEET
RECOMMENDED PUMPING RATE: 0005 GPM
GPM./FT. SPECIFIC CAPACITY

## LOCATION OF WELL

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



SM

DRILLERS REMARKS:

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

**WATER USE** 01
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

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

## CONTRACTOR

NAME OF WELL CONTRACTOR: Rudy WELL DRILLING
LICENCE NUMBER: 2332
ADDRESS: RRI Hillsburg
NAME OF DRILLER OR BORER: Rudy GARBOTZ
LICENCE NUMBER: 2332
SIGNATURE OF CONTRACTOR: Rudy Garbotz
SUBMISSION DATE: DAY MO. YR.

## OFFICE USE ONLY

DATA SOURCE: 1
CONTRACTOR: 2332
DATE RECEIVED: 210278
DATE OF INSPECTION:
INSPECTOR: Aug 21 78 87
REMARKS: Changed From 4905294
CSS.SS
P
WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

78/87

The Ontario Water Resources Act

CV

# WATER WELL RECORD

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

11

4906673

MUNICIP

CON 05 9

| COUNTY OR DISTRICT | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE | CON., BLOCK, TRACT, SURVEY ETC | LOT 25-27 |
|---|---|---|---|
| Peel | CALEDON (CALEDON) - | 5 WHS | ~~9~~-10 |

OWNER (SURNAME FIRST) 28-47: BelFounTAIN Church

ADDRESS: c/o [redacted] MAIN ST + 4th Line W Belfountain ~~, RR#1 TERRA COTTA, ONT~~

DATE COMPLETED 48-53: DAY 019 MO 08 YR 87

2 ZONE 17 EASTING 579324 NORTHING 4849123 RC ELEVATION 0384 RC BASIN CODE

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH - FEET FROM | TO |
|---|---|---|---|---|---|
| BROWN | CLAY | SAND, STONES | | 0 | 35 |
| Red | " | GRAVEL | | 35 | 45 |
| GRey | " | " | | 45 | 60 |
| BLue | Shale | | | 60 | 85 |
| GRey | Rock | | | 85 | 105 |
| BLue | Shale | | | 105 | 120 |
| Red | " | | | 120 | 130 |
| | | | TOTAL DepTh | 130 ft. | |

31

32

## 41 WATER RECORD

| WATER FOUND AT - FEET | KIND OF WATER |
|---|---|
| 90 | ☒ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS |
| 120 | ☒ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS |
| | ☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS |
| | ☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS |
| | ☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS |

## 51 CASING & OPEN HOLE RECORD

| INSIDE DIAM INCHES | MATERIAL | WALL THICKNESS INCHES | DEPTH - FEET FROM | TO |
|---|---|---|---|---|
| 5 | ☒ STEEL<br>☐ GALVANIZED<br>☐ CONCRETE<br>☐ OPEN HOLE<br>☐ PLASTIC | .188 | 0 | 64 |
| 5 | ☐ STEEL<br>☐ GALVANIZED<br>☐ CONCRETE<br>☒ OPEN HOLE<br>☐ PLASTIC | | 64 | 130 |
| | ☐ STEEL<br>☐ GALVANIZED<br>☐ CONCRETE<br>☐ OPEN HOLE<br>☐ PLASTIC | | | |

## SCREEN

| SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET |
|---|---|---|
| | | |

MATERIAL AND TYPE

DEPTH TO TOP OF SCREEN FEET

## 61 PLUGGING & SEALING RECORD

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

## 71 PUMPING TEST

PUMPING TEST METHOD: ☐ PUMP ☒ BAILER

PUMPING RATE: 3 GPM

DURATION OF PUMPING: 3 HOURS MINS

| STATIC LEVEL | WATER LEVEL END OF PUMPING | 15 MINUTES | 30 MINUTES | 45 MINUTES | 60 MINUTES |
|---|---|---|---|---|---|
| 57 FEET | 112 FEET | FEET | 57 FEET | FEET | FEET |

WATER LEVELS DURING: ☐ PUMPING ☒ RECOVERY

IF FLOWING, GIVE RATE: — GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: ☒ CLEAR ☐ CLOUDY

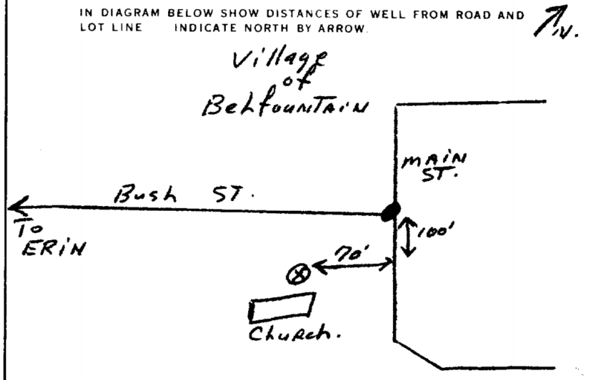
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 125 FEET

RECOMMENDED PUMPING RATE: 3 GPM

## LOCATION OF WELL

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



DRILLERS REMARKS:

15808

## FINAL STATUS OF WELL

- ☒ WATER SUPPLY
- ☐ OBSERVATION WELL
- ☐ TEST HOLE
- ☐ RECHARGE WELL
- ☐ ABANDONED, INSUFFICIENT SUPPLY
- ☐ ABANDONED, POOR QUALITY
- ☐ UNFINISHED
- ☐ DEWATERING

## WATER USE

- ☒ DOMESTIC
- ☐ STOCK
- ☐ IRRIGATION
- ☐ INDUSTRIAL
- ☐ OTHER
- ☐ COMMERCIAL
- ☐ MUNICIPAL
- ☐ PUBLIC SUPPLY
- ☐ COOLING OR AIR CONDITIONING
- ☐ NOT USED

## METHOD OF CONSTRUCTION

- ☒ CABLE TOOL
- ☐ ROTARY (CONVENTIONAL)
- ☐ ROTARY (REVERSE)
- ☐ ROTARY (AIR)
- ☐ AIR PERCUSSION
- ☐ BORING
- ☐ DIAMOND
- ☐ JETTING
- ☐ DRIVING
- ☐ DIGGING
- ☐ OTHER

## CONTRACTOR

NAME OF WELL CONTRACTOR: GRAHAM WeLL DRiLLing LTD

WELL CONTRACTOR'S LICENCE NUMBER: 2336

ADDRESS: Guelph, ONT.

NAME OF WELL TECHNICIAN: J. HAWKINS

WELL TECHNICIAN'S LICENCE NUMBER:

SIGNATURE OF TECHNICIAN/CONTRACTOR: R Graham

SUBMISSION DATE: DAY 030 MO 08 YR 87

## OFFICE USE ONLY

DATA SOURCE

CONTRACTOR

DATE RECEIVED: SEP 14 1987

DATE OF INSPECTION

INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

# WATER WELL RECORD

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

11

4907667

MUNICIP 49002 CON. HS W 05

COUNTY OR DISTRICT [redacted]

TOWNSHIP, BOROUGH, CITY, [✓ TOWN], VILLAGE: OF CALEDON

[✓ CON], BLOCK, TRACT, SURVEY, ETC: 5

LOT 25-27: 9

MAIN ERIN N0B 1T0

DATE COMPLETED 48-53 DAY 22 MO 07 YR 92

RC. ELEVATION RC. BASIN CODE II III IV

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH - FEET FROM | DEPTH - FEET TO |
|---|---|---|---|---|---|
| BROWN | TOP SOIL | | | 0 | 1 |
| | SAND + GRAVEL | STONES | | 1 | 20 |
| BROWN | CLAY | SAND + GRAVEL + STONES | | 20 | 61 |
| RED | SHALE | | | 61 | 66 |
| BLUE | SHALE | | | 66 | 103 |
| | | | TOTAL = | 103' | |
| | | 6" CASING DRIVE SHOE | | | |

31

32

## 41 WATER RECORD

| WATER FOUND AT - FEET | KIND OF WATER |
|---|---|
| 10-13 90 | 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS 14 |
| 15-18 103 | 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS 19 |
| 20-23 | 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS 24 |
| 25-28 | 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS 29 |
| 30-33 | 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS 34 80 |

## 51 CASING & OPEN HOLE RECORD

| INSIDE DIAM INCHES | MATERIAL | WALL THICKNESS INCHES | DEPTH - FEET FROM | DEPTH - FEET TO |
|---|---|---|---|---|
| 10-11 6" | 12 1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC | .188 | 0 | 13-16 62 |
| 17-18 6" | 19 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC | | 62 | 20-23 103 |
| 24-25 | 26 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC | | | 27-30 |

## SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33

DIAMETER 34-38 INCHES

LENGTH 39-40 FEET

MATERIAL AND TYPE

DEPTH TO TOP OF SCREEN 41-44 FEET 30

## 61 PLUGGING & SEALING RECORD

| DEPTH SET AT - FEET FROM | TO | MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.) |
|---|---|---|
| 10-13 0 | 14-17 10 | BENTONITE |
| 18-21 | 22-25 | ANNULAR |
| 26-29 | 30-33 | 80 |

## 71 PUMPING TEST

PUMPING TEST METHOD 10: 1 ☐ PUMP 2 ☐ BAILER AIR

PUMPING RATE 11-14: 3 GPM

DURATION OF PUMPING: 1 15-16 HOURS 17-18 MINS

STATIC LEVEL 19-21: 53.7 FEET

WATER LEVEL END OF PUMPING 22-24: FEET

25 WATER LEVELS DURING 1 ☐ PUMPING 2 ☒ RECOVERY

| 15 MINUTES 26-28 | 30 MINUTES 29-31 | 45 MINUTES 32-34 | 60 MINUTES 35-37 |
|---|---|---|---|
| 53.7 FEET | 53.7 FEET | 53.7 FEET | 53.7 FEET |

IF FLOWING, GIVE RATE 38-41: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST 42: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING 43-45: 90 FEET

RECOMMENDED PUMPING RATE 46-49: 3 GPM

50-53

## FINAL STATUS OF WELL

54
- 1 ☒ WATER SUPPLY
- 2 ☐ OBSERVATION WELL
- 3 ☐ TEST HOLE
- 4 ☐ RECHARGE WELL
- 5 ☐ ABANDONED, INSUFFICIENT SUPPLY
- 6 ☐ ABANDONED POOR QUALITY
- 7 ☐ UNFINISHED
- ☐ DEWATERING

## WATER USE

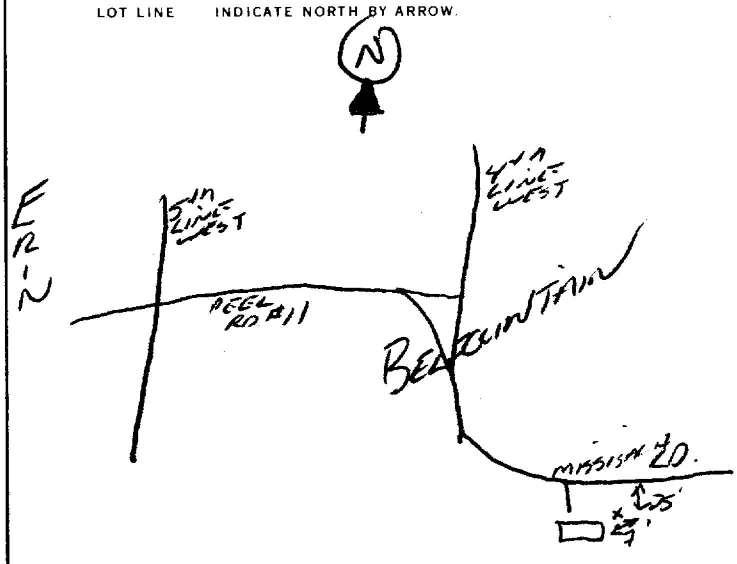
55-56
- 1 ☒ DOMESTIC
- 2 ☐ STOCK
- 3 ☐ IRRIGATION
- 4 ☐ INDUSTRIAL
- ☐ OTHER
- 5 ☐ COMMERCIAL
- 6 ☐ MUNICIPAL
- 7 ☐ PUBLIC SUPPLY
- 8 ☐ COOLING OR AIR CONDITIONING
- 9 ☐ NOT USED

## METHOD OF CONSTRUCTION

57
- 1 ☐ CABLE TOOL
- 2 ☐ ROTARY (CONVENTIONAL)
- 3 ☐ ROTARY (REVERSE)
- 4 ☒ ROTARY (AIR)
- 5 ☐ AIR PERCUSSION
- 6 ☐ BORING
- 7 ☐ DIAMOND
- 8 ☐ JETTING
- 9 ☐ DRIVING
- ☐ DIGGING
- ☐ OTHER

## LOCATION OF WELL

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



109397

DRILLERS REMARKS

## CONTRACTOR

NAME OF WELL CONTRACTOR: HANNON WELL DRILLING LTD.

WELL CONTRACTOR'S LICENCE NUMBER: 2663

ADDRESS: R.R.#5 GUELPH ONT. N1H 6J2

NAME OF WELL TECHNICIAN: HENRY R. HANNON

WELL TECHNICIAN'S LICENCE NUMBER: T-0590

SIGNATURE OF TECHNICIAN/CONTRACTOR

SUBMISSION DATE DAY 01 MO. 08 YR. 92

## OFFICE USE ONLY

DATA SOURCE 58

CONTRACTOR 59-62: 2663

DATE RECEIVED 63-68: AUG 17 1992 80

DATE OF INSPECTION

INSPECTOR

REMARKS

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FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

**The Ontario Water Resources Act**
# WATER WELL RECORD

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

11 | 4908201 | Municipality 49002 | Con. HS W 05

County or District [redacted]

Township/Borough/City/Town/Village: Caledon

Con block tract survey, etc.: √ WHS

Lot: 10

Address: 684 BUSH ST. Caledon

Date completed: day 22 month 04 year 97

21 | Northing | RC | Elevation | RC | Basin Code | ii | iii | iv

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

| General colour | Most common material | Other materials | General description | Depth – feet From | Depth – feet To |
|---|---|---|---|---|---|
| BROWN | Clay | Bolders | DENSE | 0 | 18 |
| BROWN | Clay | STONES | — " — | 18 | 46 |
| BLUE | Clay | STONES | — " — | 46 | 85 |
| Blue | Clay | | — " — | 85 | 99 |
| GREY | Lime Stone | | HARD | 99 | 131 |
| RED | Shale | | HARD | 131 | 168 |

31
32

## 41 WATER RECORD

| Water found at – feet | Kind of water |
|---|---|
| 110 | ☒ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas |
| 157 | ☒ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas |
| | ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas |
| | ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas |
| | ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas |

## 51 CASING & OPEN HOLE RECORD

| Inside diam inches | Material | Wall thickness inches | Depth – feet From | Depth – feet To |
|---|---|---|---|---|
| 6 | ☒ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic | | 0 | 102 |
| 6 | ☐ Steel ☐ Galvanized ☐ Concrete ☒ Open hole ☐ Plastic | | 102 | 168 |
| | ☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic | | | |

## SCREEN

Sizes of opening (Slot No.) | Diameter inches | Length feet
Material and type | Depth at top of screen feet

## 61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

| Depth set at – feet From | Depth set at – feet To | Material and type (Cement grout, bentonite, etc.) |
|---|---|---|
| 0 | 20 | Hole pluge and Clay |
| | | |
| | | |

## 71 PUMPING TEST

Pumping test method: ☒ Pump ☐ Bailer
Pumping rate: GPM
Duration of pumping: 24 Hours Mins

| Static level | Water level end of pumping | Water levels during ☒ Pumping ☐ Recovery 15 minutes | 30 minutes | 45 minutes | 60 minutes |
|---|---|---|---|---|---|
| 68 feet | 114 feet | 114 feet | 114 feet | 114 feet | 114 feet |

If flowing give rate: GPM
Pump intake set at: 120 feet
Water at end of test: ☒ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 125 feet
Recommended pump rate: 5 GPM

## FINAL STATUS OF WELL

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

## WATER USE

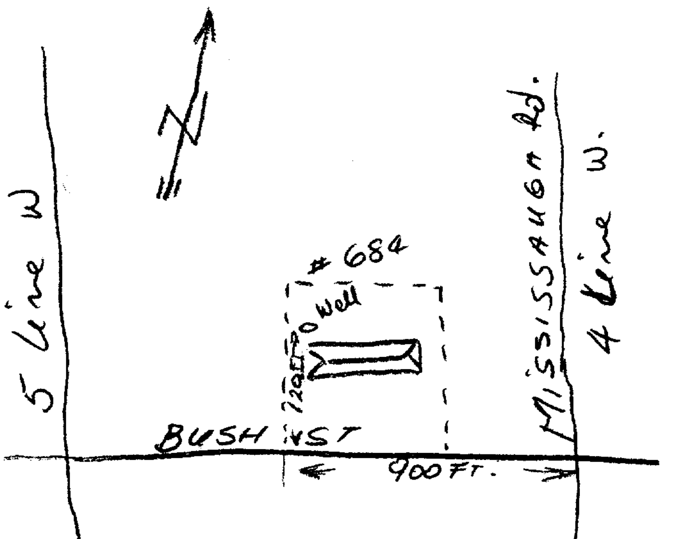
- ☒ Domestic
- ☐ Stock
- ☐ Irrigation
- ☐ Industrial
- ☐ Commercial
- ☐ Municipal
- ☐ Public supply
- ☐ Cooling & air conditioning
- ☐ Not used
- ☐ Other

## METHOD OF CONSTRUCTION

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

## LOCATION OF WELL

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



173295

Name of Well Contractor: CONCORD Well Drilling Co.
Well Contractor's Licence No.: 6650
Address: P.O. BOX 148 Caledon - Ont. LON1CO
Name of Well Technician: MARKO KIVAC
Well Technician's Licence No.: T-0278
Signature of Technician/Contractor:
Submission date: day 24 mo 04 yr 97

MINISTRY USE ONLY
Data source | Contractor 6650 | Date received MAY 26 1997
Date of inspection | Inspector
Remarks
CSS. S

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Ministry of Environment and Energy
Ontario

## The Ontario Water Resources Act
# WATER WELL RECORD

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

11

4908259

Municipality 49002 Con. HS W 05

| County or District | Township/Borough/City/Town/[✓ Village] | Con block tract survey, etc. | Lot |
|---|---|---|---|
| [redacted] | BELFOUNTAIN | | 17211 |

10

Address: 17211 OLD MAIN ST BELFOUNTAIN
Date completed: 25 (day) 09 (month) 97 (year)

21 Northing RC Elevation RC Basin Code

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

| General colour | Most common material | Other materials | General description | Depth – feet From | Depth – feet To |
|---|---|---|---|---|---|
| | TOP SOIL | | | 0 | 1 |
| BROWN | SANDY GRAVEL | ROCKS | | 1 | 15 |
| BROWN | GRAVEL | CLAY | | 15 | 42 |
| GREY | CLAY | ROCKS | | 42 | 54 |
| RED | SHALE | | | 54 | 63 |
| GREEN | SHALE | | | 63 | 105 |
| GREY | LIMESTONE/SHALE | | | 105 | 129 |
| LIGHT GREY | SANDSTONE | | | 129 | 142 |
| RED | SHALE | | | 142 | 149 |
| GREEN | SHALE | | | 149 | 151 |
| RED | SHALE | | | 151 | 170 |

31
32

### 41 WATER RECORD

| Water found at – feet | Kind of water |
|---|---|
| 115 | 1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas |
| 140 | 1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas |
| 170 | 1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas |
| | 1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas |
| | 1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas |

### 51 CASING & OPEN HOLE RECORD

| Inside diam inches | Material | Wall thickness inches | Depth – feet From | Depth – feet To |
|---|---|---|---|---|
| 6 1/4 | 1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic | .188 | +1'6" | 58'6" |
| 5" | 1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☑ Plastic | .250 | 52'0 | 170'0 |
| | 1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic | | | |

### SCREEN

| Sizes of opening (Slot No.) | Diameter inches | Length feet |
|---|---|---|
| | | |

| Material and type | Depth at top of screen feet |
|---|---|
| | |

### 61 PLUGGING & SEALING RECORD

☑ Annular space ☐ Abandonment

| Depth set at – feet From | Depth set at – feet To | Material and type (Cement grout, bentonite, etc.) |
|---|---|---|
| 0 | 25 | BENTONITE |
| | | |
| | | |

### 71 PUMPING TEST

Pumping test method: 1 ☑ Pump 2 ☐ Bailer
Pumping rate: 2 1/2 GPM
Duration of pumping: 1 Hours 0 Mins

Water levels during: 1 ☑ Pumping 2 ☐ Recovery

| Static level | Water level end of pumping | 15 minutes | 30 minutes | 45 minutes | 60 minutes |
|---|---|---|---|---|---|
| 76'1" feet | 163'3" feet | 113'0 feet | 132'1" feet | 148'7" feet | 163'3" feet |

If flowing give rate: GPM
Pump intake set at: 165 feet
Water at end of test: ☑ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☑ Deep
Recommended pump setting: 165' feet
Recommended pump rate: 2 GPM

### FINAL STATUS OF WELL

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

### WATER USE

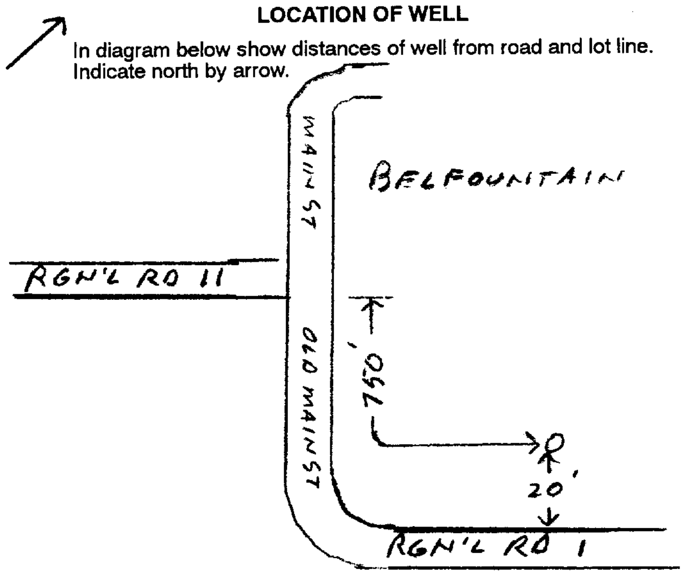
1 ☑ Domestic
2 ☐ Stock
3 ☐ Irrigation
4 ☐ Industrial
5 ☐ Commercial
6 ☐ Municipal
7 ☐ Public supply
8 ☐ Cooling & air conditioning
9 ☐ Not used
10 ☐ Other

### METHOD OF CONSTRUCTION

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

### LOCATION OF WELL

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



184518

Name of Well Contractor: MEADOWBANK DRILLING SERVICES
Well Contractor's Licence No.: 6865
Address: BOX 416 ELORA ONT N0B 1S0
Name of Well Technician: JIM BROADFOOT
Well Technician's Licence No.: T0370
Signature of Technician/Contractor: Jim Broadfoot
Submission date: 09 (day) 10 (mo) 97 (yr)

MINISTRY USE ONLY

Data source
Contractor: 6865
Date received: OCT 20 1997
Date of inspection
Inspector
Remarks
CSS.S8

0506 (07/94) Front Form 9

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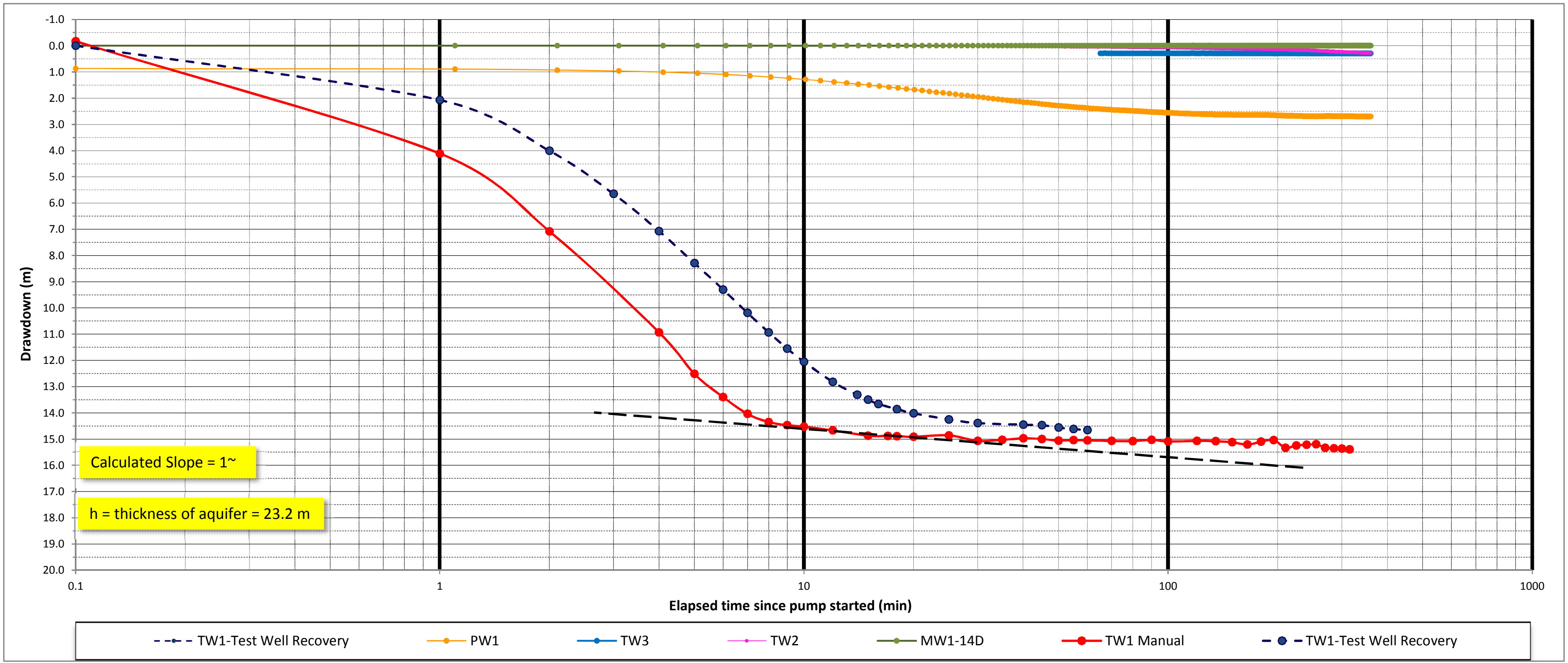
# Appendix C

## Drawdown-Time Curves

## Drawdown vs Time
## TW1-Test Well - 6 Hour Pumping Test



Calculated Slope = 1~

h = thickness of aquifer = 23.2 m

***TW1-Test Well - Operation Data***

Well Depth = 53.94 m

Static Water Level = 19.19 m below mp

Pumping rate = 0.75 L/s = 45 L/min

Transmissivity (T) = 0.183*Q/Δs = 9.37 m$^2$/day

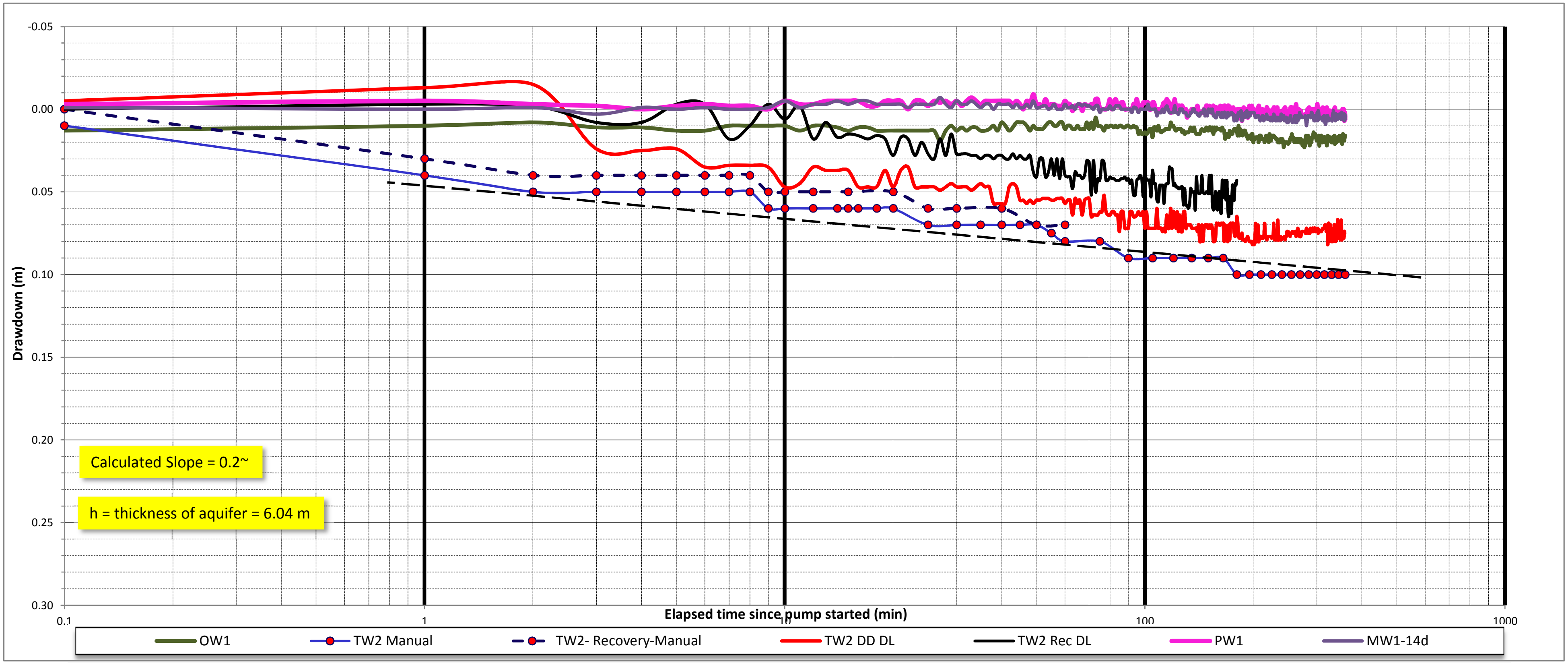
Hydraulic Conductivity (k) = T/h = 54.7*10$^{-6}$ m/sec

**Drawdown vs. Time - TW1 Pumping Test**

**Hydrogeology Investigation**

**Manors of Belfountain**

# Drawdown vs Time
## TW2-Test Well - 6 Hour Pumping Test



Calculated Slope = 0.2~

h = thickness of aquifer = 6.04 m

***TW2-Test Well - Operation Data***

Well Depth = 20.11 m

Static Water Level = 14.07 m below mp

Pumping rate = 0.189 L/s = 11.34 L/min

Transmissivity (T) = 0.183*Q/Δs = 14.94 $m^2$/day

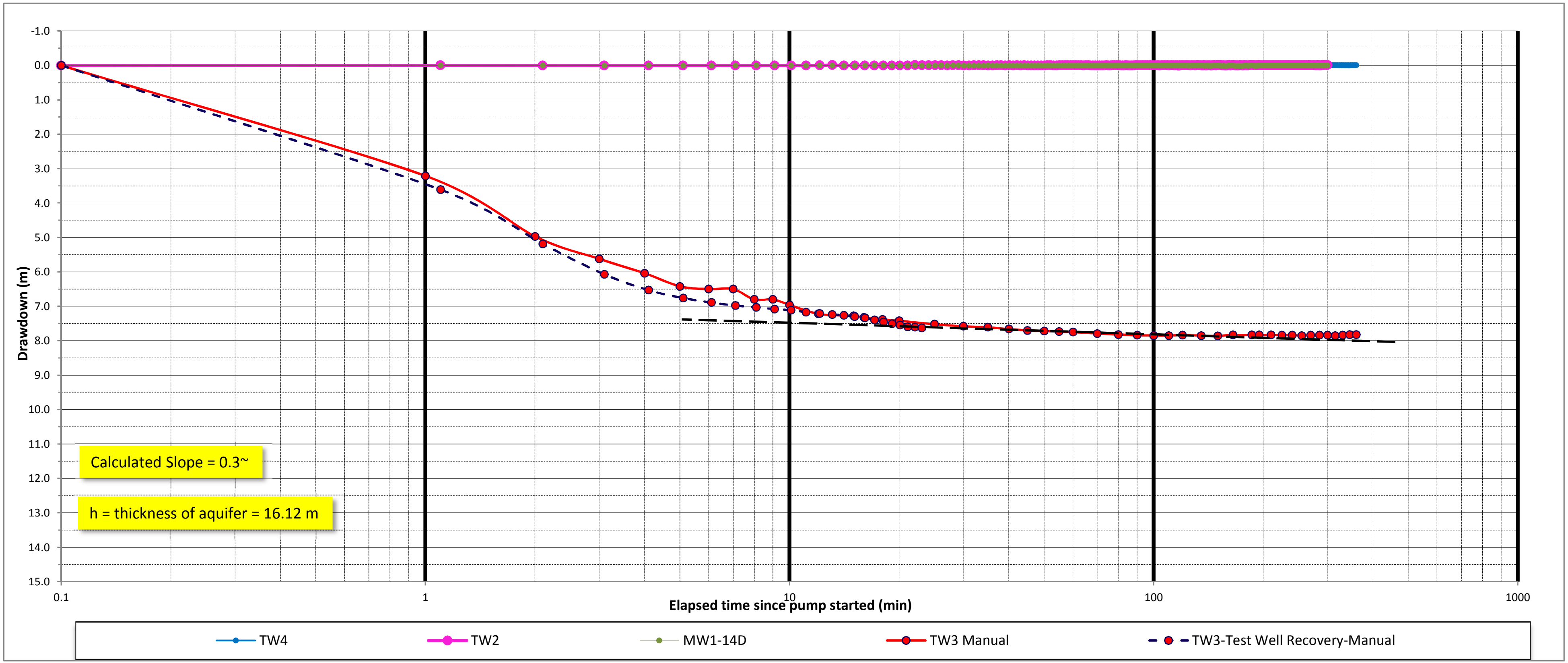
Hydraulic Conductivity (k) = T/h = $^{2.86E-5}$ m/sec

**Drawdown vs. Time - TW2 Pumping Test**

**Hydrogeology Investigation**

**Belfountain**

# Drawdown vs Time
# TW3-Test Well - 6 Hour Pumping Test



***TW3-Test Well - Operation Data***

Well Depth = 35.96 m

Static Water Level = 15.80 m below mp

Pumping rate = 1.61 L/s = 96.6 L/min

Transmissivity (T) = 0.183*Q/Δs = 84.85 $m^2$/day

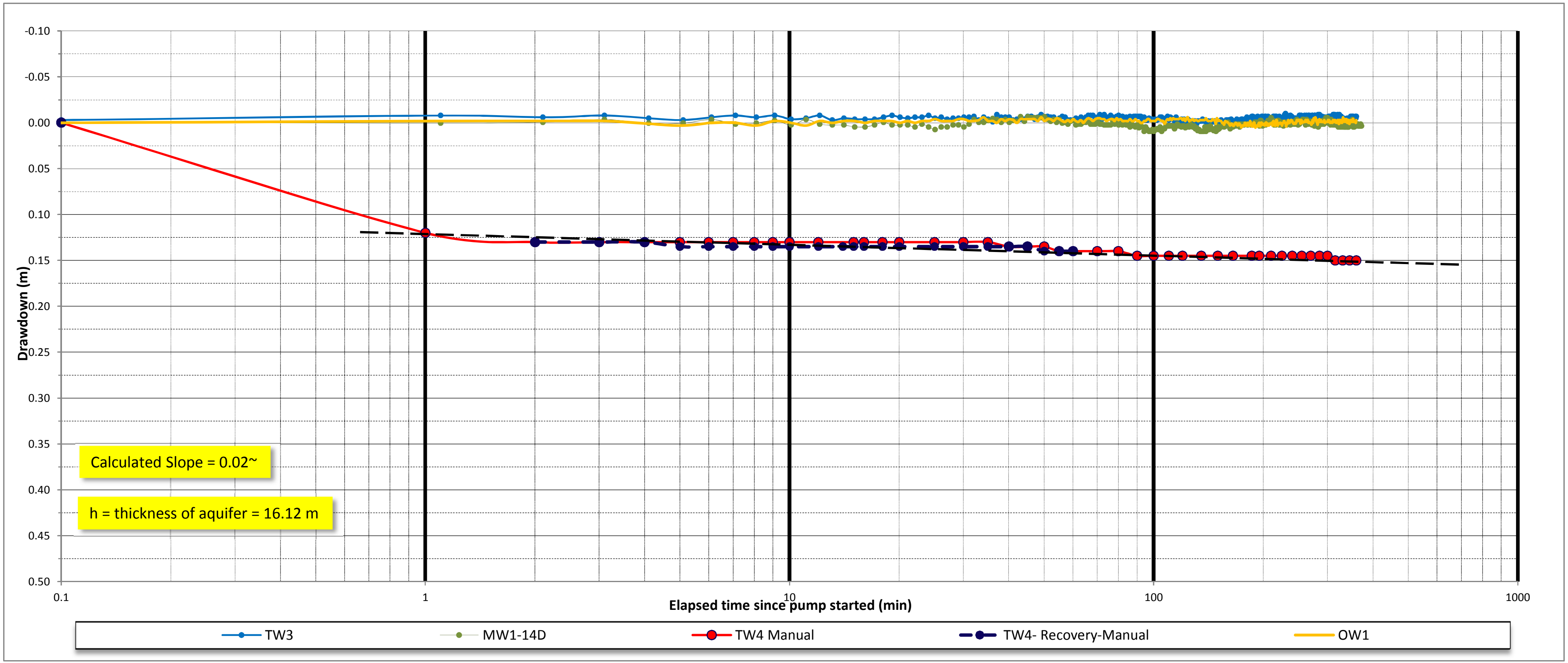
Hydraulic Conductivity (k) = T/h = 5.26 m/day = $6.1*10^{-5}$ m/sec

**Drawdown vs. Time - TW3 Pumping Test**

**Hydrogeological Investigation**

**Belfountain**

## Drawdown vs Time
## TW4-Test Well - 6 Hour Pumping Test



Calculated Slope = 0.02~

h = thickness of aquifer = 16.12 m

***TW4-Test Well - Operation Data***

Well Depth = 35.66 m

Static Water Level = 19.56 m below mp

Pumping rate = 0.5 L/s = 30 L/min

Transmissivity (T) = 0.183*Q/Δs = 403 $m^2$/day

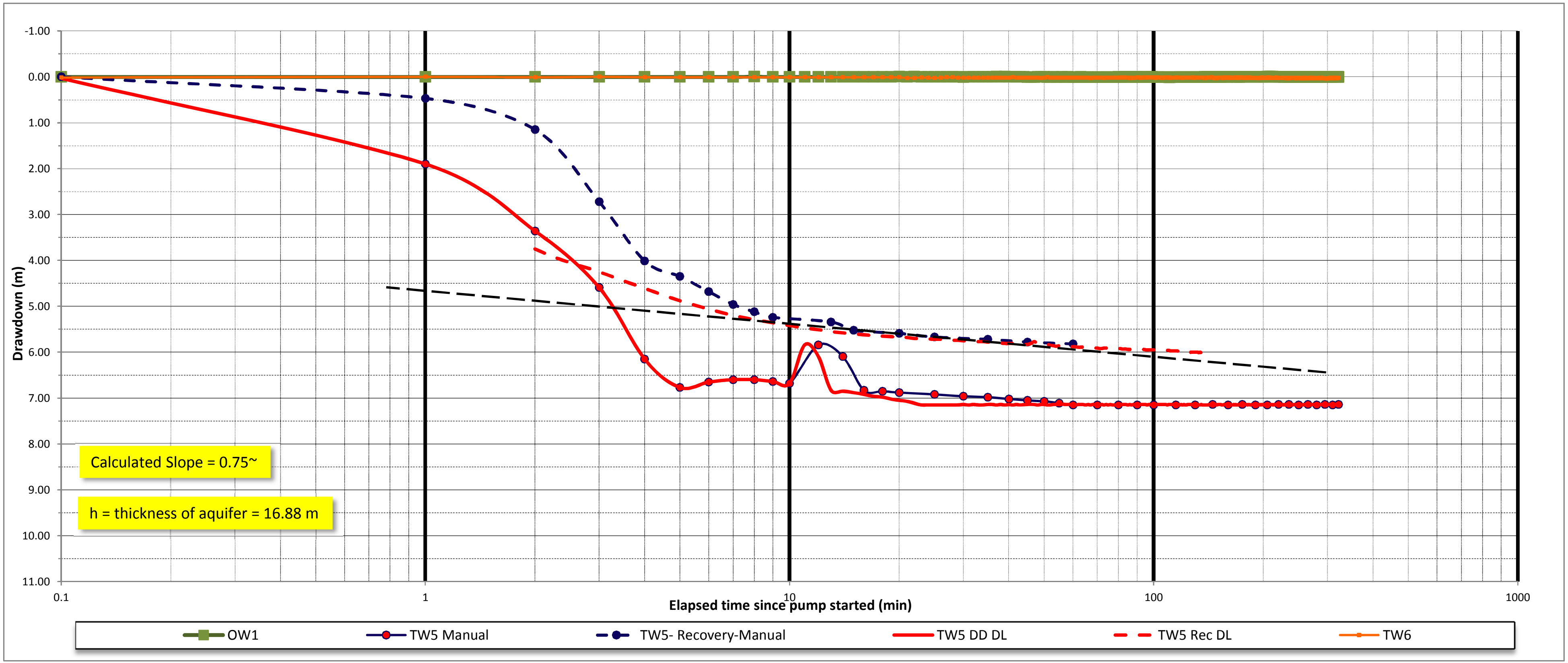
Hydraulic Conductivity (k) = T/h = 2.9*$10^{-4}$ m/sec

**Drawdown vs. Time - TW4 Pumping Test**

**Hydrogeological Investigation**

**Belfountain**

# Drawdown vs Time
# TW5-Test Well - 6 Hour Pumping Test



Calculated Slope = 0.75~

h = thickness of aquifer = 16.88 m

***__TW5-Test Well - Operation Data__***

Well Depth = 32.3 m

Static Water Level = 15.34 m below mp

Pumping rate = 1.26 L/s = 16.66 igpm

Transmissivity (T) = 0.183*Q/Δs = 26.60 m$^2$/day

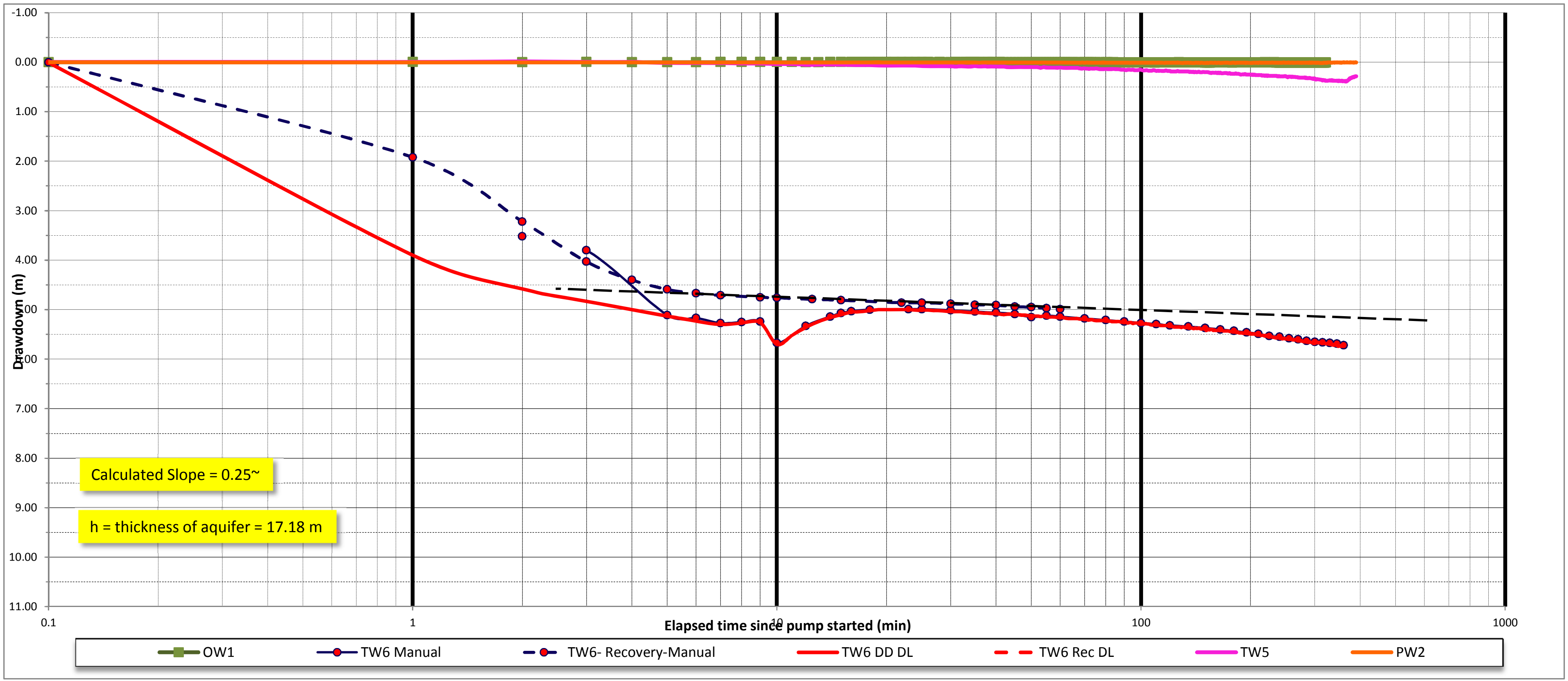
Hydraulic Conductivity (k) = T/h = 1.83*10$^{-5}$ m/sec

**Drawdown vs. Time - TW5 Pumping Test**

**Hydrogeological Investigation**

**Belfountain**

## Drawdown vs Time
## TW6-Test Well - 6 Hour Pumping Test



***TW6-Test Well - Operation Data***

Well Depth = 32.3 m

Static Water Level = 14.69 m below mp

Pumping rate = 1.14 L/s = 68.4 L/min

Transmissivity (T) = 0.183*Q/Δs = 72.10 $m^2$/day

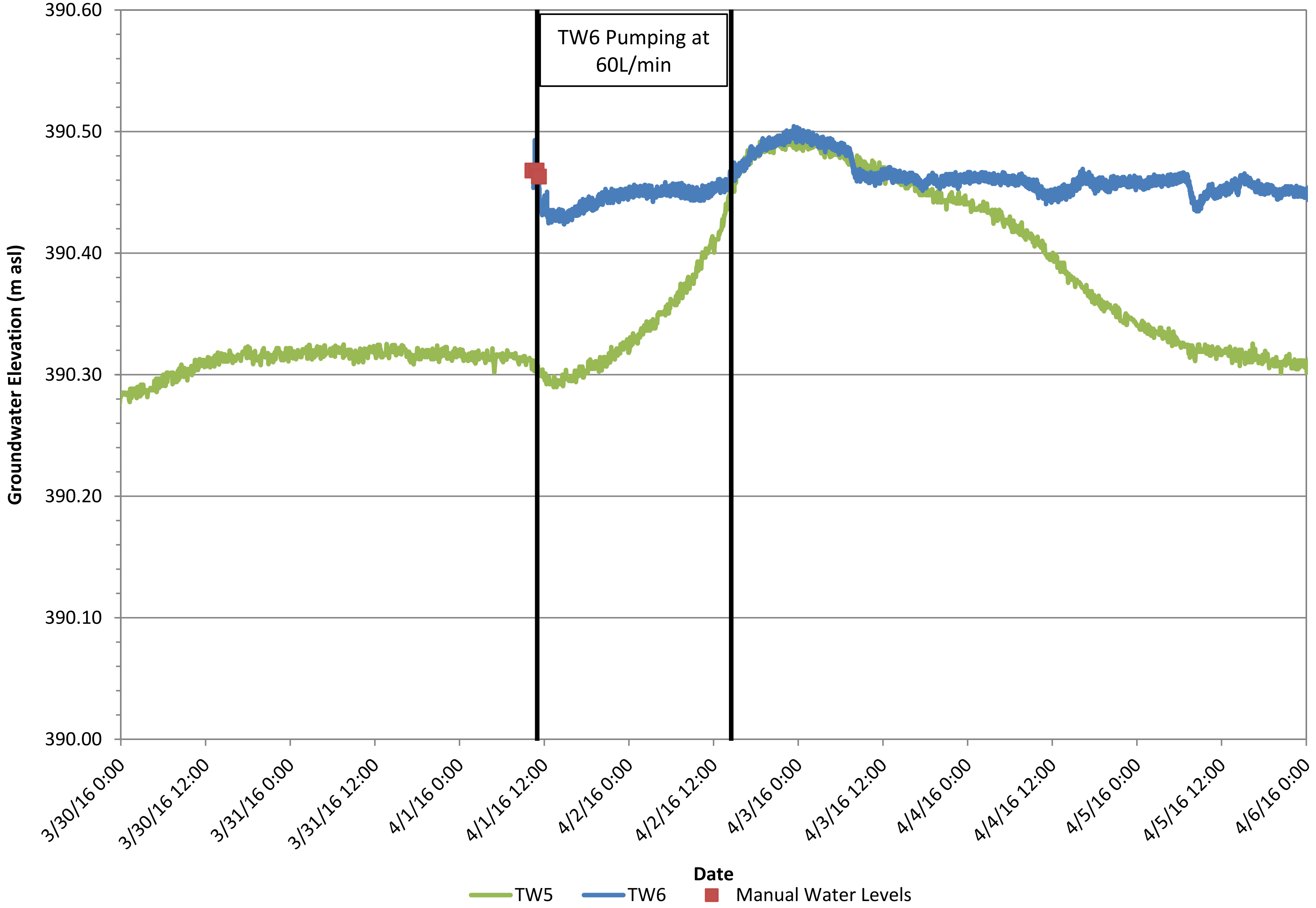
Hydraulic Conductivity (k) = T/h = $4.86*10^{-5}$ m/sec

**Drawdown vs. Time - TW6 Pumping Test**

**Hyrogeological Investigation**

**Belfountain**

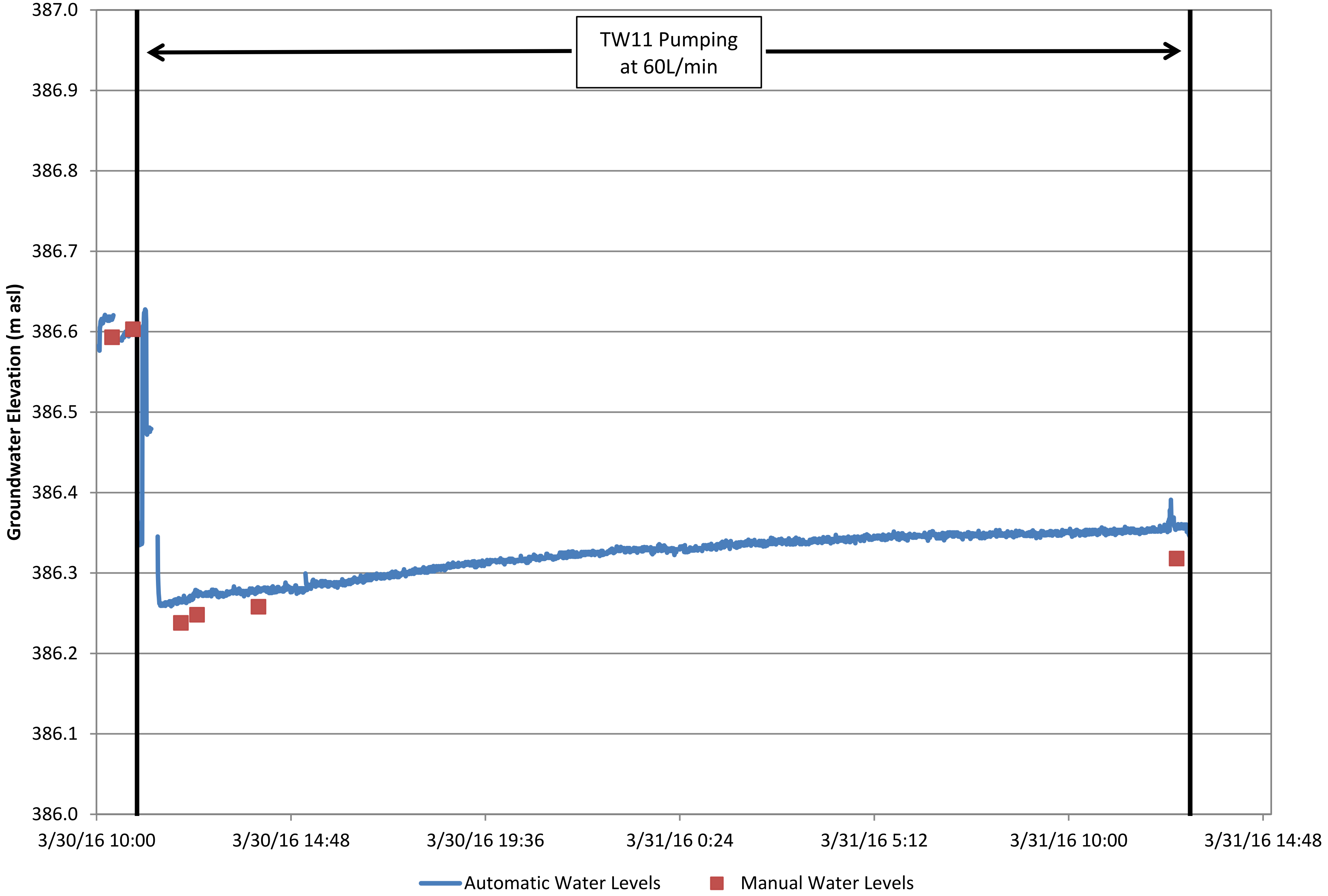
# TW5 and TW6
# 26 Hour Pumping Test
# Hydrographs



Manors of Belfountain
Caledon, Ontario

# TW11
# 26 Hour Pumping Test
# Hydrograph

Hydrogeological Investigation



R.J. Burnside & Associates Ltd.
Prepared by: SQ
Updated by: TH (COLE)
December 19, 2017

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Appendix
TW11 Pumping Test

# Appendix D

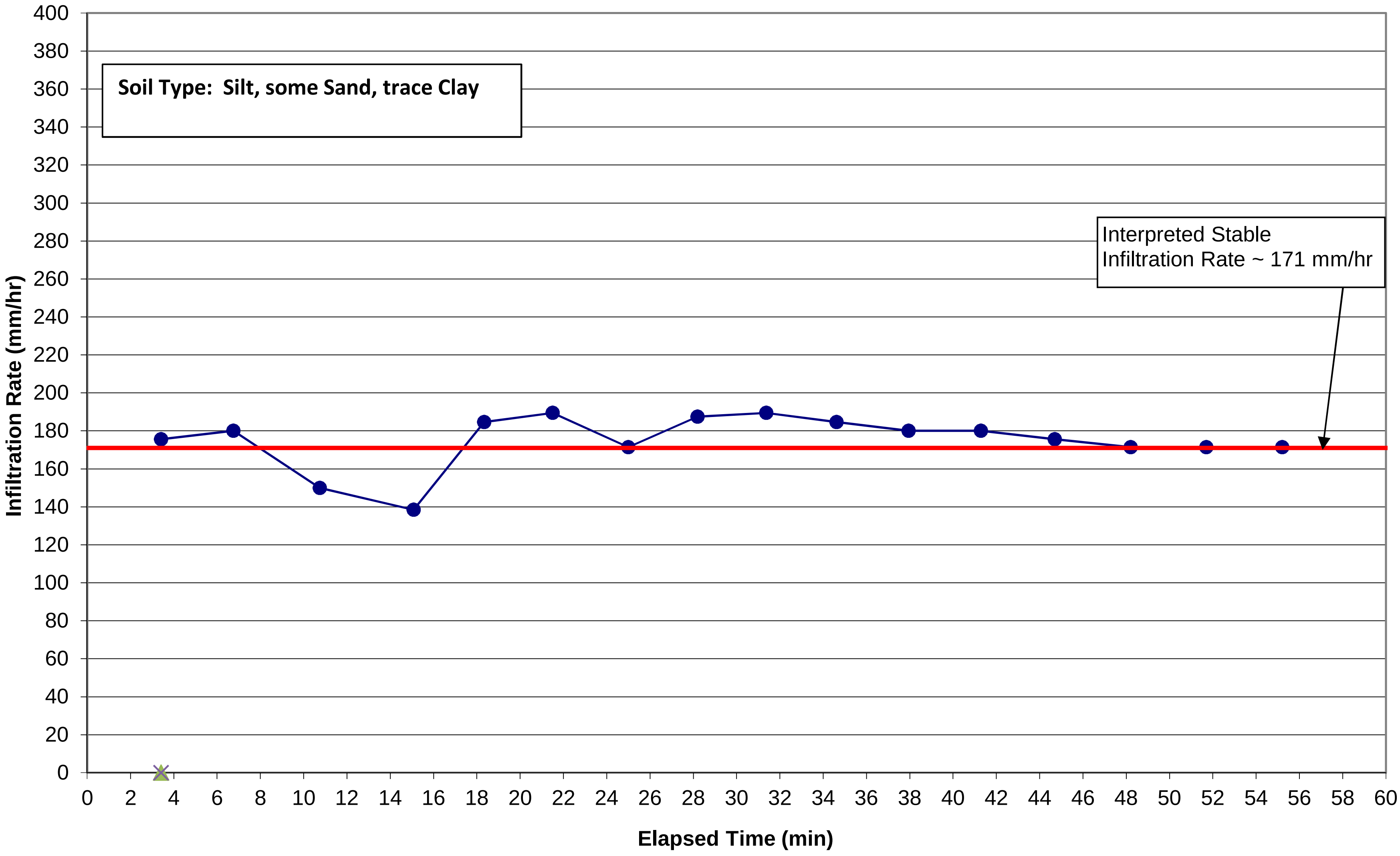
# Infiltration Data

## Infiltration Test - IT1

| | |
|---|---|
| Soil Type: | Silt, brown, soft, moist, some sand, trace clay |
| Depth: | 0.33 m |
| Location: | Belfountain |

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| 3.42 | 205 | 3.42 | 0.06 | 10 | 176 | 4214.63 |
| 6.75 | 200 | 3.33 | 0.06 | 10 | 180 | 4320 |
| 10.75 | 240 | 4.00 | 0.07 | 10 | 150 | 3600 |
| 15.08 | 260 | 4.33 | 0.07 | 10 | 138 | 3323 |
| 18.33 | 195 | 3.25 | 0.05 | 10 | 185 | 4431 |
| 21.50 | 190 | 3.17 | 0.05 | 10 | 189 | 4547 |
| 25.00 | 210 | 3.50 | 0.06 | 10 | 171 | 4114 |
| 28.20 | 192 | 3.20 | 0.05 | 10 | 188 | 4500 |
| 31.37 | 190 | 3.17 | 0.05 | 10 | 189 | 4547 |
| 34.62 | 195 | 3.25 | 0.05 | 10 | 185 | 4431 |
| 37.95 | 200 | 3.33 | 0.06 | 10 | 180 | 4320 |
| 41.28 | 200 | 3.33 | 0.06 | 10 | 180 | 4320 |
| 44.70 | 205 | 3.42 | 0.06 | 10 | 176 | 4215 |
| 48.20 | 210 | 3.50 | 0.06 | 10 | 171 | 4114 |
| 51.70 | 210 | 3.50 | 0.06 | 10 | 171 | 4114 |
| 55.20 | 210 | 3.50 | 0.06 | 10 | 171 | 4114 |

## Infiltration Rate at IT1

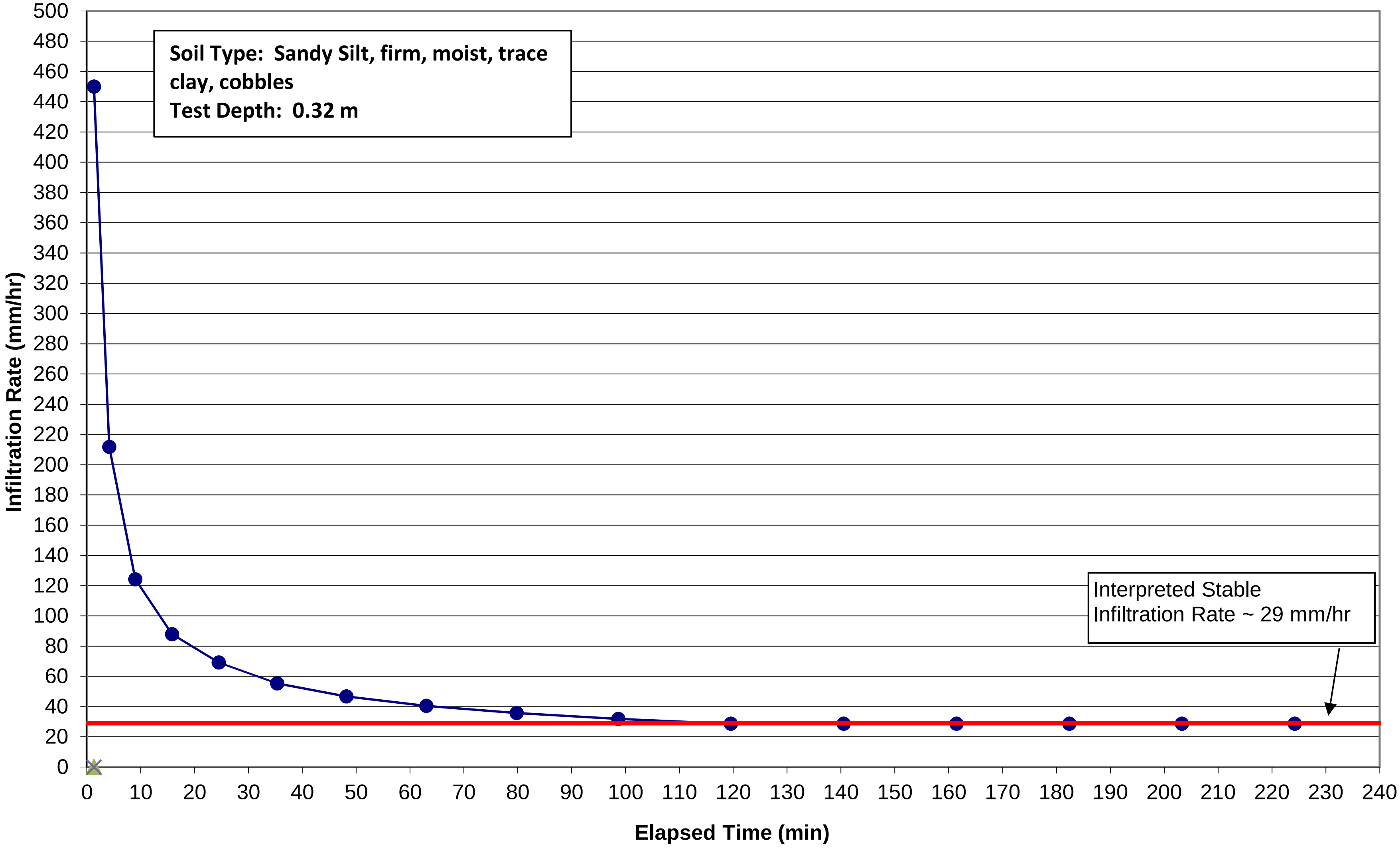


## Infiltration Test - IT2

| | |
|---|---|
| Soil Type: | Sandy Silt, firm, moist, trace clay, cobbles |
| Depth: | 0.32 m |
| Location: | Belfountain |

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| 1.33 | 80 | 1.33 | 0.02 | 10 | 450 | 10800.00 |
| 4.17 | 170 | 2.83 | 0.05 | 10 | 212 | 5082 |
| 9.00 | 290 | 4.83 | 0.08 | 10 | 124 | 2979 |
| 15.83 | 410 | 6.83 | 0.11 | 10 | 88 | 2107 |
| 24.50 | 520 | 8.67 | 0.14 | 10 | 69 | 1662 |
| 35.33 | 650 | 10.83 | 0.18 | 10 | 55 | 1329 |
| 48.18 | 771 | 12.85 | 0.21 | 10 | 47 | 1121 |
| 63.02 | 890 | 14.83 | 0.25 | 10 | 40 | 971 |
| 79.82 | 1008 | 16.80 | 0.28 | 10 | 36 | 857 |
| 98.65 | 1130 | 18.83 | 0.31 | 10 | 32 | 765 |
| 119.57 | 1255 | 20.92 | 0.35 | 10 | 29 | 688 |
| 140.52 | 1257 | 20.95 | 0.35 | 10 | 29 | 687 |
| 161.47 | 1257 | 20.95 | 0.35 | 10 | 29 | 687 |
| 182.37 | 1254 | 20.90 | 0.35 | 10 | 29 | 689 |
| 203.30 | 1256 | 20.93 | 0.35 | 10 | 29 | 688 |
| 224.25 | 1257 | 20.95 | 0.35 | 10 | 29 | 687 |

## Infiltration Rate at IT2

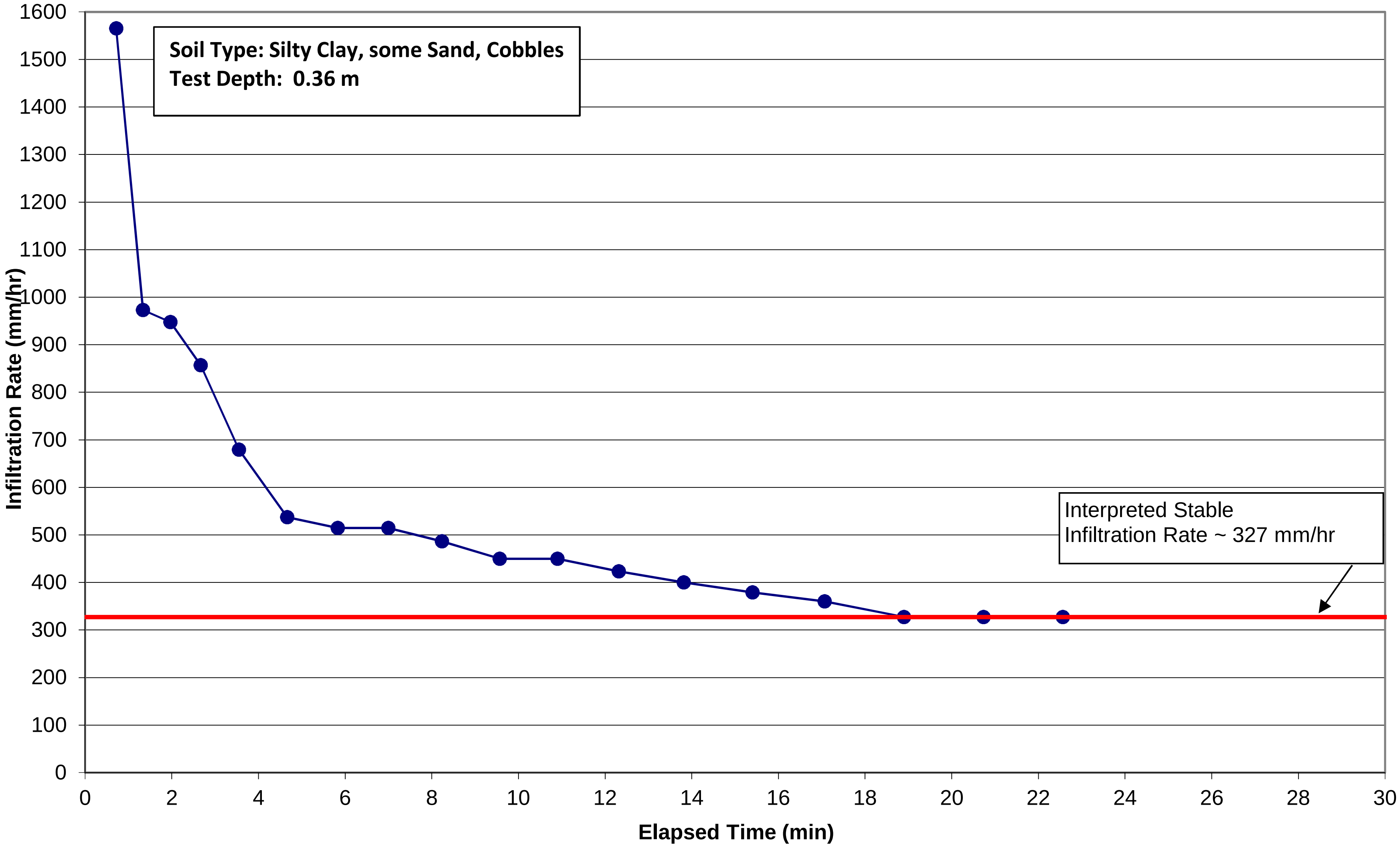


## Infiltration Test - IT4

Soil Type: Silty Clay, some Sand, cobbles
Depth: 0.36 m
Location: Belfountain

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| 0.33 | 20 | 0.33 | 0.01 | 10 | 1800 | 43200 |
| 0.72 | 23 | 0.38 | 0.01 | 10 | 1565 | 37565 |
| 1.33 | 37 | 0.62 | 0.01 | 10 | 973 | 23351 |
| 1.97 | 38 | 0.63 | 0.01 | 10 | 947 | 22737 |
| 2.67 | 42 | 0.70 | 0.01 | 10 | 857 | 20571 |
| 3.55 | 53 | 0.88 | 0.01 | 10 | 679 | 16302 |
| 4.67 | 67 | 1.12 | 0.02 | 10 | 537 | 12896 |
| 5.83 | 70 | 1.17 | 0.02 | 10 | 514 | 12343 |
| 7.00 | 70 | 1.17 | 0.02 | 10 | 514 | 12343 |
| 8.23 | 74 | 1.23 | 0.02 | 10 | 486 | 11676 |
| 9.57 | 80 | 1.33 | 0.02 | 10 | 450 | 10800 |
| 10.90 | 80 | 1.33 | 0.02 | 10 | 450 | 10800 |
| 12.32 | 85 | 1.42 | 0.02 | 10 | 424 | 10165 |
| 13.82 | 90 | 1.50 | 0.03 | 10 | 400 | 9600 |
| 15.40 | 95 | 1.58 | 0.03 | 10 | 379 | 9095 |
| 17.07 | 100 | 1.67 | 0.03 | 10 | 360 | 8640 |
| 18.90 | 110 | 1.83 | 0.03 | 10 | 327 | 7855 |
| 20.73 | 110 | 1.83 | 0.03 | 10 | 327 | 7855 |
| 22.57 | 110 | 1.83 | 0.03 | 10 | 327 | 7855 |

## Infiltration Rate at IT4

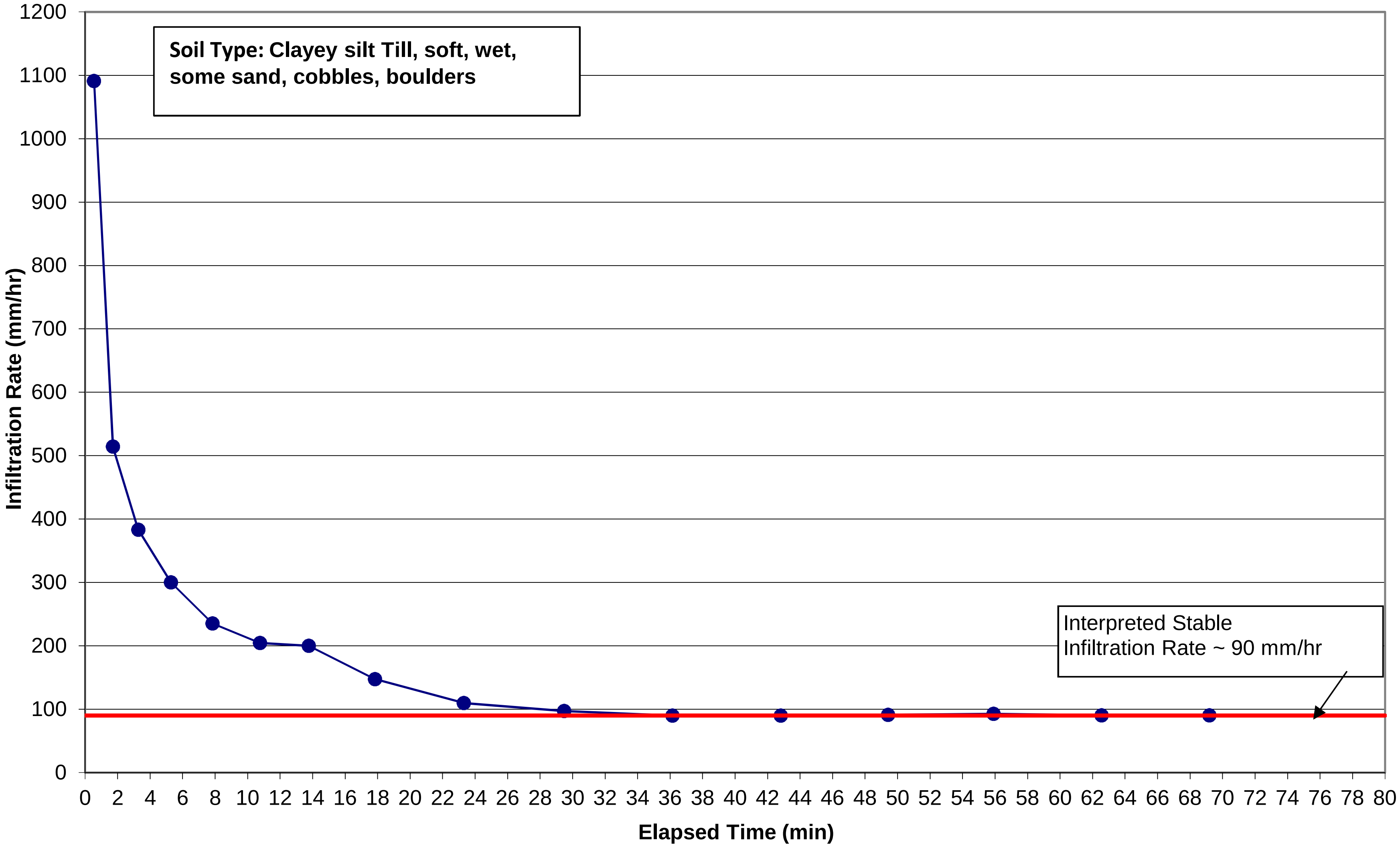


## Infiltration Test - IT5

| | |
|---|---|
| Soil Type: | Clayey silt Till, soft, wet, some sand, cobbles, boulders |
| Depth: | 0.38 m |
| Location: | Belfountain |

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| 0.55 | 33 | 0.55 | 0.01 | 10 | 1091 | 26182 |
| 1.72 | 70 | 1.17 | 0.02 | 10 | 514 | 12343 |
| 3.28 | 94 | 1.57 | 0.03 | 10 | 383 | 9191 |
| 5.28 | 120 | 2.00 | 0.03 | 10 | 300 | 7200 |
| 7.83 | 153 | 2.55 | 0.04 | 10 | 235 | 5647 |
| 10.77 | 176 | 2.93 | 0.05 | 10 | 205 | 4909 |
| 13.77 | 180 | 3.00 | 0.05 | 10 | 200 | 4800 |
| 17.83 | 244 | 4.07 | 0.07 | 10 | 148 | 3541 |
| 23.30 | 328 | 5.47 | 0.09 | 10 | 110 | 2634 |
| 29.48 | 371 | 6.18 | 0.10 | 10 | 97 | 2329 |
| 36.15 | 400 | 6.67 | 0.11 | 10 | 90 | 2160 |
| 42.82 | 400 | 6.67 | 0.11 | 10 | 90 | 2160 |
| 49.42 | 396 | 6.60 | 0.11 | 10 | 91 | 2182 |
| 55.90 | 389 | 6.48 | 0.11 | 10 | 93 | 2221 |
| 62.55 | 399 | 6.65 | 0.11 | 10 | 90 | 2165 |
| 69.18 | 398 | 6.63 | 0.11 | 10 | 90 | 2171 |

## Infiltration Rate at IT5

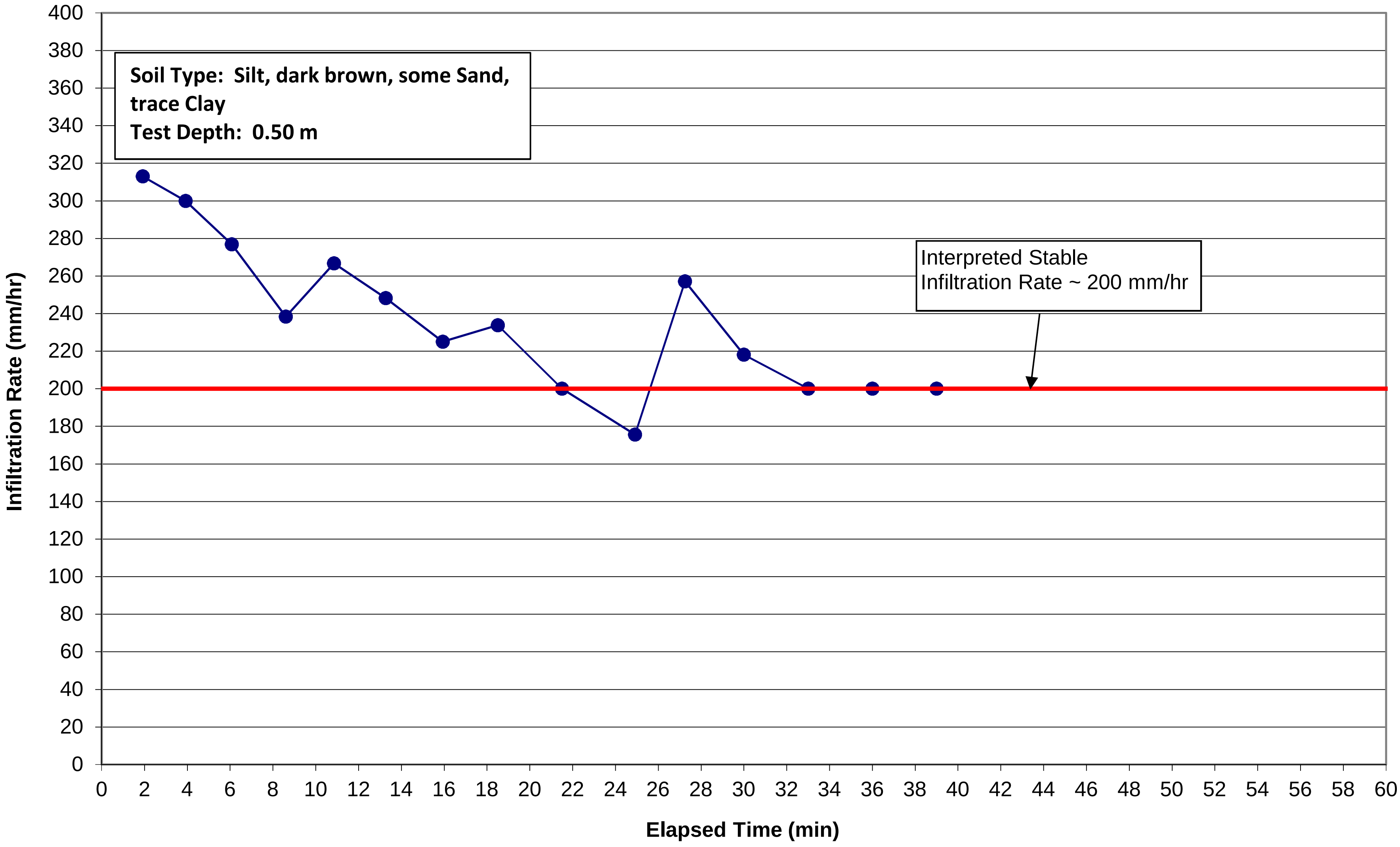


## Infiltration Test - IP1

Soil Type: Silt, dark brown, soft, moist, some sand, trace clay
Pit Size: 0.60 m x 0.60 m x 0.50 m
Location: Belfountain

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| | | 0.00 | | | | |
| 1.92 | 115 | 1.92 | 0.03 | 10 | 313 | 7513 |
| 3.92 | 120 | 2.00 | 0.03 | 10 | 300 | 7200 |
| 6.08 | 130 | 2.17 | 0.04 | 10 | 277 | 6646 |
| 8.60 | 151 | 2.52 | 0.04 | 10 | 238 | 5722 |
| 10.85 | 135 | 2.25 | 0.04 | 10 | 267 | 6400 |
| 13.27 | 145 | 2.42 | 0.04 | 10 | 248 | 5959 |
| 15.93 | 160 | 2.67 | 0.04 | 10 | 225 | 5400 |
| 18.50 | 154 | 2.57 | 0.04 | 10 | 234 | 5610 |
| 21.50 | 180 | 3.00 | 0.05 | 10 | 200 | 4800 |
| 24.92 | 205 | 3.42 | 0.06 | 10 | 176 | 4215 |
| 27.25 | 140 | 2.33 | 0.04 | 10 | 257 | 6171 |
| 30.00 | 165 | 2.75 | 0.05 | 10 | 218 | 5236 |
| 33.00 | 180 | 3.00 | 0.05 | 10 | 200 | 4800 |
| 36.00 | 180 | 3.00 | 0.05 | 10 | 200 | 4800 |
| 39.00 | 180 | 3.00 | 0.05 | 10 | 200 | 4800 |

## Infiltration Rate at IP1

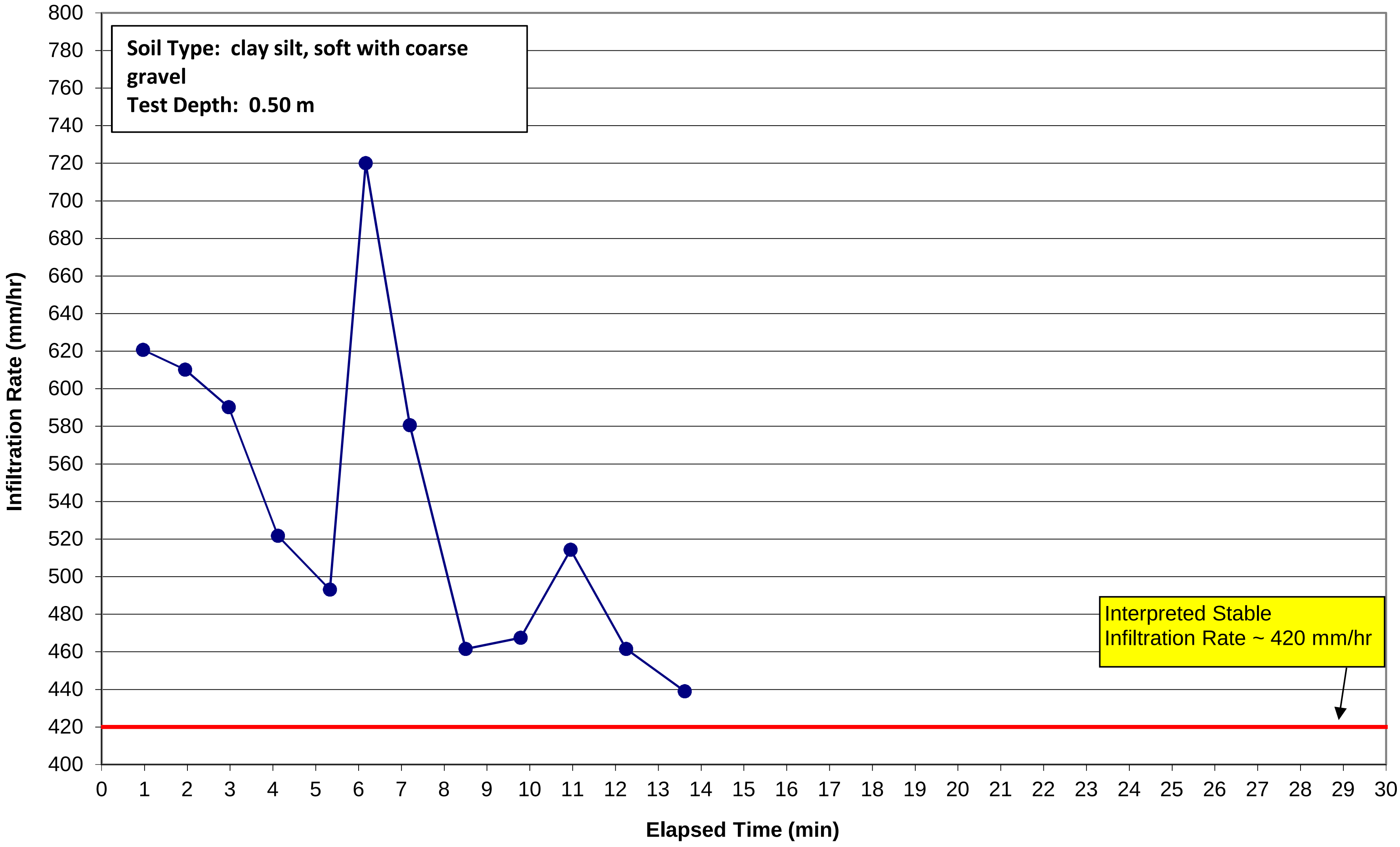


## Infiltration Test - IP2

Soil Type: clay silt, soft with coarse gravel
Depth: 0.60 m x 0.60 m x 0.50 m
Location: Belfountain

| Elapsed Time min | Interval Time sec | Interval Time min | Interval Time hour | Readings mm | Infiltration Rate mm/h | Infiltration Rate mm/day |
|---|---|---|---|---|---|---|
| | | 0.00 | | | | |
| 0.97 | 58 | 0.97 | 0.02 | 10 | 621 | 14897 |
| 1.95 | 59 | 0.98 | 0.02 | 10 | 610 | 14644 |
| 2.97 | 61 | 1.02 | 0.02 | 10 | 590 | 14164 |
| 4.12 | 69 | 1.15 | 0.02 | 10 | 522 | 12522 |
| 5.33 | 73 | 1.22 | 0.02 | 10 | 493 | 11836 |
| 6.17 | 50 | 0.83 | 0.01 | 10 | 720 | 17280 |
| 7.20 | 62 | 1.03 | 0.02 | 10 | 581 | 13935 |
| 8.50 | 78 | 1.30 | 0.02 | 10 | 462 | 11077 |
| 9.78 | 77 | 1.28 | 0.02 | 10 | 468 | 11221 |
| 10.95 | 70 | 1.17 | 0.02 | 10 | 514 | 12343 |
| 12.25 | 78 | 1.30 | 0.02 | 10 | 462 | 11077 |
| 13.62 | 82 | 1.37 | 0.02 | 10 | 439 | 10537 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

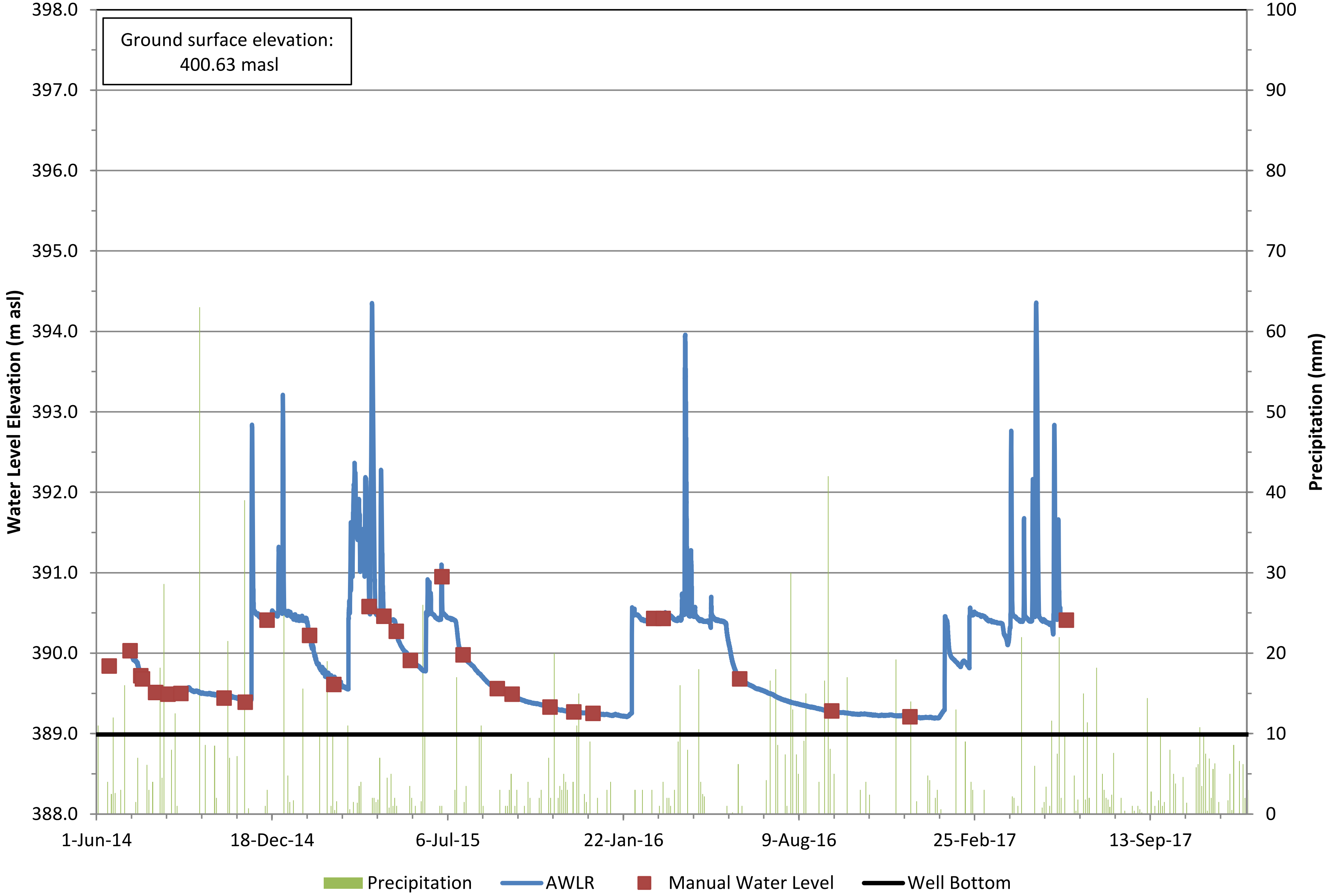
## Infiltration Rate at IP2



# Appendix E

# Hydrographs

# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# MW1D-14 Hydrograph



Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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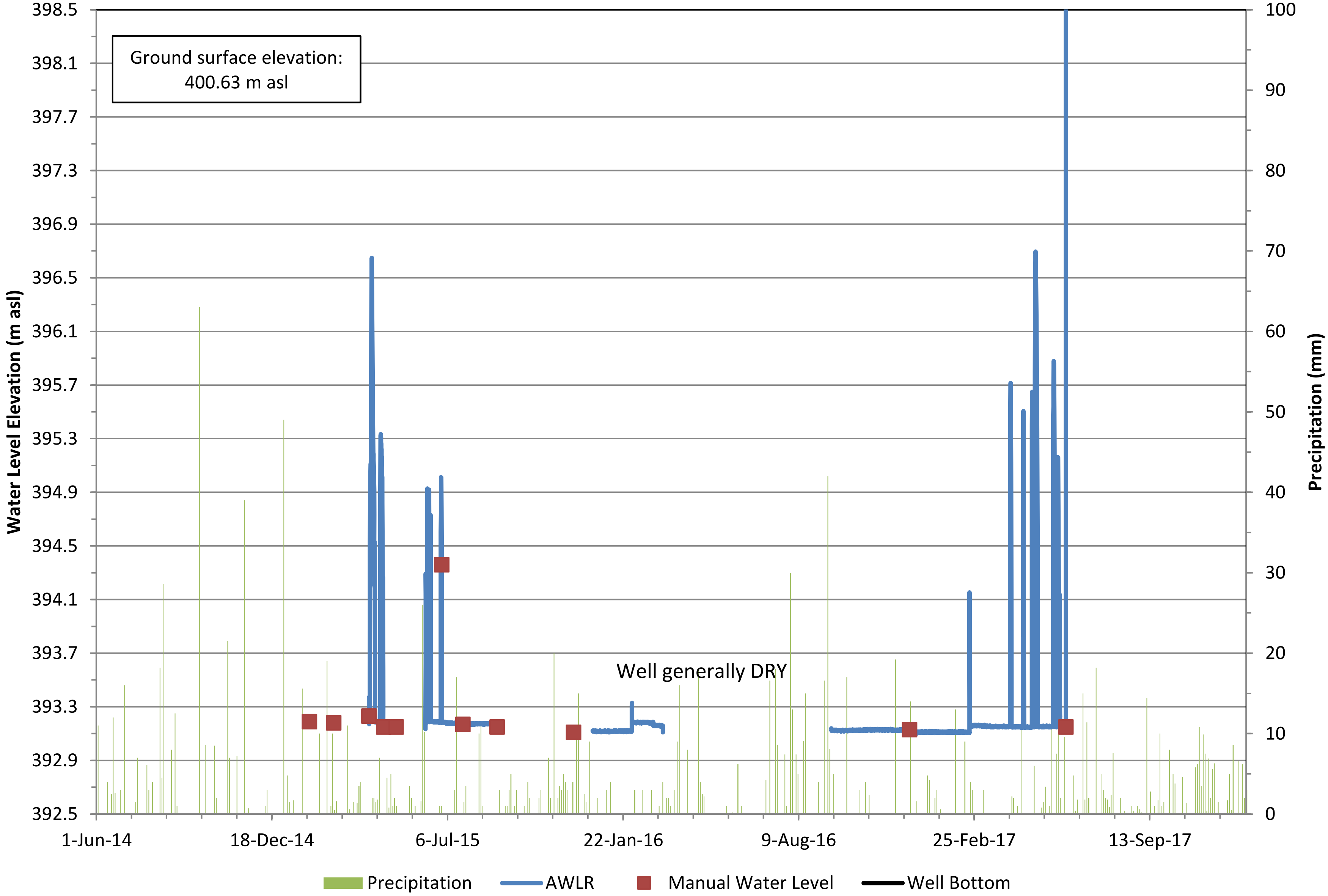
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# MW1S-14 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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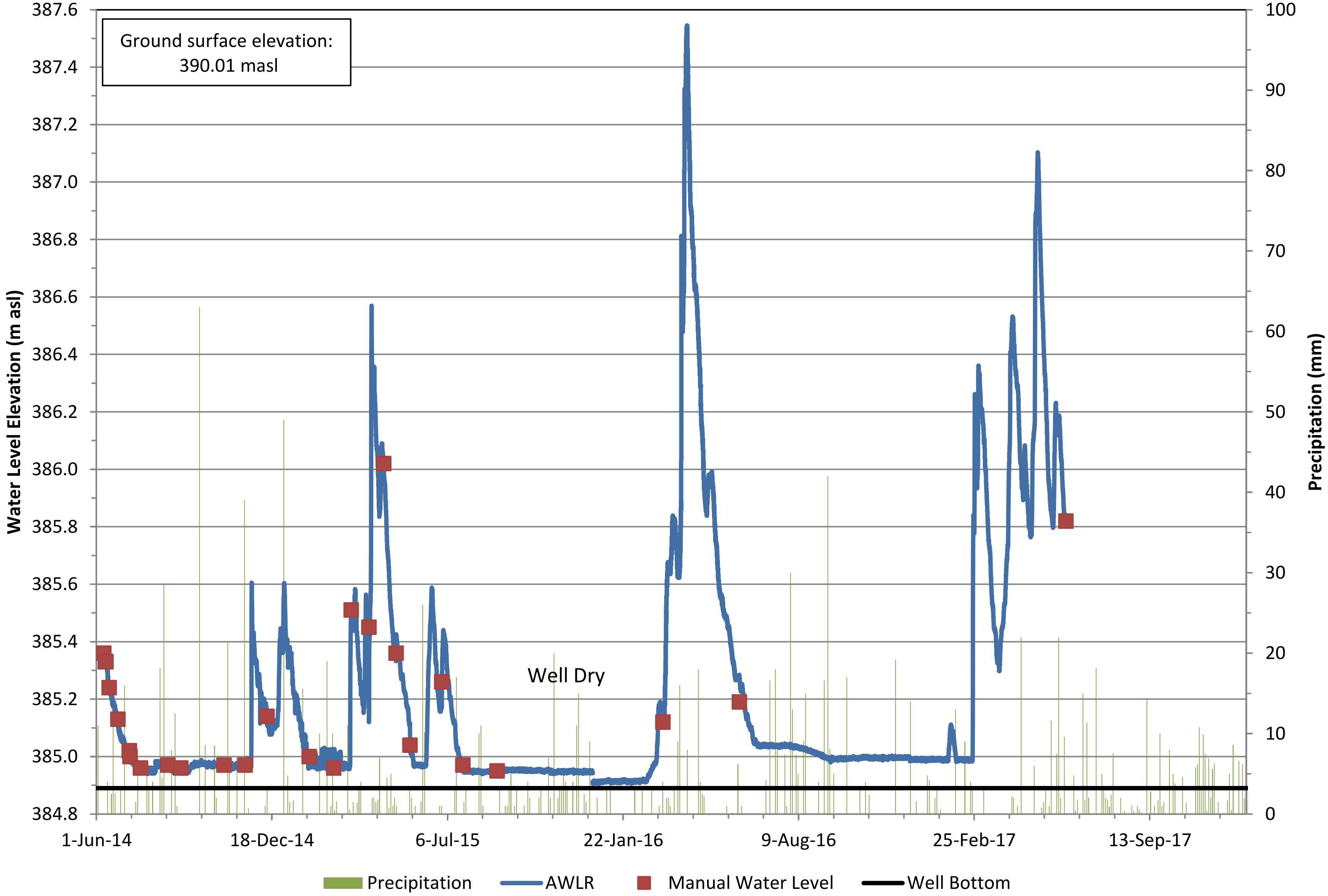
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# OW1 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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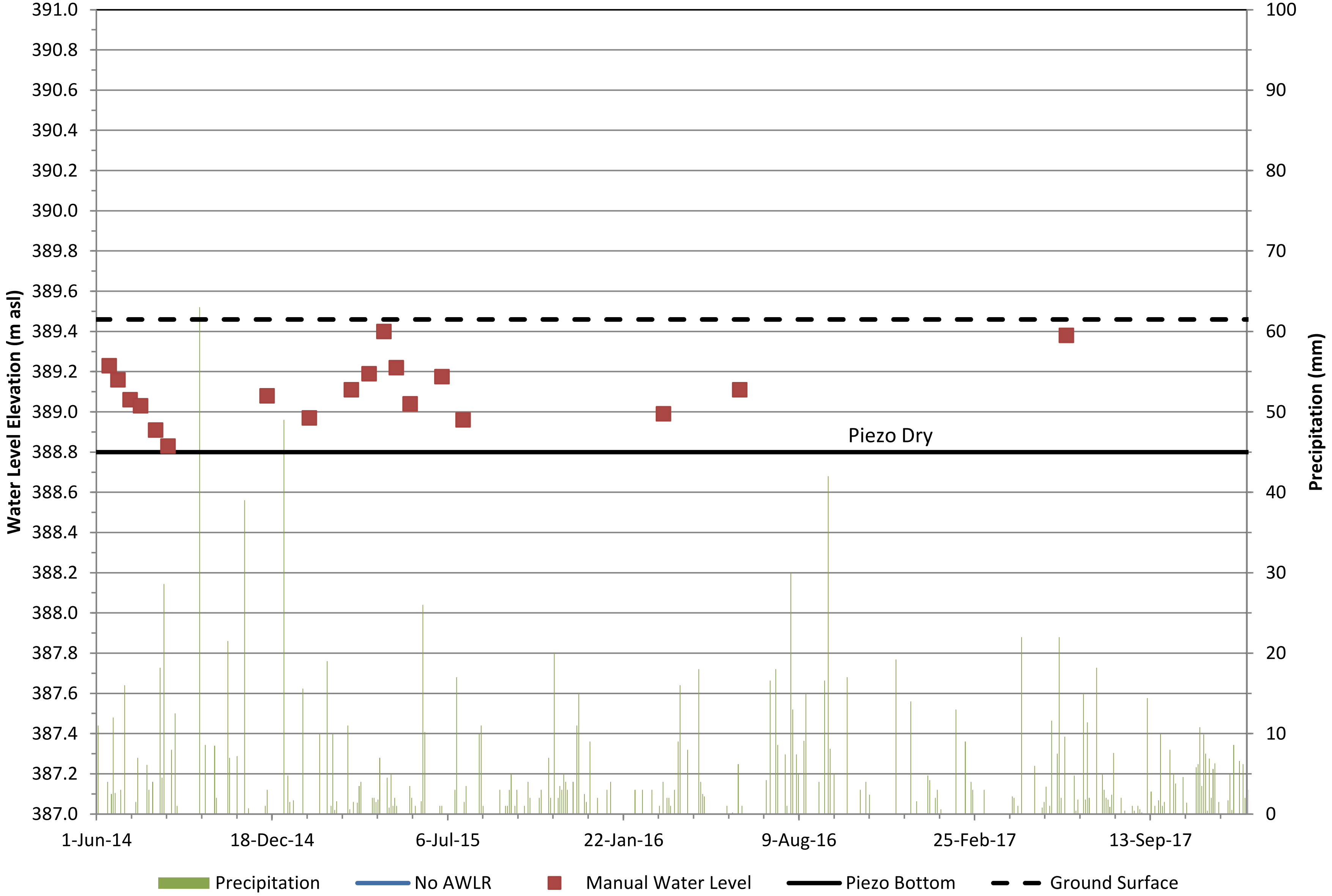
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# Piezo beside PZ2-14 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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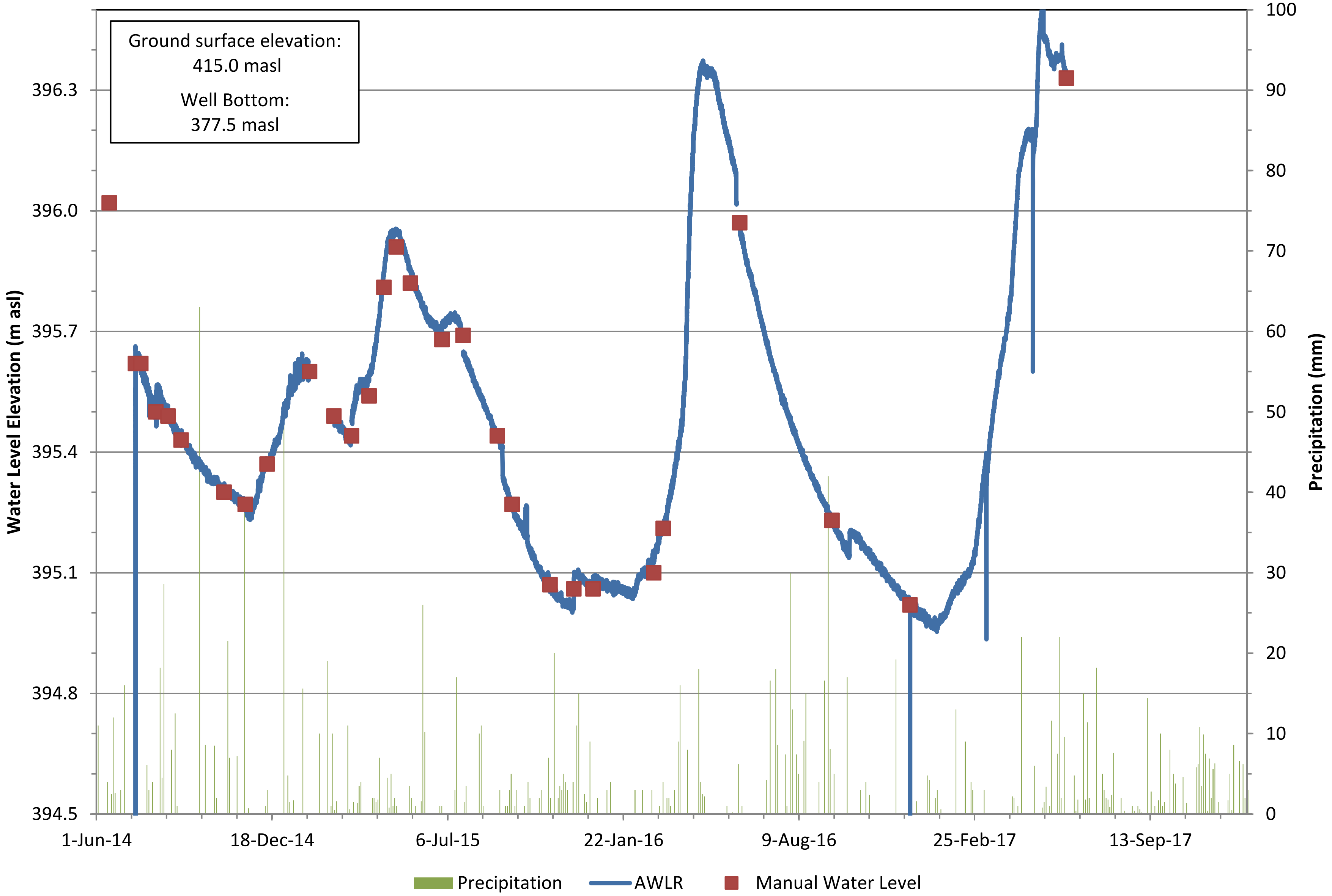
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## PW1 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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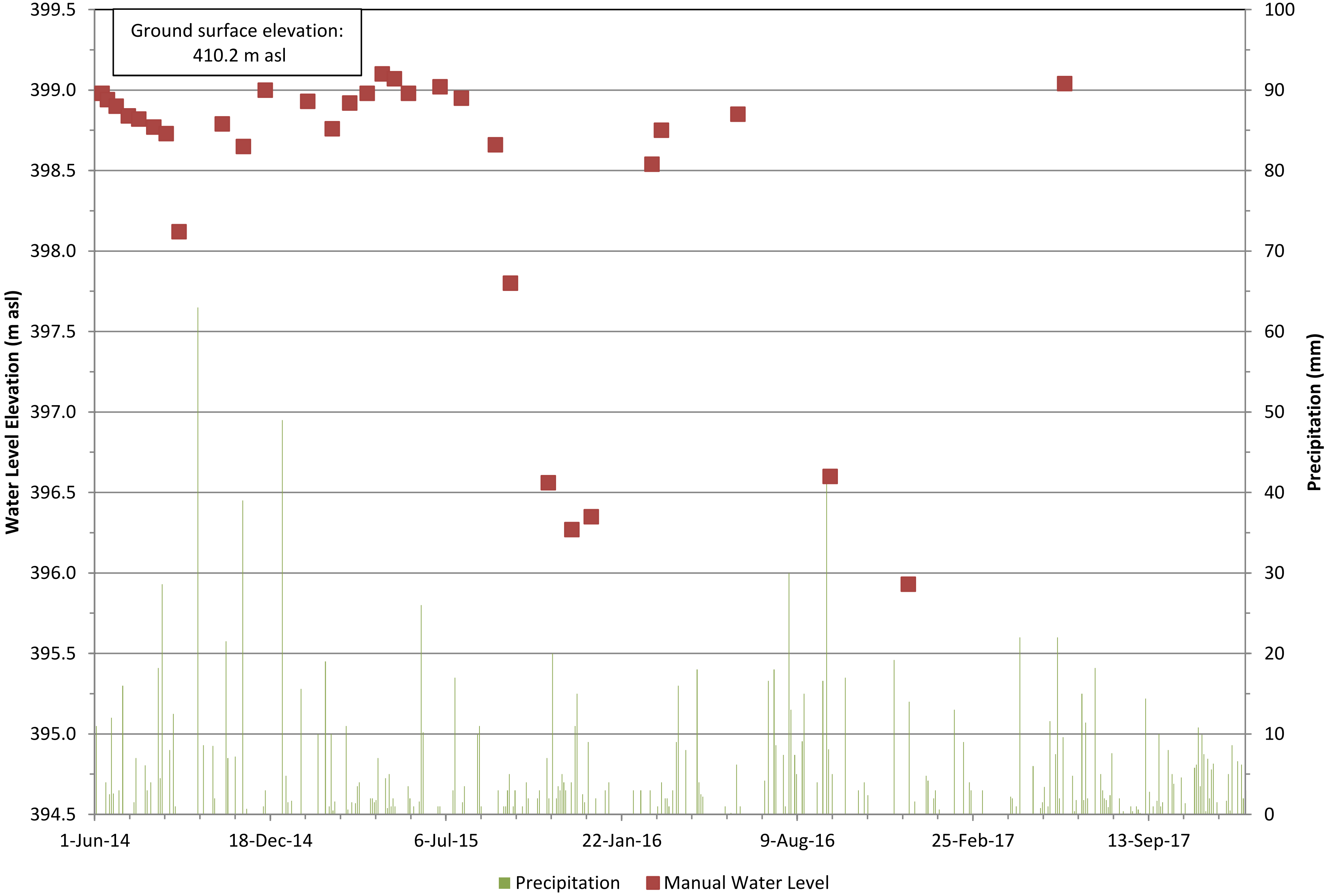
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# PW2 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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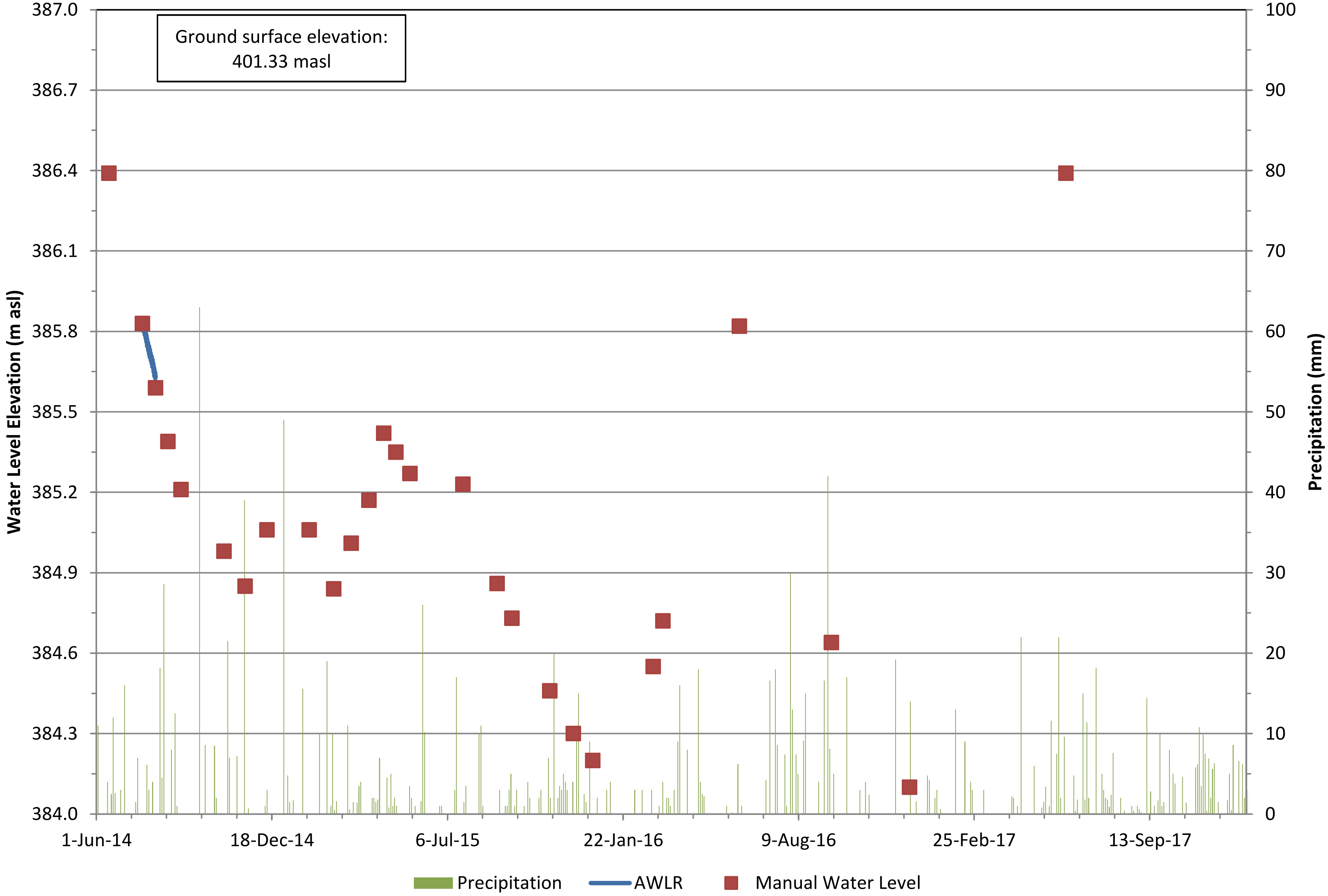
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# PW3 Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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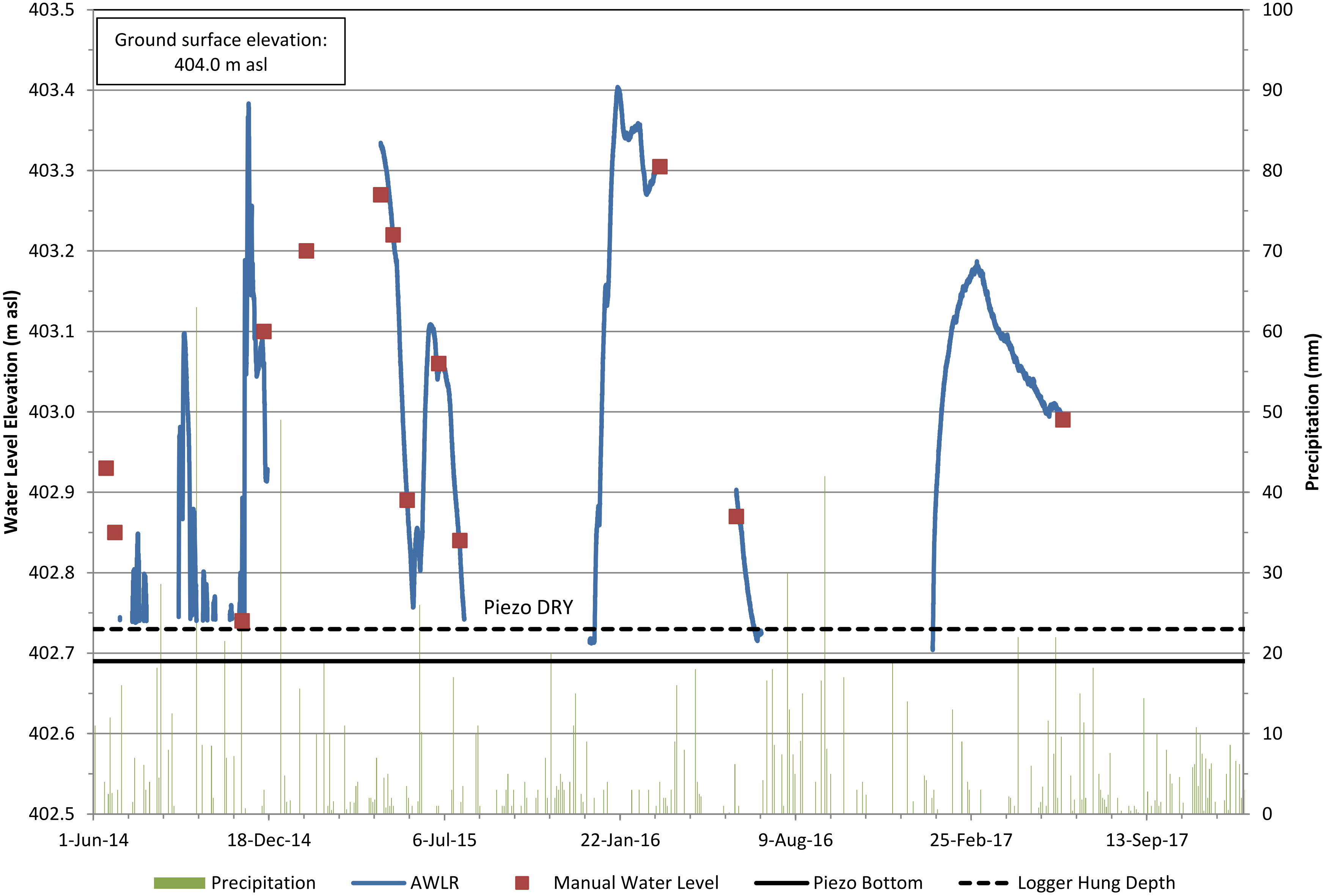
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# PZ1-14 Hydrograph



Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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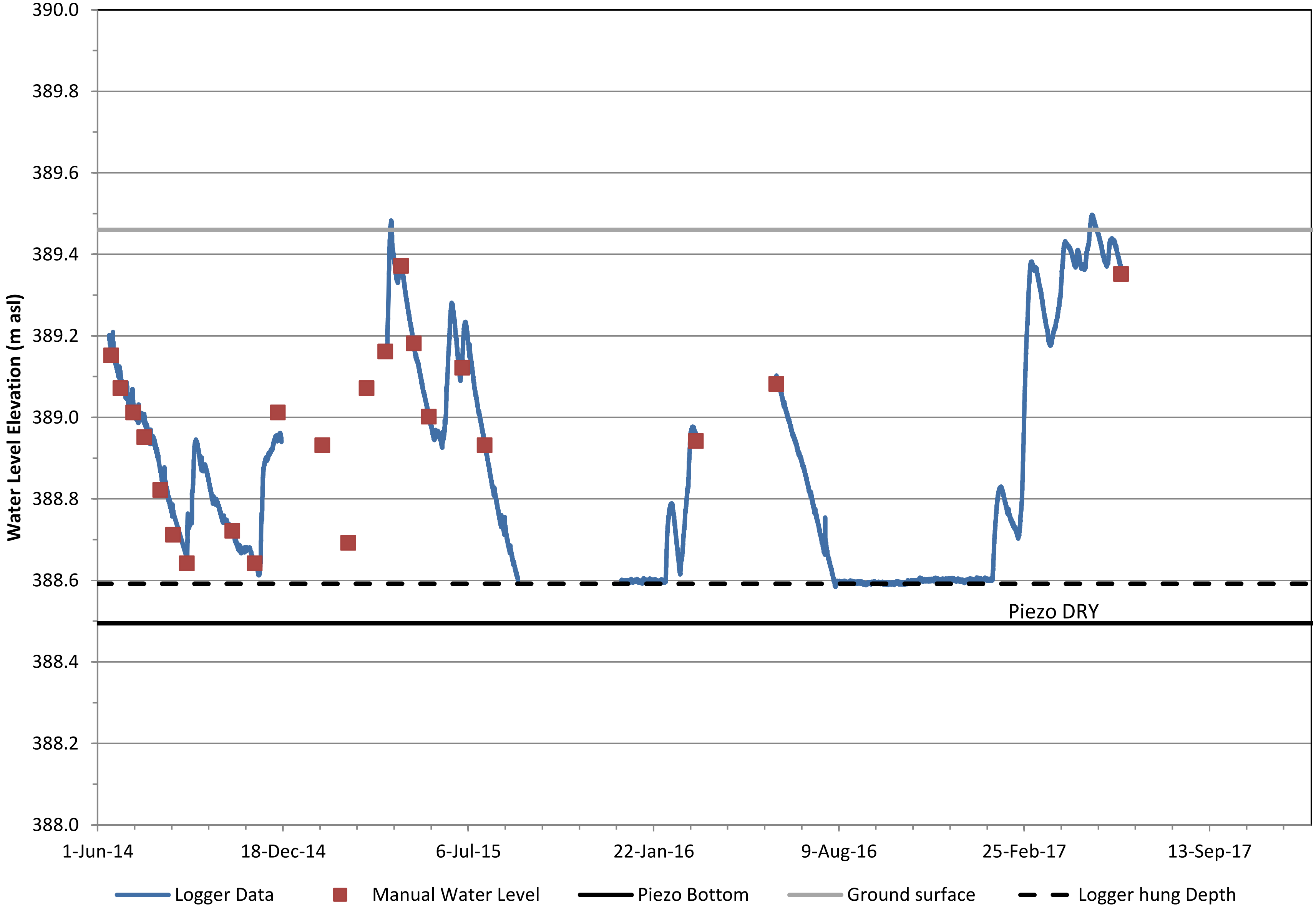
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## PZ2-14 Hydrograph (2)



Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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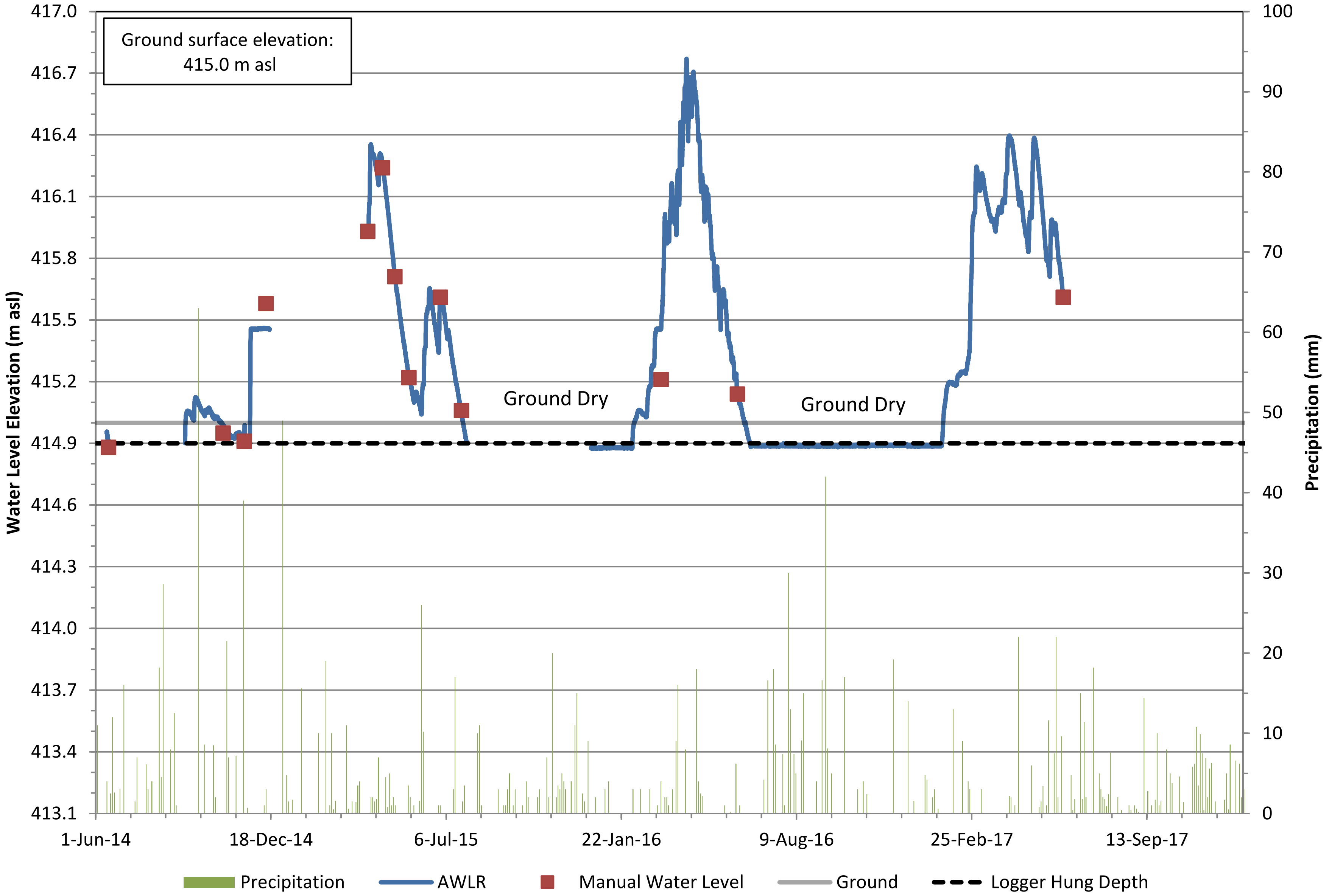
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## SG1-14 Hydrograph



Burnside
Prepared By: S.B.

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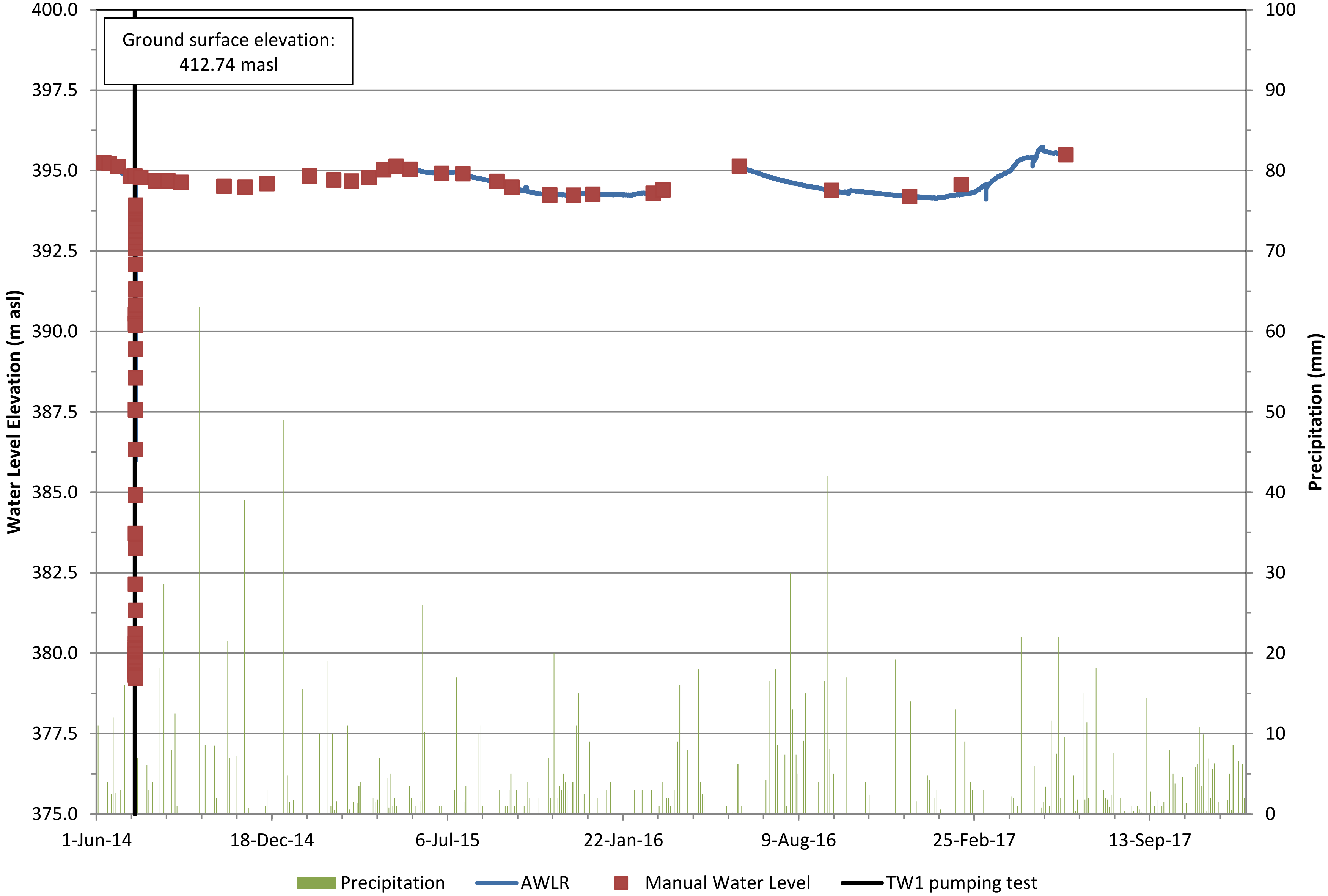
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## TW1 Hydrograph



Burnside
Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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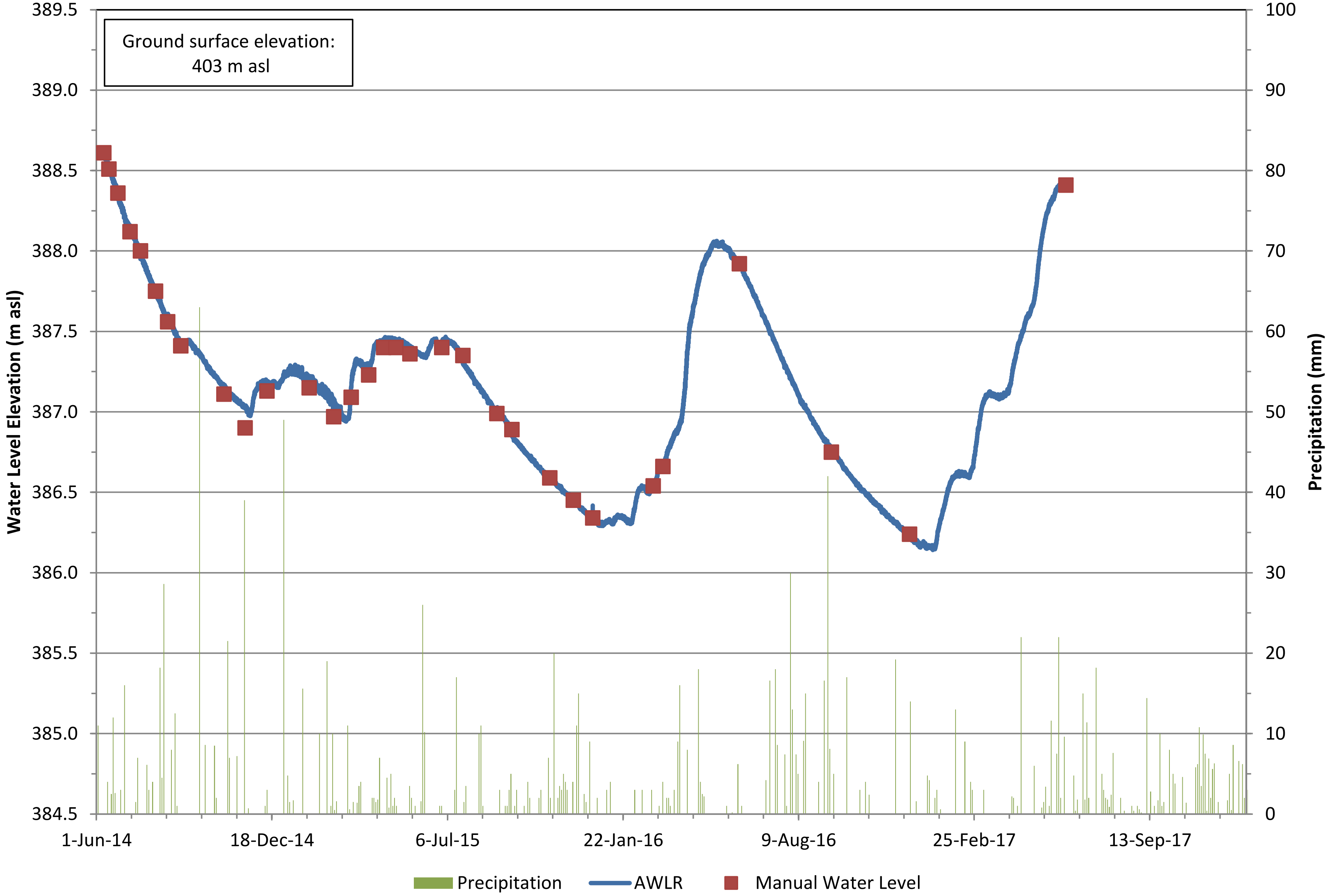
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## TW1-09 Hydrograph



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Updated By: T.H. (COLE)
12/12/2017

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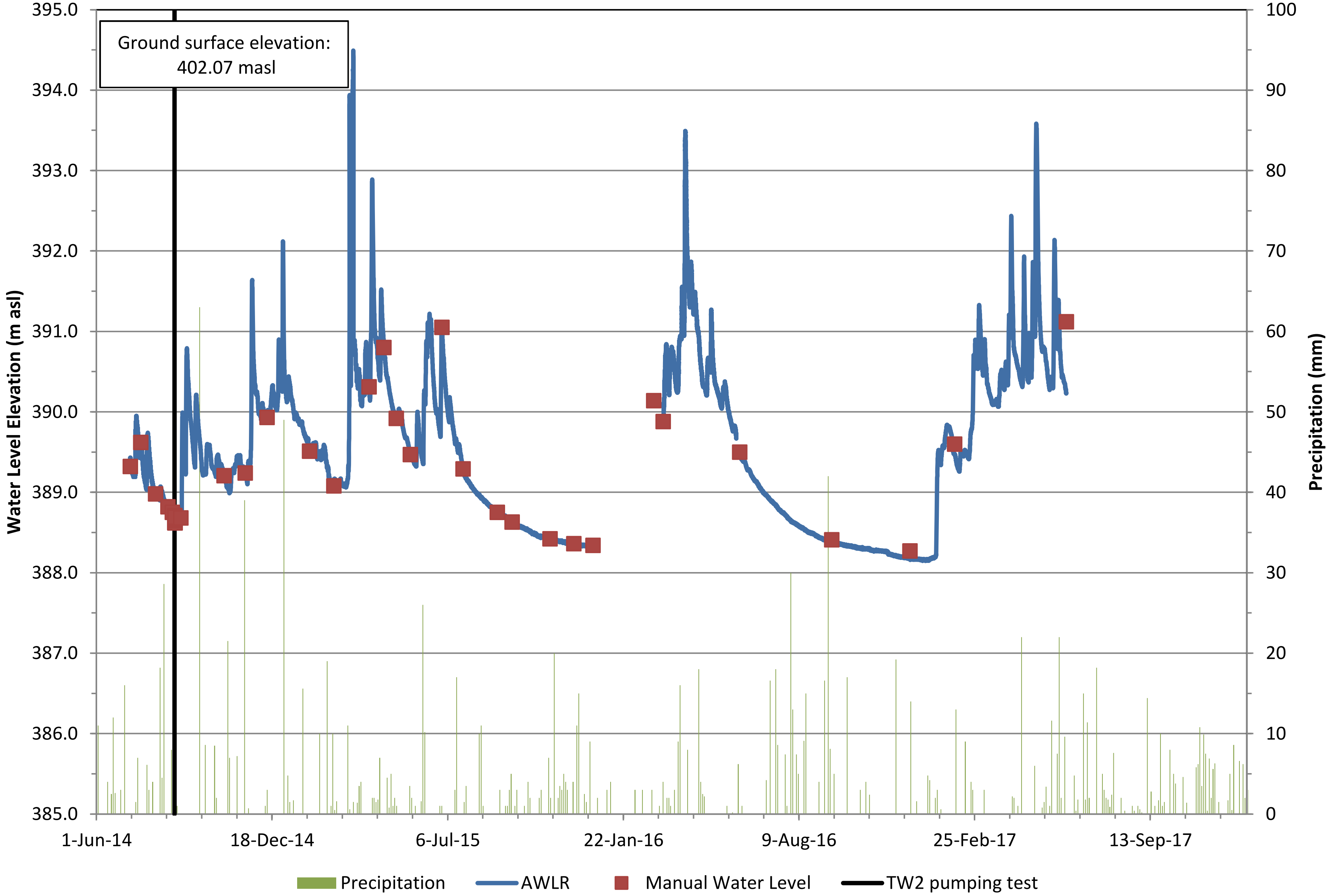
## Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## TW2 (A165390) Hydrograph



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Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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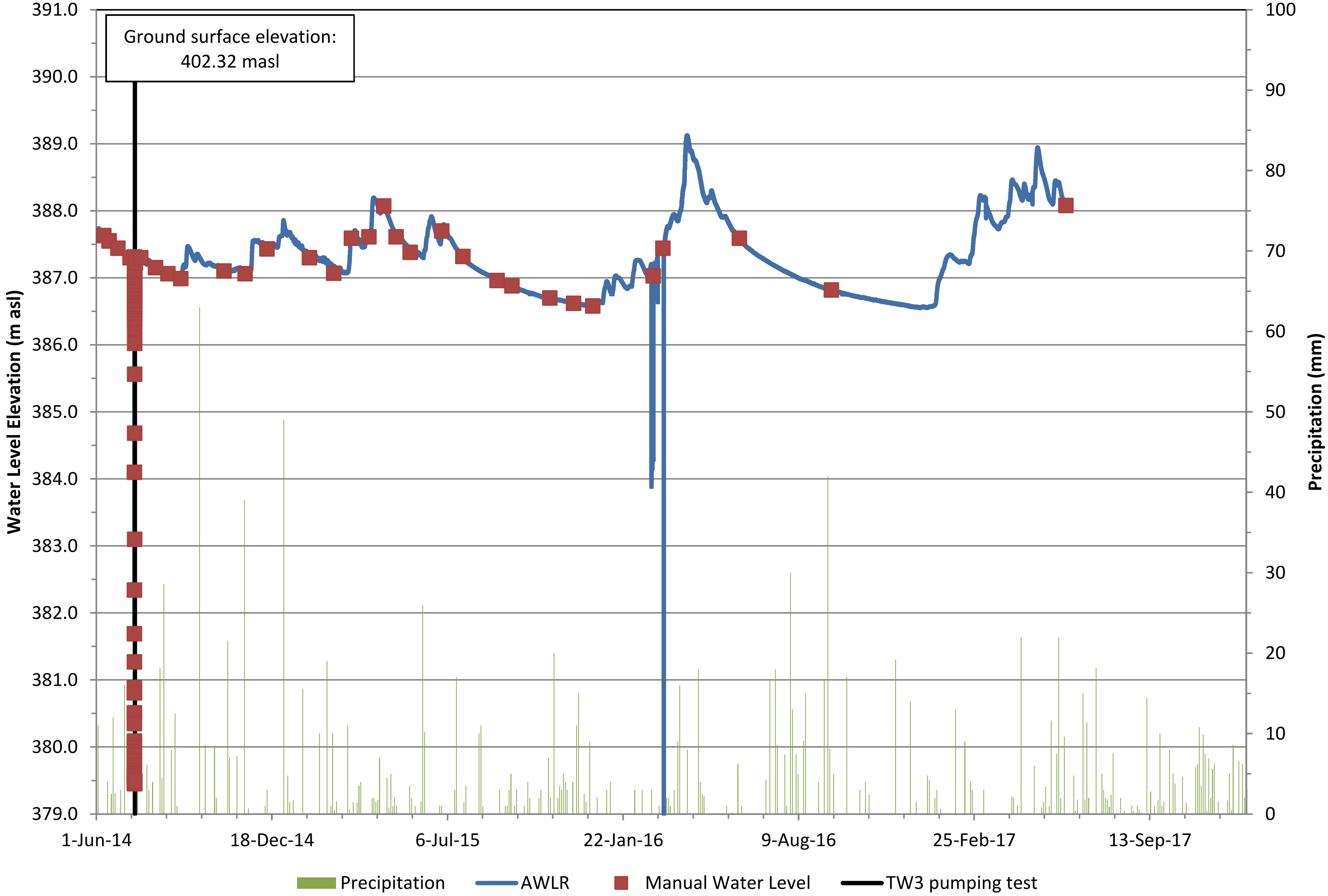
# Manors of Belfountain Hydrogeological Investigation
## Groundwater Monitoirng
## TW3 Hydrograph



Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

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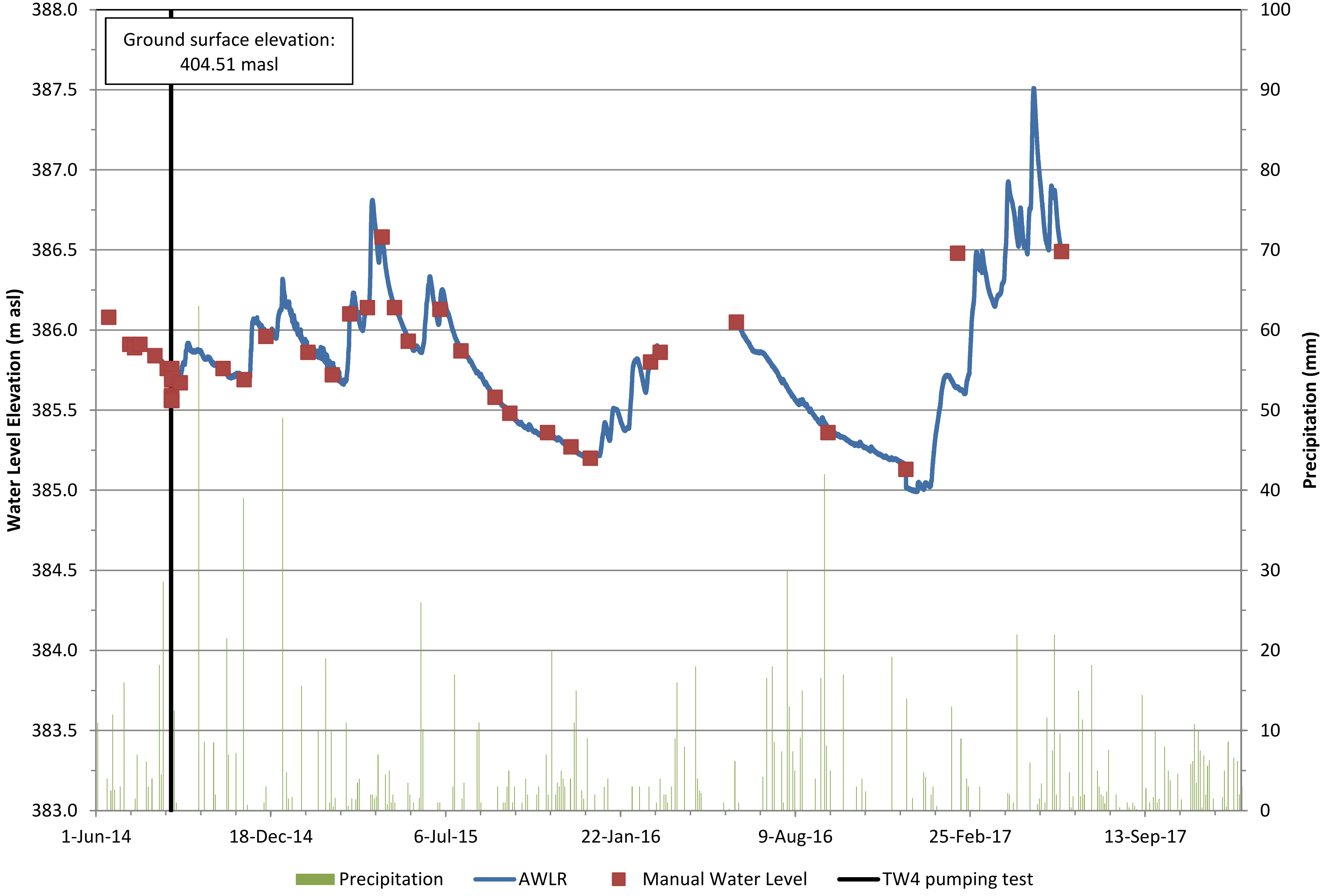
# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# TW4 Hydrograph



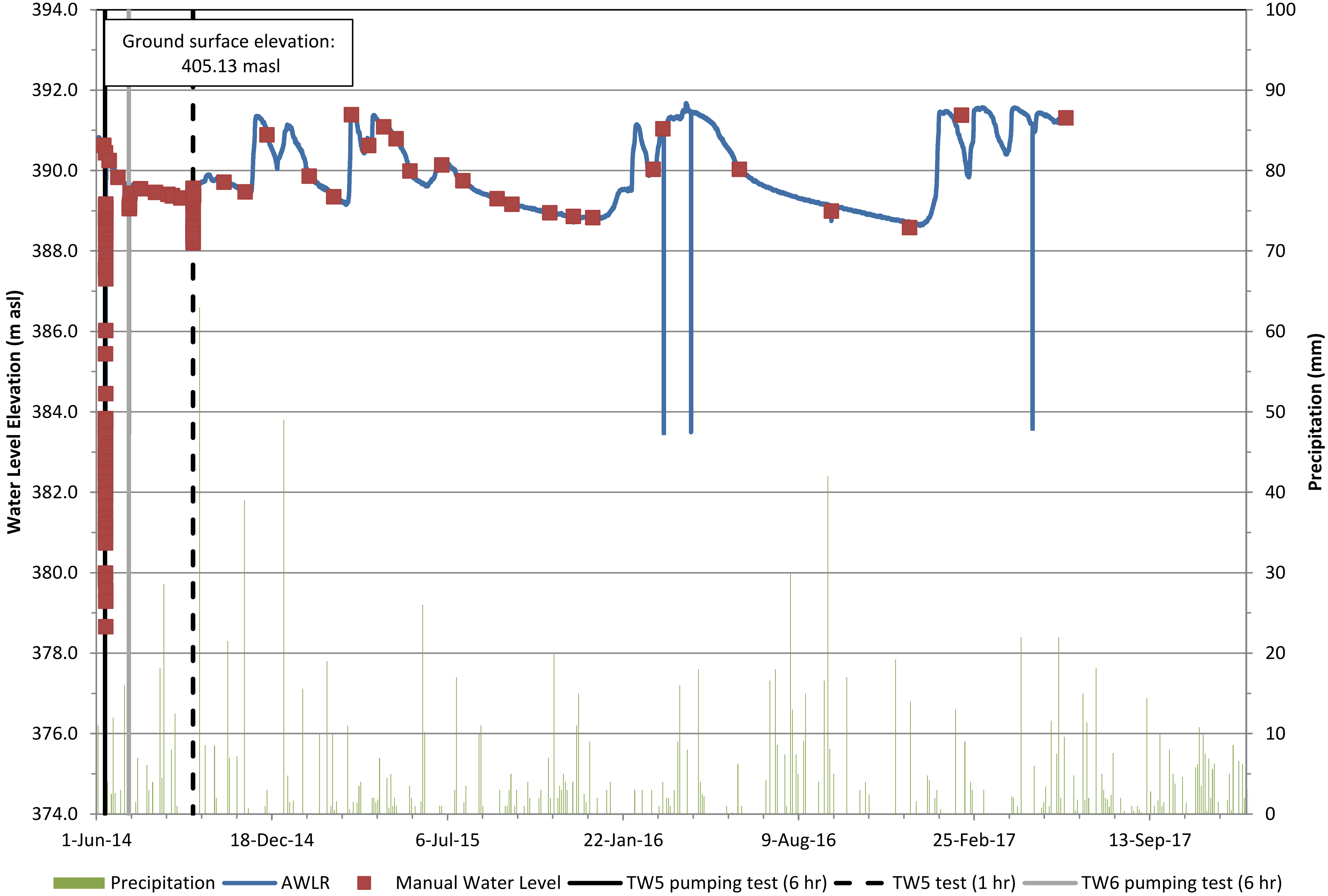
BURNSIDE

Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

picutre]

Appendix E
2017-0646

# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# TW5 Hydrograph

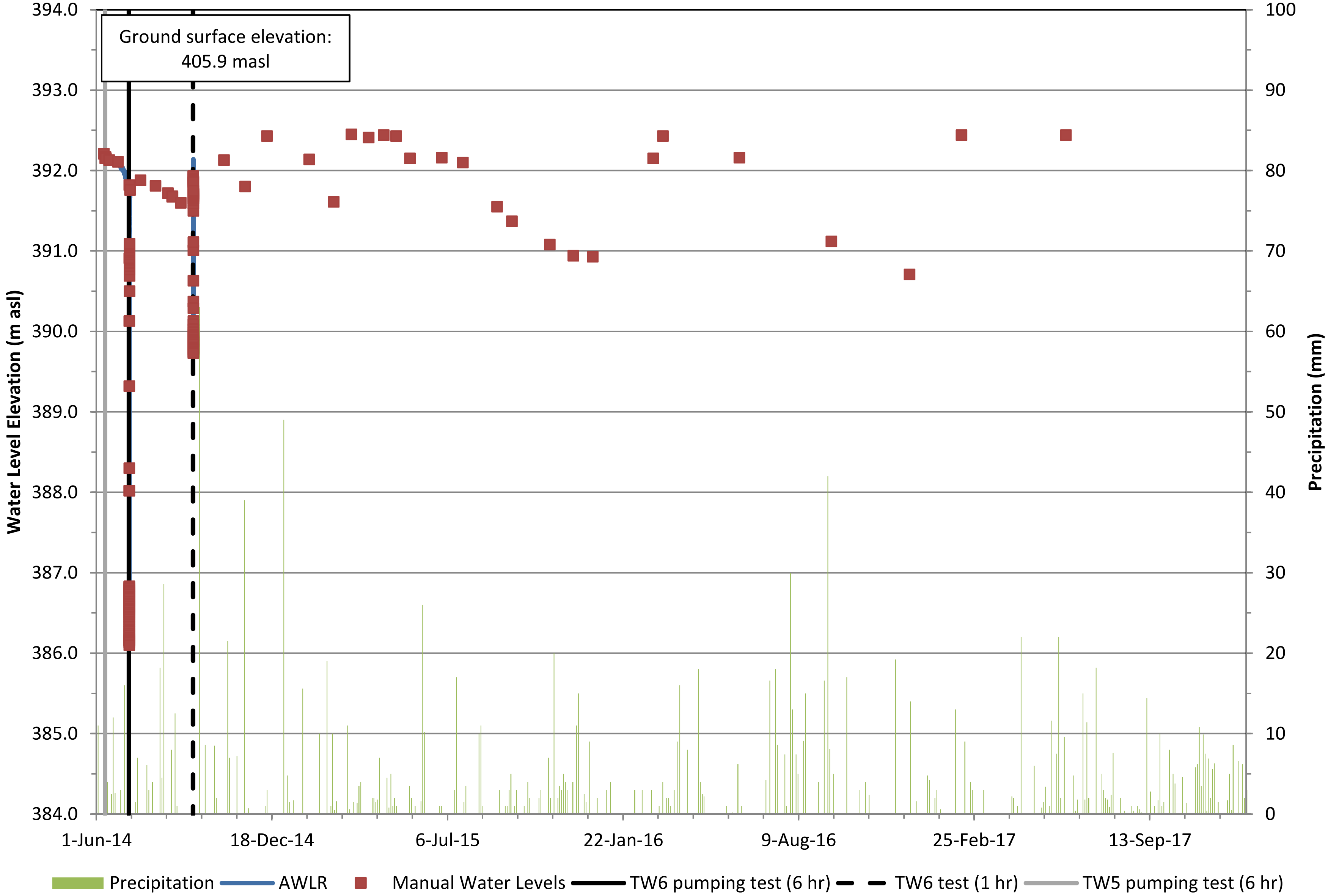


BURNSIDE
Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

COLE ENGINEERING

Appendix E
2017-0646

# Manors of Belfountain Hydrogeological Investigation
# Groundwater Monitoirng
# TW6 Hydrograph



Burnside

Prepared By: S.B.
Updated By: T.H. (COLE)
12/12/2017

COLE ENGINEERING

Appendix E
2017-0646

# Appendix F

# Groundwater Quality

| | | | Well ID | PW2 | | | | | OW1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Date | 12/04/2014 | 04/07/2015 | 06/29/2015 | 09/17/2015 | 11/26/2015 | 12/04/2014 | 04/07/2015 | 06/29/2015 |
| | | | Lab sample ID | 6152997 | 6430214 | 6701615 | 6988488 | 7237258 | 6153004 | 6430223 | 6701613 |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | - | 595 | - | 596 | - | - | 601 | - |
| pH | pH Units | 6.5 - 8.5 | NA | - | 7.92 | - | 8.16 | - | - | 8.1 | - |
| Saturation pH | | | | - | 7.00 | - | 6.99 | - | - | 6.98 | - |
| Langelier Index | | | | - | 0.92 | - | 1.17 | - | - | 1.12 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | - | 281 | - | 295 | - | - | 265 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | - | 304 | - | 330 | - | - | 294 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | - | 259 | - | 251 | - | - | 265 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | - | 259 | - | 251 | - | - | 265 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | - | <5 | - | <5 | - | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | - | <5 | - | <5 | - | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | - | <0.05 | - | <0.25 | - | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | - | 22.3 | - | 22.9 | - | - | 3.48 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 6.51 | 3.44 | 4.15 | 2.75 | 2.12 | 0.89 | 0.85 | 1.89 |
| Nitrite as N | mg/L | 1 | 0.1 | - | <0.05 | - | <0.25 | <0.05 | - | <0.05 | - |
| Bromide | mg/L | - | 0.1 | - | <0.05 | - | <0.25 | - | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | - | 18.2 | - | 22.0 | - | - | 14 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | - | <0.10 | - | <0.50 | - | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | - | 7.52 | - | 8.45 | - | - | 5.38 | - |
| Ammonia as N | mg/L | - | 0.02 | - | 0.3 | - | <0.02 | - | - | 0.08 | - |
| Total Phosphorus | mg/L | - | 0.05 | - | <0.05 | - | <0.05 | - | - | 0.17 | - |
| Total Organic Carbon | mg/L | - | 0.5 | - | 0.5 | - | 0.7 | - | - | 2 | - |
| Colour | TCU | 5 | 5 | - | <5 | - | <5 | - | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | - | 4.6 | - | 1.2 | - | - | 269 | - |
| Calcium | mg/L | - | 0.05 | - | 73.6 | - | 77.6 | - | - | 71.9 | - |
| Magnesium | mg/L | - | 0.05 | - | 23.5 | - | 24.7 | - | - | 20.7 | - |
| Sodium | mg/L | 200 | 0.05 | - | 8.20 | - | 9.37 | - | - | 7.68 | - |
| Potassium | mg/L | - | 0.05 | - | 0.90 | - | 0.84 | - | - | 2.16 | - |
| Aluminum | mg/L | 0.1 | 0.004 | - | <0.004 | - | <0.004 | - | - | <0.004 | - |
| Antimony | mg/L | 0.006 | 0.003 | - | <0.003 | - | <0.003 | - | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | - | <0.003 | - | <0.003 | - | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | - | 0.056 | - | 0.050 | - | - | 0.048 | - |
| Beryllium | mg/L | - | 0.001 | - | <0.001 | - | <0.001 | - | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | - | <0.010 | - | <0.010 | - | - | <0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | - | <0.001 | - | <0.001 | - | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | - | 0.005 | - | <0.003 | - | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | - | <0.001 | - | <0.001 | - | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | - | <0.003 | - | <0.003 | - | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | - | <0.010 | - | <0.010 | - | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | - | <0.0001 | - | <0.0001 | - | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | - | <0.003 | - | 0.004 | - | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | - | <0.004 | - | <0.004 | - | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | - | 0.126 | - | 0.126 | - | - | 0.102 | - |
| Thallium | mg/L | - | 0.006 | - | <0.006 | - | <0.006 | - | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | - | <0.010 | - | <0.010 | - | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | - | 0.022 | - | 0.021 | - | - | 0.017 | - |
| Zirconium | mg/L | - | 0.004 | - | <0.004 | - | <0.004 | - | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | - | 3.400 | - | 0.104 | - | - | 0.6 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due to the presence of non-target Ions; the RDLs were adjusted to reflect the dilution.

| | | | **Well ID** | **TW1** | | **TW2** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | **05/02/2017** | **03/10/2017** | **04/07/2015** | **06/29/2015** | **09/17/2015** | **11/26/2015** | **03/08/2016** | **06/02/2016** | **09/15/2016** | **12/13/2016** | **03/10/2017** | **05/02/2017** |
| | | | **Lab sample ID** | **8358383** | **8244996** | **6430142** | **6701611** | **6988471** | **7237258** | **7430218** | **7607710** | **7853176** | **8091589** | **8244997** | **8358385** |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | - | 705 | 478 | - | 561 | - | - | 526 | 575 | - | 392 | - |
| pH | pH Units | 6.5 - 8.5 | NA | - | 8.14 | 7.89 | - | 8.14 | - | - | 8.03 | 8.17 | - | 8.02 | - |
| Saturation pH | | | | - | 6.89 | 7.15 | - | 6.96 | - | - | 6.97 | 6.96 | - | 7.36 | - |
| Langelier Index | | | | - | 1.25 | 0.74 | - | 1.18 | - | - | 1.06 | 1.21 | - | 0.66 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | - | 361 | 224 | - | 299 | - | - | 276 | 294 | - | 181 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | - | 396 | 262 | - | 308 | - | - | 290 | 308 | - | 198 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | - | 256 | 212 | - | 263 | - | - | 264 | 271 | - | 163 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | - | 256 | 212 | - | 263 | - | - | 264 | 271 | - | 163 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | - | <5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | - | <5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | - | 0.19 | <0.05 | - | <0.25 | - | - | <0.10 | <0.05 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | - | 14.30 | 18.80 | - | 6.85 | - | - | 5.59 | 5.96 | - | 16.70 | - |
| Nitrate as N | mg/L | 10 | 0.1 | <0.05 | <0.05 | 0.84 | 0.70 | 1.00 | 0.62 | 0.58 | 1.18 | 0.82 | 0.67 | 1.16 | 1.90 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.05 | <0.05 | <0.05 | - | <0.25 | <0.05 | - | <0.10 | <0.05 | - | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | - | <0.05 | <0.05 | - | <0.25 | - | - | <0.10 | <0.05 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | - | 105.0 | 10.0 | - | 23.5 | - | - | 19.0 | 25.6 | - | 13.8 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | - | <0.10 | 0.35 | - | <0.50 | - | - | <0.20 | <0.10 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | - | 12.70 | 5.78 | - | 11.50 | - | - | 9.90 | 11.80 | - | 3.65 | - |
| Ammonia as N | mg/L | - | 0.02 | - | <0.02 | <0.02 | - | <0.02 | - | - | <0.02 | <0.02 | - | 0.04 | - |
| Total Phosphorus | mg/L | - | 0.05 | - | <0.05 | <0.05 | - | <0.05 | - | - | <0.05 | 0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | - | 1.3 | 1.7 | - | 1.1 | - | - | 0.7 | 1.1 | - | 2.4 | - |
| Colour | TCU | 5 | 5 | - | <5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | - | 135.0 | 2.7 | - | 4.3 | - | - | 6.4 | 110.0 | - | 3.3 | - |
| Calcium | mg/L | - | 0.05 | - | 97.9 | 60.9 | - | 79.5 | - | - | 73.3 | 77.6 | - | 48.8 | - |
| Magnesium | mg/L | - | 0.05 | - | 28.4 | 17.5 | - | 24.3 | - | - | 22.6 | 24.3 | - | 14.4 | - |
| Sodium | mg/L | 200 | 0.05 | - | 5.27 | 6.79 | - | 3.47 | - | - | 2.65 | 3.10 | - | 6.39 | - |
| Potassium | mg/L | - | 0.05 | - | 1.18 | 1.53 | - | 1.12 | - | - | 1.03 | 1.12 | - | 1.26 | - |
| Aluminum | mg/L | 0.1 | 0.004 | - | 0.006 | <0.004 | - | <0.004 | - | - | 0.006 | 0.014 | - | 0.017 | - |
| Antimony | mg/L | 0.006 | 0.003 | - | <0.003 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | - | 0.006 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | - | 0.073 | 0.042 | - | 0.088 | - | - | 0.063 | 0.092 | - | 0.030 | - |
| Beryllium | mg/L | - | 0.001 | - | <0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | - | 0.016 | 0.010 | - | <0.010 | - | - | 0.012 | <0.010 | - | <0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | - | <0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | - | <0.003 | 0.005 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | - | <0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | - | <0.003 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | - | 0.167 | <0.010 | - | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | - | 0.019 | <0.002 | - | <0.002 | - | - | 0.004 | 0.003 | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | - | <0.0001 | <0.0001 | - | <0.0001 | - | - | <0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | - | <0.003 | <0.003 | - | 0.004 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | - | <0.004 | <0.004 | - | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | - | 0.588 | 0.087 | - | 0.128 | - | - | 0.122 | 0.134 | - | 0.078 | - |
| Thallium | mg/L | - | 0.006 | - | <0.006 | <0.006 | - | <0.006 | - | - | <0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | - | <0.010 | <0.010 | - | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | - | <0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | - | 0.034 | 0.012 | - | 0.010 | - | - | 0.010 | 0.009 | - | 0.011 | - |
| Zirconium | mg/L | - | 0.004 | - | <0.004 | <0.004 | - | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | - | 1.56 | 2.30 | - | 1.09 | - | - | 2.23 | 1.18 | - | 2.09 | - |

**Notes:**
ODWS = Ontario Drinking Water Standards
RDL = Reportable Detection Limit
-' = No value available
Indicates exceedance of ODWS criteria
Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW3 | | | TW4 | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample Date | 03/08/2016 | 03/10/2017 | 05/02/2017 | 03/10/2017 | 05/02/2017 |
| | | | Lab sample ID | 7430216 | 8245003 | 8358386 | 8245009 | 8358387 |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | |
| Electrical Conductivity | uS/cm | | 2 | - | 802 | - | 558 | - |
| pH | pH Units | 6.5 - 8.5 | NA | - | 8.14 | - | 8.10 | - |
| Saturation pH | | | | - | 6.83 | - | 6.99 | - |
| Langelier Index | | | | - | 1.31 | - | 1.11 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | - | 433 | - | 275 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | - | 484 | - | 284 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | - | 248 | - | 250 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | - | 248 | - | 250 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | - | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | - | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | - | 0.1 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | - | 3.41 | - | 12.60 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 0.54 | 0.62 | 0.58 | 3.43 | 3.22 |
| Nitrite as N | mg/L | 1 | 0.1 | - | <0.05 | <0.05 | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | - | <0.05 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | - | 193.0 | - | 18.9 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | - | <0.10 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | - | 10.70 | - | 7.28 | - |
| Ammonia as N | mg/L | - | 0.02 | - | 0.14 | - | <0.02 | - |
| Total Phosphorus | mg/L | - | 0.05 | - | <0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | - | 0.7 | - | 1.2 | - |
| Colour | TCU | 5 | 5 | - | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | - | 15.3 | - | 0.6 | - |
| Calcium | mg/L | - | 0.05 | - | 122.0 | - | 74.1 | - |
| Magnesium | mg/L | - | 0.05 | - | 31.1 | - | 21.8 | - |
| Sodium | mg/L | 200 | 0.05 | - | 3.42 | - | 5.36 | - |
| Potassium | mg/L | - | 0.05 | - | 1.28 | - | 1.01 | - |
| Aluminum | mg/L | 0.1 | 0.004 | - | 0.008 | - | 0.011 | - |
| Antimony | mg/L | 0.006 | 0.003 | - | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | - | <0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | - | 0.045 | - | 0.053 | - |
| Beryllium | mg/L | - | 0.001 | - | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | - | 0.020 | - | <0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | - | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | - | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | - | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | - | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | - | 0.032 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | - | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | - | 0.005 | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | - | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | - | 0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | - | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | - | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | - | 0.916 | - | 0.121 | - |
| Thallium | mg/L | - | 0.006 | - | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | - | 0.003 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | - | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | - | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | - | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | - | 0.032 | - | 0.013 | - |
| Zirconium | mg/L | - | 0.004 | - | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | - | 1.57 | - | 2.07 | - |

**Notes:**
ODWS = Ontario Drinking Water Standards
RDL = Reportable Detection Limit
-' = No value available
Indicates exceedance of ODWS criteria
Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW5 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | **04/07/2015** | **06/29/2015** | **09/17/2015** | **11/26/2015** | **03/08/2016** | **06/02/2016** | **09/15/2016** | **12/13/2016** | **03/10/2017** | **05/02/2017** |
| | | | **Lab sample ID** | **6430199** | **6701614** | **6988482** | **7237247** | **7430208** | **7607719** | **7853172** | **8091594** | **8245015** | **8358388** |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 592 | - | 655 | - | - | 606 | 667 | - | 604 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 7.90 | - | 8.12 | - | - | 8.10 | 8.08 | - | 8.12 | - |
| Saturation pH | | | | 7.02 | - | 7.01 | - | - | 6.99 | 7.04 | - | 7.00 | - |
| Langelier Index | | | | 0.88 | - | 1.11 | - | - | 1.11 | 1.04 | - | 1.12 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 285 | - | 301 | - | - | 298 | 280 | - | 288 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 302 | - | 368 | - | - | 326 | 358 | - | 306 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 244 | - | 234 | - | - | 251 | 237 | - | 249 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 244 | - | 234 | - | - | 251 | 237 | - | 249 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.05 | - | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | 19.80 | - | 37.90 | - | - | 24.3 | 41.20 | - | 20.20 | |
| Nitrate as N | mg/L | 10 | 0.1 | 6.31 | 8.28 | 7.77 | 7.09 | 7.80 | 6.72 | 7.18 | 6.34 | 6.76 | 7.99 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.05 | - | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | <0.05 | - | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | 14.5 | - | 22.8 | - | - | 16.8 | 20.1 | - | 14.1 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.10 | - | <0.50 | - | - | <0.20 | <0.20 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | 6.79 | - | 7.42 | - | - | 7.49 | 7.43 | - | 7.03 | - |
| Ammonia as N | mg/L | - | 0.02 | <0.02 | - | <0.02 | - | - | <0.02 | <0.02 | - | <0.02 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | <0.05 | - | - | <0.05 | <0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.6 | - | 1.0 | - | - | <0.5 | 0.6 | - | 0.7 | - |
| Colour | TCU | 5 | 5 | <5 | - | <5 | - | - | <5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 1.5 | - | 8.2 | - | - | 2.5 | 1.7 | - | 1.9 | - |
| Calcium | mg/L | - | 0.05 | 80.2 | - | 83.4 | - | - | 81.5 | 76.6 | - | 79.3 | - |
| Magnesium | mg/L | - | 0.05 | 20.5 | - | 22.6 | - | - | 23.0 | 21.6 | - | 21.9 | - |
| Sodium | mg/L | 200 | 0.05 | 7.24 | - | 15.80 | - | - | 9.66 | 16.00 | - | 8.93 | - |
| Potassium | mg/L | - | 0.05 | 1.02 | - | 1.13 | - | - | 0.91 | 0.90 | - | 0.91 | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | <0.004 | - | - | 0.006 | 0.010 | - | 0.013 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | 0.110 | - | 0.110 | - | - | 0.112 | 0.112 | - | 0.110 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | 0.011 | - | <0.010 | - | - | 0.011 | <0.010 | - | <0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | 0.004 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | <0.010 | - | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | <0.0001 | - | - | <0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | 0.004 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 0.154 | - | 0.184 | - | - | 0.153 | 0.155 | - | 0.162 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | <0.006 | - | - | <0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.019 | - | 0.018 | - | - | 0.026 | 0.016 | - | 0.024 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 1.30 | - | 0.30 | - | - | 1.02 | 3.91 | - | 1.24 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Date | 04/07/2015 | 06/29/2015 | 11/26/2015 | 04/01/2016 | 04/02/2016 | 03/10/2017 | 05/02/2017 |
| | | | Lab sample ID | 6430206 | 6701612 | 7237256 | 7471115 | 7471117 | 8245021 | 8358389 |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 602 | - | - | - | - | 612 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 8.14 | - | - | - | - | 8.10 | - |
| Saturation pH | | | | 7.02 | - | - | - | - | 7.01 | - |
| Langelier Index | | | | 1.12 | - | - | - | - | 1.09 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 283 | - | - | - | - | 288 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 314 | - | - | - | - | 308 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 245 | - | - | - | - | 245 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 245 | - | - | - | - | 245 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | - | - | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | - | - | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.05 | - | - | - | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | 24.3 | - | - | - | - | 21.80 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 7.80 | 8.20 | 7.30 | 7.89 | 8.23 | 8.52 | 9.08 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.05 | - | - | - | - | <0.05 | <0.10 |
| Bromide | mg/L | - | 0.1 | <0.05 | - | - | - | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | 15.3 | - | - | - | - | 13.5 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.10 | - | - | - | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | 6.87 | - | - | - | - | 7.01 | - |
| Ammonia as N | mg/L | - | 0.02 | <0.02 | - | - | - | - | <0.02 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | - | - | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.6 | - | - | - | - | 0.7 | - |
| Colour | TCU | 5 | 5 | <5 | - | - | - | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 6.8 | - | - | - | - | <0.5 | - |
| Calcium | mg/L | - | 0.05 | 79.7 | - | - | - | - | 79.9 | - |
| Magnesium | mg/L | - | 0.05 | 20.3 | - | - | - | - | 21.6 | - |
| Sodium | mg/L | 200 | 0.05 | 8.54 | - | - | - | - | 8.87 | - |
| Potassium | mg/L | - | 0.05 | 0.98 | - | - | - | - | 0.86 | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | - | - | - | 0.006 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | - | - | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | - | - | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | 0.088 | - | - | - | - | 0.105 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | - | - | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | <0.010 | - | - | - | - | <0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | - | - | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | 0.008 | - | - | - | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | - | - | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | - | - | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | <0.010 | - | - | - | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | - | - | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | - | - | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | - | - | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 0.139 | - | - | - | - | 0.156 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | - | - | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | - | - | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | - | - | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | 0.003 | - | - | - | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.014 | - | - | - | - | 0.017 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | - | - | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 3.3 | - | - | - | - | 1.84 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW7 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | **02/19/2016** | **02/19/2016** | **03/08/2016** | **06/02/2016** | **09/15/2016** | **12/13/2016** | **03/10/2017** | **05/02/2017** |
| | | | **Lab sample ID** | **7395659** | **7395664** | **7430212** | **7607713** | **7853182** | **8091592** | **8245027** | **8358390** |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 587 | - | - | 585 | 606 | - | 592 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 7.88 | - | - | 8.07 | 8.14 | - | 8.11 | - |
| Saturation pH | | | | 6.99 | - | - | 6.96 | 7.01 | - | 6.98 | - |
| Langelier Index | | | | 0.89 | - | - | 1.11 | 1.13 | - | 1.13 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 280 | - | - | 303 | 284 | - | 291 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 354 | - | - | 326 | 334 | - | 306 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 262 | - | - | 261 | 247 | - | 260 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 262 | - | - | 261 | 247 | - | 260 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | 18.3 | - | - | 15.2 | 17.4 | - | 12.5 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 8.52 | 8.00 | 7.27 | 6.32 | 6.97 | 5.96 | 5.77 | 6.87 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | 20.6 | - | - | 16.4 | 18.5 | - | 14.4 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.50 | - | - | <0.20 | <0.20 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | 7.03 | - | - | 7.14 | 7.12 | - | 6.72 | - |
| Ammonia as N | mg/L | - | 0.02 | 0.1 | - | - | <0.02 | <0.02 | - | 0.03 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | - | <0.05 | <0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.6 | - | - | 0.5 | 1.0 | - | 0.6 | - |
| Colour | TCU | 5 | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 3.9 | - | - | 3.7 | 4.8 | - | 1.8 | - |
| Calcium | mg/L | - | 0.05 | 77.2 | - | - | 83.2 | 77.5 | - | 80.0 | - |
| Magnesium | mg/L | - | 0.05 | 21.2 | - | - | 23.1 | 21.9 | - | 22.2 | - |
| Sodium | mg/L | 200 | 0.05 | 5.60 | - | - | 5.15 | 6.44 | - | 4.86 | - |
| Potassium | mg/L | - | 0.05 | 1.00 | - | - | 0.89 | 0.87 | - | 0.92 | - |
| Aluminum | mg/L | 0.1 | 0.004 | < 0.004 | - | - | 0.009 | 0.012 | - | 0.009 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | 0.093 | - | - | 0.101 | 0.099 | - | 0.109 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | <0.010 | - | - | 0.012 | <0.010 | - | 0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | - | <0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 0.106 | - | - | 0.132 | 0.124 | - | 0.136 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | - | <0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.017 | - | - | 0.035 | 0.020 | - | 0.029 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 7.26 | - | - | 1.11 | 2.78 | - | 1.69 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | **Well ID** | **TW8** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | **02/23/2016** | **02/23/2016** | **03/07/2016** | **06/02/2016** | **09/15/2016** | **12/13/2016** | **03/10/2017** | **05/02/2017** |
| | | | **Lab sample ID** | **7401690** | **7401689** | **7426611** | **7607726** | **7853189** | **8091595** | **8245033** | **8358391** |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 606 | - | - | 627 | 598 | - | 604 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 8.02 | - | - | 8.17 | 8.08 | - | 8.12 | - |
| Saturation pH | | | | 6.96 | - | - | 6.95 | 7.01 | - | 6.98 | - |
| Langelier Index | | | | 1.06 | - | - | 1.22 | 1.07 | - | 1.14 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 315 | - | - | 324 | 296 | - | 301 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 368 | - | - | 358 | 364 | - | 312 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 254 | - | - | 251 | 238 | - | 251 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 254 | - | - | 251 | 238 | - | 251 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | 10.4 | - | - | 11.0 | 9.46 | | 9.54 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 8.25 | 7.93 | 7.76 | 5.35 | 7.85 | 7.41 | 6.68 | 5.15 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | <0.25 | - | - | <0.10 | <0.10 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | 49.1 | - | - | 58.0 | 43.5 | - | 31.1 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.50 | - | - | <0.20 | <0.20 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | 7.60 | - | - | 7.75 | 7.49 | - | 7.18 | - |
| Ammonia as N | mg/L | - | 0.02 | <0.02 | - | - | <0.02 | <0.02 | - | 0.15 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | - | 0.05 | 0.06 | - | 0.08 | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.6 | - | - | 0.7 | 1.5 | - | 1.1 | - |
| Colour | TCU | 5 | 5 | <5 | - | - | <5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 21.1 | - | - | 53.6 | 113 | - | 113 | - |
| Calcium | mg/L | - | 0.05 | 85.6 | - | - | 88.3 | 80.6 | - | 81.6 | - |
| Magnesium | mg/L | - | 0.05 | 24.7 | - | - | 25.1 | 22.9 | - | 23.6 | - |
| Sodium | mg/L | 200 | 0.05 | 4.69 | - | - | 4.72 | 3.22 | - | 3.67 | - |
| Potassium | mg/L | - | 0.05 | 1.30 | - | - | 1.34 | 1.17 | - | 1.12 | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | - | 0.011 | 0.011 | - | <0.004 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | - | <0.003 | 0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | 0.110 | - | - | 0.087 | 0.085 | - | 0.099 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | 0.013 | - | - | 0.025 | 0.022 | - | 0.011 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | 0.007 | - | - | 0.005 | 0.005 | - | 0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | - | <0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 0.44 | - | - | 1.42 | 1.66 | - | 0.55 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | - | <0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.016 | - | - | 0.023 | 0.024 | - | 0.017 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 3.27 | - | - | 1.52 | 3.31 | - | 1.59 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW9 | | | | | | | TW10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Date | 02/26/2016 | 02/26/2016 | 03/08/2016 | 06/02/2016 | 09/15/2016 | 12/13/2016 | 03/10/2017 | 03/10/2017 | 02/25/2016 | 05/02/2017 |
| | | | Lab sample ID | 7410959 | 7410958 | 7430214 | 7607733 | 7853195 | 8091593 | 8245039 | 8245045 | 7408001 | 8358393 |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 610 | - | - | 601 | 594 | - | 620 | 430 | - | - |
| pH | pH Units | 6.5 - 8.5 | NA | 8.02 | - | - | 8.10 | 8.15 | - | 8.10 | 8.06 | - | - |
| Saturation pH | | | | 6.94 | - | - | 6.95 | 7.00 | - | 6.90 | 7.26 | - | - |
| Langelier Index | | | | 1.08 | - | - | 1.15 | 1.15 | - | 1.20 | 0.80 | - | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 310 | - | - | 314 | 289 | - | 310 | 202 | - | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 332 | - | - | 334 | 332 | - | 326 | 216 | - | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 265 | - | - | 257 | 249 | - | 294 | 182 | - | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 265 | - | - | 257 | 249 | - | 294 | 182 | - | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | <5 | - | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | - | <5 | <5 | - | <5 | <5 | - | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.05 | - | - | <0.10 | <0.05 | - | <0.05 | <0.05 | - | - |
| Chloride | mg/L | 250 | 0.2 | 9.37 | - | - | 9.32 | 9.76 | - | 8.84 | 14.40 | - | - |
| Nitrate as N | mg/L | 10 | 0.1 | 3.26 | 3.65 | 3.41 | 2.99 | 2.17 | 1.51 | 2.68 | 1.68 | 2.41 | 0.85 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.05 | - | - | <0.10 | <0.05 | - | <0.05 | <0.05 | - | <0.05 |
| Bromide | mg/L | - | 0.1 | <0.05 | - | - | <0.10 | <0.05 | - | <0.05 | <0.05 | - | - |
| Sulphate | mg/L | 500 | 0.2 | 50.0 | - | - | 50.5 | 45.3 | - | 50.1 | 14.3 | - | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.10 | - | - | <0.20 | <0.10 | - | <0.10 | <0.10 | - | - |
| Reactive Silica | mg/L | - | 0.05 | 8.72 | - | - | 8.60 | 8.77 | - | 8.42 | 4.56 | - | - |
| Ammonia as N | mg/L | - | 0.02 | <0.02 | - | - | <0.02 | <0.02 | - | 0.09 | 0.03 | - | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | - | <0.05 | <0.05 | - | <0.05 | 0.06 | - | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.6 | - | - | 0.6 | 0.9 | - | 0.8 | 2.1 | - | - |
| Colour | TCU | 5 | 5 | <5 | - | - | <5 | <5 | - | <5 | <5 | - | - |
| Turbidity | NTU | 5 | 0.5 | 10.4 | - | - | 3.5 | 2.4 | - | 2.0 | 64.8 | - | - |
| Calcium | mg/L | - | 0.05 | 82.4 | - | - | 82.5 | 76.2 | - | 81.5 | 54.3 | - | - |
| Magnesium | mg/L | - | 0.05 | 25.4 | - | - | 26.2 | 23.9 | - | 25.8 | 16.2 | - | - |
| Sodium | mg/L | 200 | 0.05 | 3.99 | - | - | 3.91 | 4.03 | - | 4.17 | 5.76 | - | - |
| Potassium | mg/L | - | 0.05 | 1.19 | - | - | 0.98 | 0.89 | - | 0.99 | 1.21 | - | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | - | <0.004 | 0.01 | - | 0.009 | 0.014 | - | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | <0.003 | - | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | <0.003 | - | - |
| Barium | mg/L | 1 | 0.002 | 0.070 | - | - | 0.069 | 0.074 | - | 0.074 | 0.036 | - | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | <0.001 | - | - |
| Boron | mg/L | 5 | 0.01 | 0.014 | - | - | 0.013 | 0.010 | - | 0.012 | <0.010 | - | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | <0.001 | - | - |
| Chromium | mg/L | 0.05 | 0.003 | 0.005 | - | - | <0.003 | <0.003 | - | <0.003 | <0.003 | - | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | - | <0.001 | <0.001 | - | <0.001 | <0.001 | - | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | <0.003 | - | - |
| Iron | mg/L | 0.3 | 0.01 | < 0.010 | - | - | <0.010 | <0.010 | - | <0.010 | <0.010 | - | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Manganese | mg/L | 0.05 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | 0.009 | - | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | - | <0.0001 | <0.0001 | - | <0.0001 | <0.0001 | - | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | - | <0.003 | <0.003 | - | <0.003 | <0.003 | - | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | <0.004 | - | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Strontium | mg/L | - | 0.005 | 0.320 | - | - | 0.296 | 0.279 | - | 0.339 | 0.083 | - | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | - | <0.006 | <0.006 | - | <0.006 | <0.006 | - | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | - | <0.010 | <0.010 | - | <0.010 | <0.010 | - | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | - | <0.002 | <0.002 | - | <0.002 | <0.002 | - | - |
| Zinc | mg/L | 5 | 0.005 | 0.022 | - | - | 0.031 | 0.028 | - | 0.037 | 0.016 | - | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | - | <0.004 | <0.004 | - | <0.004 | <0.004 | - | - |
| % Difference/ Ion Balance | % | - | NA | 3.26 | - | - | 1.52 | 3.13 | - | 6.98 | 1.56 | - | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | Well ID | TW11 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Date | 02/29/2016 | 02/29/2016 | 03/30/2016 | 03/07/2016 | 03/31/2016 | 06/02/2016 | 09/15/2016 | 12/13/2016 | 03/10/2017 | 05/02/2017 |
| | | | Lab sample ID | 7413129 | 7413121 | 7471112 | 7426610 | 7471114 | 7607739 | 7853203 | 8091596 | 8245052 | 8358394 |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | | | | | | | |
| Electrical Conductivity | uS/cm | | 2 | 607 | - | - | - | - | 572 | 589 | - | 568 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 8.00 | - | - | - | - | 8.08 | 8.20 | - | 8.16 | - |
| Saturation pH | | | | 6.95 | - | - | - | - | 6.95 | 6.99 | - | 6.99 | - |
| Langelier Index | | | | 1.05 | - | - | - | - | 1.13 | 1.21 | - | 1.17 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 303 | - | - | - | - | 289 | 286 | - | 278 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 326 | - | - | - | - | 300 | 314 | - | 286 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 267 | - | - | - | - | 262 | 258 | - | 249 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 267 | - | - | - | - | 262 | 258 | - | 249 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | - | - | - | <5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | - | - | - | <5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.10 | - | - | - | - | <0.10 | <0.05 | - | <0.05 | - |
| Chloride | mg/L | 250 | 0.2 | 12.8 | - | - | - | - | 18.4 | 12.7 | - | 13.9 | - |
| Nitrate as N | mg/L | 10 | 0.1 | 4.58 | 4.61 | 3.46 | 5.03 | 3.37 | 3.00 | 4.08 | 3.58 | 3.94 | 3.00 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.10 | - | - | - | - | <0.10 | <0.05 | - | <0.05 | <0.05 |
| Bromide | mg/L | - | 0.1 | <0.10 | - | - | - | - | <0.10 | <0.05 | - | <0.05 | - |
| Sulphate | mg/L | 500 | 0.2 | 21.3 | - | - | - | - | 17.3 | 21.3 | - | 19.1 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.20 | - | - | - | - | <0.20 | <0.10 | - | <0.10 | - |
| Reactive Silica | mg/L | - | 0.05 | 8.05 | - | - | - | - | 7.67 | 7.88 | - | 7.19 | - |
| Ammonia as N | mg/L | - | 0.02 | <0.02 | - | - | - | - | <0.02 | <0.02 | - | <0.02 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | - | - | - | <0.05 | <0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | 0.7 | - | - | - | - | 1.1 | 0.8 | - | 1.6 | - |
| Colour | TCU | 5 | 5 | <5 | - | - | - | - | <5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 2.9 | - | - | - | - | 10.2 | 4.9 | - | 7.4 | - |
| Calcium | mg/L | - | 0.05 | 81.7 | - | - | - | - | 78.3 | 77.5 | - | 75.0 | - |
| Magnesium | mg/L | - | 0.05 | 24.0 | - | - | - | - | 22.8 | 22.4 | - | 22.0 | - |
| Sodium | mg/L | 200 | 0.05 | 5.39 | - | - | - | - | 7.26 | 5.49 | - | 5.82 | - |
| Potassium | mg/L | - | 0.05 | 1.01 | - | - | - | - | 0.99 | 0.97 | - | 0.98 | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | - | - | - | <0.004 | 0.013 | - | 0.011 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | - | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | <0.003 | - | - | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Barium | mg/L | 1 | 0.002 | 0.060 | - | - | - | - | 0.056 | 0.059 | - | 0.061 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | - | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | <0.010 | - | - | - | - | 0.010 | <0.010 | - | 0.010 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | - | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | < 0.003 | - | - | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | - | - | - | <0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | - | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | < 0.010 | - | - | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | - | - | - | <0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | - | - | - | <0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | - | - | - | <0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 0.132 | - | - | - | - | 0.123 | 0.128 | - | 0.129 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | - | - | - | <0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | - | - | - | <0.010 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | - | - | - | <0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.013 | - | - | - | - | 0.024 | 0.016 | - | 0.015 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | - | - | - | <0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 1.24 | - | - | - | - | 1.67 | 2.28 | - | 1.85 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Well ID** | **TW12** | | | |
| | | | **Sample Date** | **03/01/2016** | **03/01/2016** | **03/10/2017** | **05/02/2017** |
| | | | **Lab sample ID** | **7417874** | **7417866** | **8245058** | **8358397** |
| **Sample Parameter** | **Unit** | **ODWS Criteria** | **RDL** | | | | |
| Electrical Conductivity | uS/cm | | 2 | 1740 | - | 1730 | - |
| pH | pH Units | 6.5 - 8.5 | NA | 7.92 | - | 7.95 | - |
| Saturation pH | | | | 6.6 | - | 6.61 | - |
| Langelier Index | | | | 1.32 | - | 1.34 | - |
| Total Hardness (as CaCO3) | mg/L | 80-100 | 0.5 | 1010 | - | 1020 | - |
| Total Dissolved Solids | mg/L | 500 | 20 | 1480 | - | 1400 | - |
| Alkalinity (as CaCO3) | mg/L | 30-500 | 5 | 195 | - | 192 | - |
| Bicarbonate (as CaCO3) | mg/L | - | 5 | 195 | - | 192 | - |
| Carbonate (as CaCO3) | mg/L | - | 5 | <5 | - | <5 | - |
| Hydroxide (as CaCO3) | mg/L | - | 5 | <5 | - | <5 | - |
| Fluoride | mg/L | 1.5 | 0.1 | <0.25 | - | <0.25 | - |
| Chloride | mg/L | 250 | 0.2 | 2.3 | - | 2.11 | - |
| Nitrate as N | mg/L | 10 | 0.1 | <0.25 | <0.25 | <0.25 | <0.10 |
| Nitrite as N | mg/L | 1 | 0.1 | <0.25 | - | <0.25 | <0.10 |
| Bromide | mg/L | - | 0.1 | <0.25 | - | <0.25 | - |
| Sulphate | mg/L | 500 | 0.2 | 875 | - | 896 | - |
| Ortho Phosphate as P | mg/L | - | 0.2 | <0.50 | - | <0.50 | - |
| Reactive Silica | mg/L | - | 0.05 | 14.2 | - | 13.1 | - |
| Ammonia as N | mg/L | - | 0.02 | 0.08 | - | <0.02 | - |
| Total Phosphorus | mg/L | - | 0.05 | <0.05 | - | <0.05 | - |
| Total Organic Carbon | mg/L | - | 0.5 | <0.5 | - | 0.6 | - |
| Colour | TCU | 5 | 5 | <5 | - | <5 | - |
| Turbidity | NTU | 5 | 0.5 | 5 | - | 8.6 | - |
| Calcium | mg/L | - | 0.05 | 320 | - | 318 | - |
| Magnesium | mg/L | - | 0.05 | 51.6 | - | 54.3 | - |
| Sodium | mg/L | 200 | 0.05 | 7.51 | - | 8.43 | - |
| Potassium | mg/L | - | 0.05 | 1.91 | - | 1.95 | - |
| Aluminum | mg/L | 0.1 | 0.004 | <0.004 | - | 0.008 | - |
| Antimony | mg/L | 0.006 | 0.003 | <0.003 | - | <0.003 | - |
| Arsenic | mg/L | 0.025 | 0.003 | 0.013 | - | 0.013 | - |
| Barium | mg/L | 1 | 0.002 | 0.005 | - | 0.012 | - |
| Beryllium | mg/L | - | 0.001 | <0.001 | - | <0.001 | - |
| Boron | mg/L | 5 | 0.01 | 0.055 | - | 0.058 | - |
| Cadmium | mg/L | 0.005 | 0.001 | <0.001 | - | <0.001 | - |
| Chromium | mg/L | 0.05 | 0.003 | <0.003 | - | <0.003 | - |
| Cobalt | mg/L | - | 0.001 | <0.001 | - | <0.001 | - |
| Copper | mg/L | 1 | 0.003 | <0.003 | - | <0.003 | - |
| Iron | mg/L | 0.3 | 0.01 | 0.401 | - | 0.665 | - |
| Lead | mg/L | 0.01 | 0.002 | <0.002 | - | <0.002 | - |
| Manganese | mg/L | 0.05 | 0.002 | 0.026 | - | 0.030 | - |
| Mercury | mg/L | 0.001 | 0.0001 | <0.0001 | - | <0.0001 | - |
| Molybdenum | mg/L | - | 0.002 | 0.004 | - | 0.005 | - |
| Nickel | mg/L | - | 0.003 | <0.003 | - | <0.003 | - |
| Selenium | mg/L | 0.01 | 0.004 | <0.004 | - | <0.004 | - |
| Silver | mg/L | - | 0.002 | <0.002 | - | <0.002 | - |
| Strontium | mg/L | - | 0.005 | 3.52 | - | 3.86 | - |
| Thallium | mg/L | - | 0.006 | <0.006 | - | <0.006 | - |
| Tin | mg/L | - | 0.002 | <0.002 | - | <0.002 | - |
| Titanium | mg/L | - | 0.002 | 0.012 | - | 0.013 | - |
| Tungsten | mg/L | - | 0.01 | <0.010 | - | <0.010 | - |
| Uranium | mg/L | 0.02 | 0.002 | <0.002 | - | <0.002 | - |
| Vanadium | mg/L | - | 0.002 | <0.002 | - | <0.002 | - |
| Zinc | mg/L | 5 | 0.005 | 0.036 | - | 0.046 | - |
| Zirconium | mg/L | - | 0.004 | <0.004 | - | <0.004 | - |
| % Difference/ Ion Balance | % | - | NA | 3.66 | - | 4.11 | - |

**Notes:**

ODWS = Ontario Drinking Water Standards

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria

Samples 7607710-7607739 required dilution prior to analysis for Anions due

# Appendix G

## Certificates of Analysis

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

**CLIENT NAME:** **R.J. BURNSIDE & ASSOCIATES LTD**
**292 Speedvale Avenue West, Unit 7**
**Guelph, ON N1H1C4**
**(519) 823-4995**

**ATTENTION TO:** **Dwight Smikle**

**PROJECT:** **300033273**

**AGAT WORK ORDER:** **14W924797**

**WATER ANALYSIS REVIEWED BY:** **Mike Muneswar, BSc (Chem), Senior Inorganic Analyst**

**DATE REPORTED:** **Dec 08, 2014**

**PAGES (INCLUDING COVER):** **4**

**VERSION*:** **1**

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

**All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.**

# Certificate of Analysis

**AGAT WORK ORDER: 14W924797**

**PROJECT: 300033273**

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

**CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD**

**ATTENTION TO: Dwight Smikle**

**SAMPLING SITE:**

**SAMPLED BY:Sean Quinlan**

## Nitrate (Water)

**DATE RECEIVED: 2014-12-05**

**DATE REPORTED: 2014-12-08**

| | | | SAMPLE DESCRIPTION: | PW2 | OW1 |
|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water |
| | | | DATE SAMPLED: | 12/4/2014 | 12/4/2014 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **6152997** | **6153004** |
| Nitrate as N | mg/L | | 0.05 | 6.51 | 0.89 |

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

# Quality Assurance

**CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD**
**PROJECT: 300033273**
**SAMPLING SITE:**

**AGAT WORK ORDER: 14W924797**
**ATTENTION TO: Dwight Smikle**
**SAMPLED BY:Sean Quinlan**

## Water Analysis

| RPT Date: Dec 08, 2014 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| **Nitrate (Water)** | | | | | | | | | | | | | | | |
| Nitrate as N | 6150673 | | <0.5 | <0.5 | 0.0% | < 0.05 | 95% | 90% | 110% | 99% | 90% | 110% | 104% | 80% | 120% |

Certified By:

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Method Summary

**CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD**
**PROJECT: 300033273**
**SAMPLING SITE:**

**AGAT WORK ORDER: 14W924797**
**ATTENTION TO: Dwight Smikle**
**SAMPLED BY:Sean Quinlan**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| **Water Analysis** | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

AGAT Laboratories

2.0, 2.1, 2.2

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Mississauga, ON
L4Z 1Y2
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**Laboratory Use Only**

Arrival Temperature: 3.1/2.3/2.9

AGAT WO #: 14W924797

Lab Temperature:

Notes:

# Chain of Custody Record

P: 905.712.5100 · F: 905.712.5122

## Client Information

Company: BURNSIDE
Contact: DWIGHT SMIKLE
Address: 292 Speedvale Ave
Guelph, ON
Phone: 823-4995 Fax: ~~836~~-5477
Project: 300033273 PO:
AGAT Quotation #:

**Please note, if quotation number is not provided, client will be billed full price for analysis.**

## Regulatory Requirements

☐ Regulation 153/04 (reg. 511 Amend.)
Table ______ Indicate one
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture (check one)
☐ Coarse ☐ Fine

☐ Sewer Use
Region ______ Indicate one
☐ Sanitary
☐ Storm

☐ Regulation 558
☐ CCME
☐ Other (specify) ______
☐ Prov. Water Quality Objectives (PWQO)
☐ None

## Turnaround Time Required (TAT) Required*

**Regular TAT**
☐ 5 to 7 Working Days

**Rush TAT** (please provide prior notification)
**Rush Surcharges Apply**
☐ 3 Working Days
☐ 2 Working Days
☒ 1 Working Day

**OR**

Date Required (Rush surcharges may apply): Morning of Dec 8th

*TAT is exclusive of weekends and statutory holidays

## Invoice To

Same: Yes ☑ No ☐
Company:
Contact:
Address:

**Is this a drinking water sample?**
(potable water intended for human consumption)
☐ Yes ☒ No
If "Yes", please use the
***Drinking Water Chain of Custody Form***

Is this submission for a **Record of Site Condition?**
☐ Yes ☒ No

## Legend Matrix

**GW** Ground Water **O** Oil
**SW** Surface Water **P** Paint
**SD** Sediment **S** Soil

## Report Information – reports to be sent to:

1. Name: Dwight Smikle
Email: Dwight.Smikle@rjburnside.com
2. Name:
Email:

| Sample Identification | Date Sampled | Time Sampled | Sample Matrix | # of Containers | Comments Site/Sample Information | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl- ☐ CN- ☐ EC ☐ FOC ☐ Cr+6- ☐ SAR ☐ $NO_3/NO_2$ ☐ N- Total ☐ Hg ☐ pH | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | VOC: ☐ VOC ☐ THM ☐ BTEX | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW2 | 4 Dec 14 | 10:45 | GW | 1 | | | | | | | | | | | | | | | | | ✓ | | | | | | | | |
| OW1 | 4 Dec 14 | 11:15 | GW | 1 | | | | | | | | | | | | | | | | | ✓ | | | | | | | | |
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| | | | | | |
|---|---|---|---|---|---|
| Samples Relinquished By (Print Name and Sign): SEAN QUINLAN | Date/Time 4 DEC 14 | Samples Received By (Print Name and Sign): Ranji Singh | Date/Time 4 Dec 14 | Pink Copy - Client | Page 1 of 1 |
| Samples Relinquished By (Print Name and Sign): | Date/Time | Samples Received By (Print Name and Sign): N. Deruelq | Date/Time Dec 5 9:46 | Yellow Copy - AGAT<br>White Copy- AGAT | Nº: 46237 |

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 15T047356

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Dec 04, 2015

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 15T047356
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:MV

## Nitrate/Nitrite (Water)

DATE RECEIVED: 2015-11-27

DATE REPORTED: 2015-12-04

| | | | SAMPLE DESCRIPTION: | TW5 | TW6 | PW2 | TW2 |
|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 11/26/2015 | 11/26/2015 | 11/26/2015 | 11/26/2015 |
| Parameter | Unit | G / S | RDL | 7237247 | 7237256 | 7237257 | 7237258 |
| Nitrate as N | mg/L | | 0.05 | 7.09 | 7.30 | 2.12 | 0.62 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: Amanjot Bhela

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 15T047356
ATTENTION TO: Dwight Smikle
SAMPLED BY:MV

## Water Analysis

| RPT Date: Dec 04, 2015 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate/Nitrite (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 7238301 | | <0.25 | <0.25 | NA | < 0.05 | 90% | 90% | 110% | 92% | 90% | 110% | 96% | 80% | 120% |
| Nitrite as N | 7238301 | | <0.25 | <0.25 | NA | < 0.05 | NA | 90% | 110% | 106% | 90% | 110% | 91% | 80% | 120% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Amanjot Bhela

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:
AGAT WORK ORDER: 15T047356
ATTENTION TO: Dwight Smikle
SAMPLED BY:MV

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

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5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
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**Laboratory Use Only**

Work Order #: 15T047356

Cooler Quantity: large

Arrival Temperatures: 4.2 | 3.8 | 3.5
2.7 | 3 | 3.2

Custody Seal Intact: ☐Yes ☐No ☒N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

**Report Information:**

Company: RJ Burnside &
Contact: Dwight Smikle
Address: 292 Speedvale Ave. West, Unit 20
Guelph ONT N1H 1C4
Phone: 519-823-4995 Fax:
Reports to be sent to:
1. Email: Dwight.Smikle@rjburnside.com
2. Email:

**Project Information:**

Project: 300033273
Site Location: Bel Fountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

**Invoice Information:** Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

**Regulatory Requirements:** ☐ **No Regulatory Requirement**
(Please check all applicable boxes)

☐Regulation 153/04
Table ____ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ____ Indicate One

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
____ Indicate One

Is this submission for a **Record of Site Condition?**
☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis***
☒ Yes ☐ No

**Turnaround Time (TAT) Required:**

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**Sample Matrix Legend**

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | **ORPs:** ☐ B-HWS ☐ Cl ☐ CN ☐ $Cr^{6+}$ ☐ EC ☐ FOC ☒ $NO_3/NO_2$ ☐ Total N ☐ Hg ☐ pH ☐ SAR (Check Applicable) | **Nutrients:** ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☒ $NO_3/NO_2$ (Check Applicable) | **Volatiles:** ☐ VOC ☐ BTEX ☐ THM (Check Applicable) | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW5 | 11/26/15 | 11:00 | 1 | GW | | | | | | ✓ | ✓ | | | | | | | | | |
| TW6 | ↓ | 12:00 | 1 | GW | | | | | | ✓ | ✓ | | | | | | | | | |
| PW2 | | 12:45 | 1 | GW | | | | | | ✓ | ✓ | | | | | | | | | |
| TW2 | | 13:45 | 1 | GW | | | | | | ✓ | ✓ | | | | | | | | | |
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Samples Relinquished By (Print Name and Sign): Matt Valeriote / Matt V
Date:
Time:

Samples Relinquished By (Print Name and Sign):
Date: 2015-11-27
Time: 3:37

Samples Received By (Print Name and Sign):
Date: 2015-11-27
Time: 12:46

Samples Received By (Print Name and Sign):
Date:
Time:

Page 1 of 1

Nº: T 018756

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Document ID: DIV-78-1511.010

Date Issued: November 2, 2015

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CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON   N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: Belfountain

AGAT WORK ORDER: 15T990997

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Jul 08, 2015

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 15T990997

PROJECT: Belfountain

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:Sean Quinlan

## Nitrate (Water)

DATE RECEIVED: 2015-06-30

DATE REPORTED: 2015-07-08

| | | | SAMPLE DESCRIPTION: | TW2 | TW6 | OW1 | TW5 | PW2 |
|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 6/29/2015 | 6/29/2015 | 6/29/2015 | 6/29/2015 | 6/29/2015 |
| Parameter | Unit | G / S | RDL | 6701611 | 6701612 | 6701613 | 6701614 | 6701615 |
| Nitrate as N | mg/L | | 0.05 | 0.70 | 8.20 | 1.89 | 8.28 | 4.15 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

CHARTERED
DR. ANTHONY R. K. DAPAAH
CHEMIST

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: Belfountain
SAMPLING SITE:

AGAT WORK ORDER: 15T990997
ATTENTION TO: Dwight Smikle
SAMPLED BY:Sean Quinlan

## Water Analysis

| RPT Date: Jul 08, 2015 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 6698272 | | 14.4 | 14.3 | 0.7% | < 0.05 | 96% | 90% | 110% | 107% | 90% | 110% | 106% | 80% | 120% |

Certified By:

DR. ANTHONY R. K. DAPAAH
Tony Dapaah

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain

SAMPLING SITE:

AGAT WORK ORDER: 15T990997

ATTENTION TO: Dwight Smikle

SAMPLED BY:Sean Quinlan

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

# AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

## Laboratory Use Only

Work Order #: 15T990997

Cooler Quantity:

Arrival Temperatures: 8.7 | 8.9 | 8.9
8.7 | 7.9 | 7.9

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: BURNSIDE
Contact: DWIGHT SMIKLE
Address: 292 Speedvale Ave
Guelph ON
Phone: 823-4995 Fax:
Reports to be sent to:
1. Email: dwight.smikle@rjburnside.com
2. Email:

## Project Information:

Project: Belfountain
Site Location: 300033273
Sampled By: SEAN QUINLAN
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

*(Please check all applicable boxes)*

☐Regulation 153/04
Table ___ *Indicate One*
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture *(Check One)*
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ___ *Indicate One*

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
___ *Indicate One*

**Is this submission for a Record of Site Condition?**
☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis***
☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

(Check Applicable)
ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐$NO_3/NO_2$ ☐Total N ☐Hg ☐pH ☐SAR
Nutrients: ☐TP ☐$NH_3$ ☐TKN ☐$NO_3$ ☐$NO_2$ ☐$NO_3/NO_2$
Volatiles: ☐VOC ☐BTEX ☐THM

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs | Nutrients | Volatiles | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | 29 JUNE 15 | 12:00 | 1 | GW | | | | | | | | | | | | | | | | | ✓ |
| TW6 | ↓ | 9:20 | 1 | ↓ | | | | | | | | | | | | | | | | | ✓ |
| BW1 | ↓ | 10:20 | 1 | ↓ | | | | | | | | | | | | | | | | | ✓ |
| TW5 | ↓ | 10:00 | 1 | ↓ | | | | | | | | | | | | | | | | | ✓ |
| PW2 | ↓ | 11:00 | 1 | ↓ | | | | | | | | | | | | | | | | | ✓ |

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time | |
|---|---|---|---|---|---|---|
| SEAN QUINLAN | 29JUNE15 | | | Jun30/15 | 11:40 | Page 1 of 1 |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time | |
| | | | | Jun30/15 | 3:32 | Nº: T 009718 |

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 15W020701

PROJECT: Belfountain

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2015-09-18

DATE REPORTED: 2015-09-28

| | | | SAMPLE DESCRIPTION: | TW2 | TW6 | TW5 | PW2 |
|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 9/17/2015 | 9/17/2015 | 9/17/2015 | 9/17/2015 |
| Parameter | Unit | G / S | RDL | 6988471 | 6988476 | 6988482 | 6988488 |
| Electrical Conductivity | uS/cm | | 2 | 561 | 661 | 655 | 596 |
| pH | pH Units | | NA | 8.14 | 8.11 | 8.12 | 8.16 |
| Saturation pH | | | | 6.96 | 7.01 | 7.01 | 6.99 |
| Langelier Index | | | | 1.18 | 1.10 | 1.11 | 1.17 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 299 | 302 | 301 | 295 |
| Total Dissolved Solids | mg/L | | 20 | 308 | 356 | 368 | 330 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 263 | 235 | 234 | 251 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 263 | 235 | 234 | 251 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 |
| Fluoride | mg/L | | 0.25 | <0.25 | <0.25 | <0.25 | <0.25 |
| Chloride | mg/L | | 0.50 | 6.85 | 38.1 | 37.9 | 22.9 |
| Nitrate as N | mg/L | | 0.25 | 1.00 | 7.48 | 7.77 | 2.75 |
| Nitrite as N | mg/L | | 0.25 | <0.25 | <0.25 | <0.25 | <0.25 |
| Bromide | mg/L | | 0.25 | <0.25 | <0.25 | <0.25 | <0.25 |
| Sulphate | mg/L | | 0.50 | 23.5 | 23.2 | 22.8 | 22.0 |
| Ortho Phosphate as P | mg/L | | 0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | 11.5 | 7.07 | 7.42 | 8.45 |
| Ammonia as N | mg/L | | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 1.1 | 0.6 | 1.0 | 0.7 |
| Colour | TCU | | 5 | <5 | <5 | <5 | <5 |
| Turbidity | NTU | | 0.5 | 4.3 | 1.1 | 8.2 | 1.2 |
| Calcium | mg/L | | 0.05 | 79.5 | 83.1 | 83.4 | 77.6 |
| Magnesium | mg/L | | 0.05 | 24.3 | 23.0 | 22.6 | 24.7 |
| Sodium | mg/L | | 0.05 | 3.47 | 16.5 | 15.8 | 9.37 |
| Potassium | mg/L | | 0.05 | 1.12 | 0.99 | 1.13 | 0.84 |
| Aluminum | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 |

DR. ANTHONY R. K. DAPAAH

Certified By:

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 15W020701

PROJECT: Belfountain

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2015-09-18

DATE REPORTED: 2015-09-28

| | | | SAMPLE DESCRIPTION: | TW2 | TW6 | TW5 | PW2 |
|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 9/17/2015 | 9/17/2015 | 9/17/2015 | 9/17/2015 |
| Parameter | Unit | G / S | RDL | 6988471 | 6988476 | 6988482 | 6988488 |
| Barium | mg/L | | 0.002 | 0.088 | 0.107 | 0.110 | 0.050 |
| Beryllium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 |
| Selenium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.128 | 0.193 | 0.184 | 0.126 |
| Thallium | mg/L | | 0.006 | <0.006 | <0.006 | <0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.010 | 0.018 | 0.018 | 0.021 |
| Zirconium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 1.09 | 0.0657 | 0.298 | 0.104 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

DR. ANTHONY R. K. DAPAAH

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 15W020701
PROJECT: Belfountain
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

| RPT Date: Sep 28, 2015 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | | | | | |
| Electrical Conductivity | 6988394 | | 576 | 577 | 0.2% | < 2 | 100% | 80% | 120% | NA | | | NA | | |
| pH | 6988394 | | 8.14 | 8.07 | 0.9% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 6993029 | | 198 | 196 | 1.0% | < 20 | 100% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 6988394 | | 201 | 201 | 0.0% | < 5 | 96% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 6988394 | | 201 | 201 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 6988394 | | <5 | <5 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 6988394 | | <5 | <5 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 6988476 | 6988476 | <0.25 | <0.25 | 0.0% | < 0.05 | 105% | 90% | 110% | 107% | 90% | 110% | 101% | 80% | 120% |
| Chloride | 6988476 | 6988476 | 38.1 | 39.3 | 3.1% | < 0.10 | 96% | 90% | 110% | 103% | 90% | 110% | 104% | 80% | 120% |
| Nitrate as N | 6988476 | 6988476 | 7.48 | 7.63 | 2.0% | < 0.05 | 93% | 90% | 110% | 104% | 90% | 110% | 105% | 80% | 120% |
| Nitrite as N | 6988476 | 6988476 | <0.25 | <0.25 | 0.0% | < 0.05 | NA | 90% | 110% | 100% | 90% | 110% | 98% | 80% | 120% |
| Bromide | 6988476 | 6988476 | <0.25 | <0.25 | 0.0% | < 0.05 | 109% | 90% | 110% | 101% | 90% | 110% | 98% | 80% | 120% |
| Sulphate | 6988476 | 6988476 | 23.2 | 23.7 | 2.1% | < 0.10 | 108% | 90% | 110% | 104% | 90% | 110% | 103% | 80% | 120% |
| Ortho Phosphate as P | 6988476 | 6988476 | <0.50 | <0.50 | 0.0% | < 0.10 | 102% | 90% | 110% | 96% | 90% | 110% | 99% | 80% | 120% |
| Reactive Silica | 6970809 | | 10.6 | 10.6 | 0.0% | < 0.05 | 98% | 90% | 110% | 101% | 90% | 110% | 89% | 80% | 120% |
| Ammonia as N | 6984408 | | <0.02 | <0.02 | 0.0% | < 0.02 | 102% | 90% | 110% | 103% | 90% | 110% | 99% | 80% | 120% |
| Total Phosphorus | 6985416 | | 0.98 | 1.00 | 2.0% | < 0.05 | 96% | 80% | 120% | 93% | 90% | 110% | 97% | 70% | 130% |
| Total Organic Carbon | 6985404 | | 15.5 | 16.0 | 3.2% | < 0.5 | 93% | 90% | 110% | 108% | 90% | 110% | 83% | 80% | 120% |
| Colour | 6984708 | | 126 | 126 | 0.0% | < 5 | 103% | 90% | 110% | NA | | | NA | | |
| Turbidity | 6988488 | 6988488 | 1.2 | 1.3 | 8.0% | < 0.5 | 94% | 90% | 110% | NA | | | NA | | |
| Calcium | 6985382 | | 57.8 | 58.8 | 1.7% | < 0.05 | 105% | 90% | 110% | 101% | 90% | 110% | 103% | 70% | 130% |
| Magnesium | 6985382 | | 31.4 | 31.8 | 1.3% | < 0.05 | 102% | 90% | 110% | 98% | 90% | 110% | 100% | 70% | 130% |
| Sodium | 6985382 | | 14.8 | 14.7 | 0.7% | < 0.05 | 104% | 90% | 110% | 101% | 90% | 110% | 104% | 70% | 130% |
| Potassium | 6985382 | | 5.51 | 5.60 | 1.6% | < 0.05 | 104% | 90% | 110% | 101% | 90% | 110% | 107% | 70% | 130% |
| Aluminum | 6987565 | | 0.006 | 0.006 | 0.0% | < 0.004 | 103% | 90% | 110% | 109% | 90% | 110% | 103% | 70% | 130% |
| Antimony | 6987565 | | <0.003 | <0.003 | 0.0% | < 0.003 | 108% | 90% | 110% | 105% | 90% | 110% | 106% | 70% | 130% |
| Arsenic | 6987565 | | <0.003 | <0.003 | 0.0% | < 0.003 | 107% | 90% | 110% | 110% | 90% | 110% | 113% | 70% | 130% |
| Barium | 6987565 | | 0.120 | 0.121 | 0.8% | < 0.002 | 106% | 90% | 110% | 107% | 90% | 110% | 104% | 70% | 130% |
| Beryllium | 6987565 | | <0.001 | <0.001 | 0.0% | < 0.001 | 103% | 90% | 110% | 108% | 90% | 110% | 106% | 70% | 130% |
| Boron | 6987565 | | 0.146 | 0.143 | 2.1% | < 0.010 | 104% | 90% | 110% | 108% | 90% | 110% | 100% | 70% | 130% |
| Cadmium | 6987565 | | <0.001 | <0.001 | 0.0% | < 0.001 | 101% | 90% | 110% | 104% | 90% | 110% | 102% | 70% | 130% |
| Chromium | 6987565 | | <0.003 | <0.003 | 0.0% | < 0.003 | 103% | 90% | 110% | 109% | 90% | 110% | 100% | 70% | 130% |
| Cobalt | 6987565 | | <0.001 | <0.001 | 0.0% | < 0.001 | 103% | 90% | 110% | 107% | 90% | 110% | 102% | 70% | 130% |
| Copper | 6987565 | | <0.003 | <0.003 | 0.0% | < 0.003 | 102% | 90% | 110% | 108% | 90% | 110% | 93% | 70% | 130% |
| Iron | 6987565 | | <0.010 | <0.010 | 0.0% | < 0.010 | 102% | 90% | 110% | 100% | 90% | 110% | 96% | 70% | 130% |
| Lead | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 104% | 90% | 110% | 105% | 90% | 110% | 105% | 70% | 130% |
| Manganese | 6987565 | | 0.003 | 0.003 | 0.0% | < 0.002 | 100% | 90% | 110% | 107% | 90% | 110% | 87% | 70% | 130% |
| Mercury | 6985826 | | <0.0001 | <0.0001 | 0.0% | < 0.0001 | 101% | 90% | 110% | 98% | 90% | 110% | 96% | 80% | 120% |
| Molybdenum | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 96% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: Belfountain
SAMPLING SITE:

AGAT WORK ORDER: 15W020701
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Sep 28, 2015 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits Lower | Acceptable Limits Upper | Recovery | Acceptable Limits Lower | Acceptable Limits Upper | Recovery | Acceptable Limits Lower | Acceptable Limits Upper |
| Nickel | 6987565 | | 0.006 | 0.006 | 0.0% | < 0.003 | 103% | 90% | 110% | 107% | 90% | 110% | 98% | 70% | 130% |
| Selenium | 6987565 | | <0.004 | <0.004 | 0.0% | < 0.004 | 98% | 90% | 110% | 102% | 90% | 110% | 114% | 70% | 130% |
| Silver | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 100% | 90% | 110% | 114% | 90% | 110% | 86% | 70% | 130% |
| Strontium | 6987565 | | 0.179 | 0.178 | 0.6% | < 0.005 | 103% | 90% | 110% | 105% | 90% | 110% | 106% | 70% | 130% |
| Thallium | 6987565 | | <0.006 | <0.006 | 0.0% | < 0.006 | 101% | 90% | 110% | 102% | 90% | 110% | 103% | 70% | 130% |
| Tin | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 103% | 90% | 110% | 105% | 90% | 110% | 102% | 70% | 130% |
| Titanium | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 104% | 90% | 110% | 103% | 90% | 110% | 99% | 70% | 130% |
| Tungsten | 6987565 | | <0.010 | <0.010 | 0.0% | < 0.010 | 107% | 90% | 110% | 101% | 90% | 110% | 105% | 70% | 130% |
| Uranium | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 96% | 90% | 110% | 95% | 90% | 110% | 100% | 70% | 130% |
| Vanadium | 6987565 | | <0.002 | <0.002 | 0.0% | < 0.002 | 102% | 90% | 110% | 108% | 90% | 110% | 104% | 70% | 130% |
| Zinc | 6987565 | | <0.005 | <0.005 | 0.0% | < 0.005 | 101% | 90% | 110% | 107% | 90% | 110% | 105% | 70% | 130% |
| Zirconium | 6987565 | | <0.004 | <0.004 | 0.0% | < 0.004 | 93% | 90% | 110% | 99% | 90% | 110% | 96% | 70% | 130% |

Comments: NA signifies Not Applicable
QA Qualifier for Silver: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

Certified By:

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
DR. ANTHONY R. K. DAPAAH
CHEMIST

Tony Dapaah

# QA Violation

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 15W020701
PROJECT: Belfountain
ATTENTION TO: Dwight Smikle

| RPT Date: Sep 28, 2015 | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Sample Id | Sample Description | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | |
| Silver | | TW2 | 100% | 90% | 110% | 114% | 90% | 110% | 86% | 70% | 130% |

Comments: NA signifies Not Applicable
QA Qualifier for Silver: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 15W020701
PROJECT: Belfountain
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 15W020701
PROJECT: Belfountain
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 15W020701
Cooler Quantity:
Arrival Temperatures: 9.7 | 8.1 | 7.6
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: On ice

## Report Information:

Company: Burnside
Contact: Dwight Smikle
Address: 292 Speedvale Ave
Guelph ON
Phone: 823 4995 Fax:
Reports to be sent to:
1. Email: Dwight.Smikle@rjburnside.com
2. Email: Sean.Quinlan@rjburnside.com

## Regulatory Requirements: ☑ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ Indicate One
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ Indicate One

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ Indicate One

## Turnaround Time (TAT) Required:

**Regular TAT** ☑ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: Belfountain
Site Location: 300033273
Sampled By: S. Quinlan
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on Certificate of Analysis** ☐ Yes ☒ No

## Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

**Sample Matrix Legend**

| | |
|---|---|
| B | Biota |
| GW | Ground Water |
| O | Oil |
| P | Paint |
| S | Soil |
| SD | Sediment |
| SW | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ $NO_3/NO_2$ ☐ Total N ☐ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | TDS | Various Inorganics | Metals | Mercury | TOC | Ammonia, Total Phosphorus |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | 17 Sept 15 | 12:00 | 6 | GW | | | | | | | | | | | | | | | | | X | X | X | X | X | X |
| TW6 | | 10:45 | 6 | GW | | | | | | | | | | | | | | | | | X | X | X | X | X | X |
| TW5 | | 10:00 | 6 | GW | | | | | | | | | | | | | | | | | X | X | X | X | X | X |
| PW2 | | 11:30 | 6 | GW | | | | | | | | | | | | | | | | | X | X | X | X | X | X |
| | | | ~~6~~ | ~~GW~~ | | | | | | | | | | | | | | | | | | | | | | |

WQA

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| SEAN Quinlan | 18 Sept 15 | 14:00 | M. Kelly Maggie Kelly | 2015/9/18 | 3:13pm |
| | | | | Sep, 19 | 10:00 |

Page 1 of 1

Nº: T013128

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 15W960815

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Apr 15, 2015

PAGES (INCLUDING COVER): 8

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES*

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 15W960815
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2015-04-08
DATE REPORTED: 2015-04-15

|  |  |  | SAMPLE DESCRIPTION: | TW2 | TW5 | TW6 | PW2 | OW1 |
|---|---|---|---|---|---|---|---|---|
|  |  |  | SAMPLE TYPE: | Water | Water | Water | Water | Water |
|  |  |  | DATE SAMPLED: | 4/7/2015 | 4/7/2015 | 4/7/2015 | 4/7/2015 | 4/7/2015 |
| Parameter | Unit | G / S | RDL | 6430142 | 6430199 | 6430206 | 6430214 | 6430223 |
| Electrical Conductivity | uS/cm |  | 2 | 478 | 592 | 602 | 595 | 601 |
| pH | pH Units |  | NA | 7.89 | 7.90 | 8.14 | 7.92 | 8.10 |
| Saturation pH |  |  |  | 7.15 | 7.02 | 7.02 | 7.00 | 6.98 |
| Langelier Index |  |  |  | 0.74 | 0.88 | 1.12 | 0.92 | 1.12 |
| Total Hardness (as CaCO3) | mg/L |  | 0.5 | 224 | 285 | 283 | 281 | 265 |
| Total Dissolved Solids | mg/L |  | 20 | 262 | 302 | 314 | 304 | 294 |
| Alkalinity (as CaCO3) | mg/L |  | 5 | 212 | 244 | 245 | 259 | 265 |
| Bicarbonate (as CaCO3) | mg/L |  | 5 | 212 | 244 | 245 | 259 | 265 |
| Carbonate (as CaCO3) | mg/L |  | 5 | <5 | <5 | <5 | <5 | <5 |
| Hydroxide (as CaCO3) | mg/L |  | 5 | <5 | <5 | <5 | <5 | <5 |
| Fluoride | mg/L |  | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Chloride | mg/L |  | 0.10 | 18.8 | 19.8 | 24.3 | 22.3 | 3.48 |
| Nitrate as N | mg/L |  | 0.05 | 0.84 | 6.31 | 7.80 | 3.44 | 0.85 |
| Nitrite as N | mg/L |  | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Bromide | mg/L |  | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Sulphate | mg/L |  | 0.10 | 9.96 | 14.5 | 15.3 | 18.2 | 14.0 |
| Ortho Phosphate as P | mg/L |  | 0.10 | 0.35 | <0.10 | <0.10 | <0.10 | <0.10 |
| Reactive Silica | mg/L |  | 0.05 | 5.78 | 6.79 | 6.87 | 7.52 | 5.38 |
| Ammonia as N | mg/L |  | 0.02 | <0.02 | <0.02 | <0.02 | 0.30 | 0.08 |
| Total Phosphorus | mg/L |  | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.17 |
| Total Organic Carbon | mg/L |  | 0.5 | 1.7 | 0.6 | 0.6 | 0.5 | 2.0 |
| Colour | TCU |  | 5 | <5 | <5 | <5 | <5 | <5 |
| Turbidity | NTU |  | 0.5 | 2.7 | 1.5 | 6.8 | 4.6 | 269 |
| Calcium | mg/L |  | 0.05 | 60.9 | 80.2 | 79.7 | 73.6 | 71.9 |
| Magnesium | mg/L |  | 0.05 | 17.5 | 20.5 | 20.3 | 23.5 | 20.7 |
| Sodium | mg/L |  | 0.05 | 6.79 | 7.24 | 8.54 | 8.20 | 7.68 |
| Potassium | mg/L |  | 0.05 | 1.53 | 1.02 | 0.98 | 0.90 | 2.16 |
| Aluminum | mg/L |  | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| Antimony | mg/L |  | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Arsenic | mg/L |  | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 15W960815
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2015-04-08

DATE REPORTED: 2015-04-15

| | | | SAMPLE DESCRIPTION: | TW2 | TW5 | TW6 | PW2 | OW1 |
|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 4/7/2015 | 4/7/2015 | 4/7/2015 | 4/7/2015 | 4/7/2015 |
| Parameter | Unit | G / S | RDL | 6430142 | 6430199 | 6430206 | 6430214 | 6430223 |
| Barium | mg/L | | 0.002 | 0.042 | 0.110 | 0.088 | 0.056 | 0.048 |
| Beryllium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.010 | 0.011 | <0.010 | <0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | 0.005 | 0.004 | 0.008 | 0.005 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.087 | 0.154 | 0.139 | 0.126 | 0.102 |
| Thallium | mg/L | | 0.006 | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | <0.002 | 0.003 | <0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.012 | 0.019 | 0.014 | 0.022 | 0.017 |
| Zirconium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| % Difference/ Ion Balance | | | 0.1 | 2.3 | 1.3 | 3.3 | 3.4 | 0.6 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 15W960815
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: Apr 15, 2015 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment - Groundwater Samples | | | | | | | | | | | | | | | |
| Electrical Conductivity | 6428305 | | 6200 | 6200 | 0.0% | < 2 | 95% | 80% | 120% | NA | | | NA | | |
| pH | 6428305 | | 7.71 | 7.43 | 3.7% | NA | 100% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 6430142 | 6430142 | 262 | 262 | 0.0% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 6428305 | | 518 | 524 | 1.2% | < 5 | 99% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 6428305 | | 518 | 524 | 1.2% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 6428305 | | <5 | <5 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 6428305 | | <5 | <5 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 6430050 | | <0.25 | <0.25 | 0.0% | < 0.05 | 108% | 90% | 110% | 104% | 90% | 110% | 99% | 80% | 120% |
| Chloride | 6430050 | | 172 | 167 | 2.9% | < 0.10 | 101% | 90% | 110% | 105% | 90% | 110% | 102% | 80% | 120% |
| Nitrate as N | 6430050 | | <0.25 | <0.25 | 0.0% | < 0.05 | 92% | 90% | 110% | 102% | 90% | 110% | 105% | 80% | 120% |
| Nitrite as N | 6430050 | | <0.25 | <0.25 | 0.0% | < 0.05 | NA | 90% | 110% | 98% | 90% | 110% | 92% | 80% | 120% |
| Bromide | 6430050 | | <0.25 | <0.25 | 0.0% | < 0.05 | 110% | 90% | 110% | 100% | 90% | 110% | 100% | 80% | 120% |
| Sulphate | 6430050 | | 133 | 129 | 3.1% | < 0.10 | 99% | 90% | 110% | 101% | 90% | 110% | 102% | 80% | 120% |
| Ortho Phosphate as P | 6430050 | | <0.50 | <0.50 | 0.0% | < 0.10 | 104% | 90% | 110% | 95% | 90% | 110% | 102% | 80% | 120% |
| Reactive Silica | 6432724 | | 12.2 | 12.2 | 0.0% | < 0.05 | 96% | 90% | 110% | 97% | 90% | 110% | 96% | 80% | 120% |
| Ammonia as N | 6429741 | | 0.25 | 0.23 | 8.3% | < 0.02 | 107% | 90% | 110% | 99% | 90% | 110% | 104% | 80% | 120% |
| Total Phosphorus | 6430142 | 6430142 | < 0.05 | <0.05 | 0.0% | < 0.05 | 100% | 80% | 120% | 95% | 90% | 110% | 102% | 70% | 130% |
| Total Organic Carbon | 6430142 | 6430142 | 1.7 | 1.8 | 5.7% | < 0.5 | 95% | 90% | 110% | 102% | 90% | 110% | 94% | 80% | 120% |
| Colour | 6430142 | 6430142 | < 5 | <5 | 0.0% | < 5 | 103% | 90% | 110% | NA | | | NA | | |
| Turbidity | 6430199 | 6430199 | 1.5 | 1.4 | 6.9% | < 0.5 | 106% | 90% | 110% | NA | | | NA | | |
| Calcium | 6430214 | 6430214 | 73.6 | 73.5 | 0.1% | < 0.05 | 100% | 90% | 110% | 98% | 90% | 110% | 93% | 70% | 130% |
| Magnesium | 6430214 | 6430214 | 23.5 | 23.6 | 0.4% | < 0.05 | 97% | 90% | 110% | 94% | 90% | 110% | 93% | 70% | 130% |
| Sodium | 6430214 | 6430214 | 8.20 | 8.23 | 0.4% | < 0.05 | 99% | 90% | 110% | 97% | 90% | 110% | 94% | 70% | 130% |
| Potassium | 6430214 | 6430214 | 0.90 | 0.90 | 0.0% | < 0.05 | 101% | 90% | 110% | 99% | 90% | 110% | 99% | 70% | 130% |
| Aluminum | 6430223 | 6430223 | < 0.004 | < 0.004 | 0.0% | < 0.004 | 105% | 90% | 110% | 107% | 90% | 110% | 107% | 70% | 130% |
| Antimony | 6430223 | 6430223 | < 0.003 | < 0.003 | 0.0% | < 0.003 | 96% | 90% | 110% | 100% | 90% | 110% | 96% | 70% | 130% |
| Arsenic | 6430223 | 6430223 | < 0.003 | < 0.003 | 0.0% | < 0.003 | 101% | 90% | 110% | 100% | 90% | 110% | 98% | 70% | 130% |
| Barium | 6430223 | 6430223 | 0.048 | 0.048 | 0.0% | < 0.002 | 98% | 90% | 110% | 102% | 90% | 110% | 104% | 70% | 130% |
| Beryllium | 6430223 | 6430223 | < 0.001 | < 0.001 | 0.0% | < 0.001 | 97% | 90% | 110% | 97% | 90% | 110% | 116% | 70% | 130% |
| Boron | 6430223 | 6430223 | < 0.010 | 0.010 | 10.5% | < 0.010 | 97% | 90% | 110% | 110% | 90% | 110% | 109% | 70% | 130% |
| Cadmium | 6430223 | 6430223 | < 0.001 | < 0.001 | 0.0% | < 0.001 | 101% | 90% | 110% | 104% | 90% | 110% | 104% | 70% | 130% |
| Chromium | 6430223 | 6430223 | < 0.003 | <0.003 | 0.0% | < 0.003 | 101% | 90% | 110% | 107% | 90% | 110% | 101% | 70% | 130% |
| Cobalt | 6430223 | 6430223 | < 0.001 | < 0.001 | 0.0% | < 0.001 | 98% | 90% | 110% | 100% | 90% | 110% | 101% | 70% | 130% |
| Copper | 6430223 | 6430223 | < 0.003 | < 0.003 | 0.0% | < 0.003 | 99% | 90% | 110% | 98% | 90% | 110% | 98% | 70% | 130% |
| Iron | 6430223 | 6430223 | < 0.010 | <0.010 | 0.0% | < 0.010 | 93% | 90% | 110% | 110% | 90% | 110% | 92% | 70% | 130% |
| Lead | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 103% | 90% | 110% | 107% | 90% | 110% | 104% | 70% | 130% |
| Manganese | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 105% | 90% | 110% | 109% | 90% | 110% | 99% | 70% | 130% |
| Mercury | 6430142 | 6430142 | < 0.0001 | < 0.0001 | 0.0% | < 0.0001 | 100% | 90% | 110% | 103% | 90% | 110% | 107% | 80% | 120% |
| Molybdenum | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 97% | 90% | 110% | 100% | 90% | 110% | 100% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 15W960815
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Apr 15, 2015 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nickel | 6430223 | 6430223 | < 0.003 | < 0.003 | 0.0% | < 0.003 | 103% | 90% | 110% | 101% | 90% | 110% | 100% | 70% | 130% |
| Selenium | 6430223 | 6430223 | < 0.004 | < 0.004 | 0.0% | < 0.004 | 100% | 90% | 110% | 104% | 90% | 110% | 96% | 70% | 130% |
| Silver | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 101% | 90% | 110% | 110% | 90% | 110% | 101% | 70% | 130% |
| Strontium | 6430223 | 6430223 | 0.102 | 0.097 | 5.0% | < 0.005 | 101% | 90% | 110% | 107% | 90% | 110% | 103% | 70% | 130% |
| Thallium | 6430223 | 6430223 | < 0.006 | < 0.006 | 0.0% | < 0.006 | 100% | 90% | 110% | 105% | 90% | 110% | 101% | 70% | 130% |
| Tin | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 93% | 90% | 110% | 102% | 90% | 110% | 97% | 70% | 130% |
| Titanium | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 98% | 90% | 110% | 103% | 90% | 110% | 99% | 70% | 130% |
| Tungsten | 6430223 | 6430223 | < 0.010 | < 0.010 | 0.0% | < 0.010 | 97% | 90% | 110% | 105% | 90% | 110% | 101% | 70% | 130% |
| Uranium | 6430223 | 6430223 | < 0.002 | < 0.002 | 0.0% | < 0.002 | 97% | 90% | 110% | 108% | 90% | 110% | 102% | 70% | 130% |
| Vanadium | 6430223 | 6430223 | 0.003 | 0.003 | 0.0% | < 0.002 | 101% | 90% | 110% | 105% | 90% | 110% | 99% | 70% | 130% |
| Zinc | 6430223 | 6430223 | 0.017 | 0.016 | 6.1% | < 0.005 | 102% | 90% | 110% | 107% | 90% | 110% | 101% | 70% | 130% |
| Zirconium | 6430223 | 6430223 | < 0.004 | < 0.004 | 0.0% | < 0.004 | 100% | 90% | 110% | 102% | 90% | 110% | 100% | 70% | 130% |

Comments: NA signifies Not Applicable

Certified By: ______________________

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 15W960815
ATTENTION TO: Dwight Smikle
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6002 | AQ2 EPA-103A & SM 4500 NH3-F | AQ-2 DISCRETE ANALYZER |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 15W960815
ATTENTION TO: Dwight Smikle
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance | | SM 1030 E | CALCULATION |

**AGAT** Laboratories

2.0/2.1/2.0

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2
www.agatlabs.com · webearth.agatlabs.com
P: 905.712.5100 · F: 905.712.5122

# Chain of Custody Record

**Laboratory Use Only**
Arrival Temperature: 
AGAT WO #: 15W960815
Lab Temperature: 2.6/1.8/2.2
Notes: on ice

## Client Information

Company: BURNSIDE
Contact: Dwight Smikle
Address: 292 Speedvale Ave
Guelph, ON
Phone: 823-4995 Fax: 
Project: 300033273 PO: 
AGAT Quotation #:

**Please note, if quotation number is not provided, client will be billed full price for analysis.**

## Regulatory Requirements

☐ Regulation 153/04 (reg. 511 Amend.)
Table ______ *Indicate one*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
**Soil Texture** *(check one)*
☐ Coarse ☐ Fine

☐ Sewer Use
Region ______ *Indicate one*
☐ Sanitary
☐ Storm

☐ Regulation 558
☐ CCME
☐ Other *(specify)*
☐ Prov. Water Quality Objectives (PWQO)
☒ None

## Turnaround Time Required (TAT) Required*

**Regular TAT**
☒ 5 to 7 Working Days
**Rush TAT** (please provide prior notification)
**Rush Surcharges Apply**
☐ 3 Working Days
☐ 2 Working Days
☐ 1 Working Day
**OR**
Date Required (Rush surcharges may apply):

**TAT is exclusive of weekends and statutory holidays*

## Invoice To

Same: Yes ☒ No ☐
Company: 
Contact: 
Address:

**Is this a drinking water sample?**
(potable water intended for human consumption)
☐ Yes ☒ No
If "Yes", please use the *Drinking* **Water Chain** *of* **Custody Form**

Is this submission for a **Record of Site Condition?**
☐ Yes ☒ No

## Legend Matrix

**GW** Ground Water **O** Oil
**SW** Surface Water **P** Paint
**SD** Sediment **S** Soil

## Report Information – reports to be sent to:

1. Name: Dwight Smikle
Email: Dwight.Smikle@rjburnside.com
2. Name: 
Email:

| Sample Identification | Date Sampled | Time Sampled | Sample Matrix | # of Containers | Comments Site/Sample Information | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl- ☐ CN- ☐ EC ☐ FOC ☐ Cr+6- ☐ SAR ☐ $NO_3/NO_2$ ☐ N- Total ☐ Hg ☐ pH | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | VOC: ☐ VOC ☐ THM ☐ BTEX | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | WQA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | 7 April 15 | 11:00 | GW | 6 | Metals + Mercury |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| TW5 | ↓ | 9:30 | ↓ | ↓ | field filtered |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| TW6 | ↓ | 9:00 | ↓ | ↓ | " " |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| PW2 | ↓ | 10:15 | ↓ | ↓ | " " |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| OW1 | ↓ | 14:00 | ↓ | ↓ | " " |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |

Samples Relinquished By (Print Name and Sign): Sean Quinlan Sean Quinlan
Date/Time: 8 April 15
Samples Received By (Print Name and Sign): M. Kelly Messerschmidt
Date/Time: 04-08-15 8:23
Samples Relinquished By (Print Name and Sign): 
Date/Time: 
Samples Received By (Print Name and Sign): Sharmin Apr 9/15
Date/Time: 930am

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

Nº: 53688

Document ID: DIV-78-1511.008

Date Issued: May 31, 2013

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 3000 33273

AGAT WORK ORDER: 16T069988

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 22, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 1:Partial Report Issued Feb 22nd 2016.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

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CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-02-19

DATE REPORTED: 2016-02-22

| | | | SAMPLE DESCRIPTION: | TW7 (12:50) |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395664 |
| Nitrate as N | mg/L | | 0.25 | 8.00 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7395664 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

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# Certificate of Analysis

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-19
DATE REPORTED: 2016-02-22

| | | | SAMPLE DESCRIPTION: | TW7 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395659 |
| Electrical Conductivity | uS/cm | | 2 | 587 |
| pH | pH Units | | NA | 7.88 |
| Saturation pH | | | | 6.99 |
| Langelier Index | | | | 0.89 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 280 |
| Total Dissolved Solids | mg/L | | 20 | 354 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 262 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 262 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.25 | <0.25 |
| Chloride | mg/L | | 0.50 | 18.3 |
| Nitrate as N | mg/L | | 0.25 | 8.52 |
| Nitrite as N | mg/L | | 0.25 | <0.25 |
| Bromide | mg/L | | 0.25 | <0.25 |
| Sulphate | mg/L | | 0.50 | 20.6 |
| Ortho Phosphate as P | mg/L | | 0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | |
| Ammonia as N | mg/L | | 0.02 | |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.6 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 3.9 |
| Calcium | mg/L | | 0.05 | 77.2 |
| Magnesium | mg/L | | 0.05 | 21.2 |
| Sodium | mg/L | | 0.05 | 5.60 |
| Potassium | mg/L | | 0.05 | 1.00 |
| Aluminum | mg/L | | 0.004 | < 0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

Certified By: Amanjot Bhela

# Certificate of Analysis

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

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CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-19

DATE REPORTED: 2016-02-22

| | | | SAMPLE DESCRIPTION: | TW7 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395659 |
| Barium | mg/L | | 0.002 | 0.093 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.106 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.017 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 7.32 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7395659 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

AGAT Laboratories

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# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 3000 33273
SAMPLING SITE:

AGAT WORK ORDER: 16T069988
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis

| RPT Date: Feb 22, 2016 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment (mg/L) | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7397209 | | 1320 | 1320 | 0.0% | < 2 | 98% | 80% | 120% | NA | | | NA | | |
| pH | 7397209 | | 8.11 | 8.02 | 1.1% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7393504 | | 552 | 562 | 1.8% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7397209 | | 336 | 337 | 0.3% | < 5 | 102% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7397209 | | 336 | 337 | 0.3% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7397209 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7397209 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | 99% | 90% | 110% | 93% | 90% | 110% | 89% | 80% | 120% |
| Chloride | 7395664 | 7395664 | 16.8 | 16.8 | 0.0% | < 0.10 | 105% | 90% | 110% | 98% | 90% | 110% | 96% | 80% | 120% |
| Nitrate as N | 7395664 | 7395664 | 8.00 | 7.88 | 1.5% | < 0.05 | 98% | 90% | 110% | 101% | 90% | 110% | 113% | 80% | 120% |
| Nitrite as N | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | NA | 90% | 110% | 98% | 90% | 110% | 113% | 80% | 120% |
| Bromide | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | 108% | 90% | 110% | 104% | 90% | 110% | 112% | 80% | 120% |
| Sulphate | 7395664 | 7395664 | 18.9 | 18.4 | 2.7% | < 0.10 | 104% | 90% | 110% | 95% | 90% | 110% | 102% | 80% | 120% |
| Ortho Phosphate as P | 7395664 | 7395664 | <0.50 | <0.50 | NA | < 0.10 | 95% | 90% | 110% | 90% | 90% | 110% | 92% | 80% | 120% |
| Total Phosphorus | 7396488 | | <0.05 | <0.05 | NA | < 0.05 | 102% | 80% | 120% | 95% | 90% | 110% | 102% | 70% | 130% |
| Total Organic Carbon | 7396282 | | <0.5 | <0.5 | NA | < 0.5 | 96% | 90% | 110% | 103% | 90% | 110% | 99% | 80% | 120% |
| Colour | 7396488 | | <5 | <5 | NA | < 5 | 102% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7396488 | | <0.5 | <0.5 | NA | < 0.5 | 100% | 90% | 110% | NA | | | NA | | |
| Calcium | 7395659 | 7395659 | 77.2 | 76.9 | 0.4% | < 0.05 | 105% | 90% | 110% | 104% | 90% | 110% | 89% | 70% | 130% |
| Magnesium | 7395659 | 7395659 | 21.2 | 21.6 | 1.9% | < 0.05 | 98% | 90% | 110% | 98% | 90% | 110% | 86% | 70% | 130% |
| Sodium | 7395659 | 7395659 | 5.60 | 5.64 | 0.7% | < 0.05 | 101% | 90% | 110% | 102% | 90% | 110% | 95% | 70% | 130% |
| Potassium | 7395659 | 7395659 | 1.00 | 1.02 | 2.0% | < 0.05 | 101% | 90% | 110% | 102% | 90% | 110% | 106% | 70% | 130% |
| Antimony | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 94% | 90% | 110% | 92% | 90% | 110% | 97% | 70% | 130% |
| Arsenic | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 98% | 90% | 110% | 96% | 90% | 110% | 114% | 70% | 130% |
| Barium | 7394156 | | 0.453 | 0.447 | 1.3% | < 0.002 | 96% | 90% | 110% | 97% | 90% | 110% | 92% | 70% | 130% |
| Beryllium | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 91% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Boron | 7394156 | | 0.040 | 0.039 | NA | < 0.010 | 100% | 90% | 110% | 101% | 90% | 110% | 106% | 70% | 130% |
| Cadmium | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 94% | 90% | 110% | 94% | 90% | 110% | 99% | 70% | 130% |
| Chromium | 7394156 | | 0.009 | 0.009 | NA | < 0.003 | 100% | 90% | 110% | 101% | 90% | 110% | 104% | 70% | 130% |
| Cobalt | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 101% | 90% | 110% | 102% | 90% | 110% | 105% | 70% | 130% |
| Copper | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 99% | 90% | 110% | 101% | 90% | 110% | 102% | 70% | 130% |
| Iron | 7394156 | | 7.79 | 7.51 | 3.7% | < 0.010 | 102% | 90% | 110% | 101% | 90% | 110% | 110% | 70% | 130% |
| Lead | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 92% | 90% | 110% | 91% | 90% | 110% | 91% | 70% | 130% |
| Manganese | 7394156 | | 1.35 | 1.35 | 0.0% | < 0.002 | 97% | 90% | 110% | 97% | 90% | 110% | 80% | 70% | 130% |
| Mercury | 7395659 | 7395659 | <0.0001 | <0.0001 | NA | < 0.0001 | 99% | 90% | 110% | 98% | 90% | 110% | 99% | 80% | 120% |
| Molybdenum | 7394156 | | 0.002 | 0.002 | NA | < 0.002 | 94% | 90% | 110% | 95% | 90% | 110% | 101% | 70% | 130% |
| Nickel | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 106% | 90% | 110% | 106% | 90% | 110% | 108% | 70% | 130% |
| Selenium | 7394156 | | < 0.004 | < 0.004 | NA | < 0.004 | 102% | 90% | 110% | 99% | 90% | 110% | 119% | 70% | 130% |
| Silver | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 95% | 90% | 110% | 105% | 90% | 110% | 102% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 3000 33273

SAMPLING SITE:

AGAT WORK ORDER: 16T069988

ATTENTION TO: Jim Baxter

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Feb 22, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Strontium | 7394156 | | 0.496 | 0.488 | 1.6% | < 0.005 | 94% | 90% | 110% | 96% | 90% | 110% | 95% | 70% | 130% |
| Thallium | 7394156 | | < 0.006 | < 0.006 | NA | < 0.006 | 100% | 90% | 110% | 100% | 90% | 110% | 101% | 70% | 130% |
| Tin | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 97% | 90% | 110% | 92% | 90% | 110% | 98% | 70% | 130% |
| Titanium | 7394156 | | 0.002 | 0.003 | NA | < 0.002 | 97% | 90% | 110% | 96% | 90% | 110% | 104% | 70% | 130% |
| Tungsten | 7394156 | | < 0.010 | < 0.010 | NA | < 0.010 | 96% | 90% | 110% | 90% | 90% | 110% | 101% | 70% | 130% |
| Uranium | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 97% | 90% | 110% | 91% | 90% | 110% | 97% | 70% | 130% |
| Vanadium | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 91% | 90% | 110% | 95% | 90% | 110% | 101% | 70% | 130% |
| Zinc | 7394156 | | < 0.005 | < 0.005 | NA | < 0.005 | 97% | 90% | 110% | 98% | 90% | 110% | 101% | 70% | 130% |
| Zirconium | 7394156 | | < 0.004 | < 0.004 | NA | < 0.004 | 101% | 90% | 110% | 97% | 90% | 110% | 108% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Amanjot Bhela

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

# AGAT Laboratories

✗ TURBIDITY

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

**Laboratory Use Only**

Work Order #: 16T 069 988

Cooler Quantity: 1 SMALL BLUE

Arrival Temperatures: 8.2 | 9.7 | 9.5

Custody Seal Intact: ☐ Yes ☐ No ☒ N/A

Notes: ON ICE

## Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

### Report Information:

Company: RJ Burnside & Associates Ltd

Contact: Jim Barker

Address: # 292 Speedvale Ave. west, Unit 20, Guelph ONT N1H 1C4

Phone: Fax:

Reports to be sent to:

1. Email: Jim.Barker@rjburnside.com
2. Email:

### Project Information:

Project: 300033273

Site Location:

Sampled By:

AGAT Quote #: PO:

*Please note: If quotation number is not provided, client will be billed full price for analysis.*

### Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

### Regulatory Requirements:

☐ No Regulatory Requirement

*(Please check all applicable boxes)*

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

**Is this submission for a Record of Site Condition?**
☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis***
☐ Yes ☒ No

### Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

### Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | (Check Applicable) ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO3/NO2 ☐ Total N ☐ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ NH3 ☐ TKN ☐ NO3 ☐ NO2 ☐ NO3/NO2 | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | ~~As~~ / | [illegible] | WQA | Nitrates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | Feb 19/2015 | 10:56 | 4 | GW | | | | | | | | | | | | | | | | | | | X | | | |
| FW2 | Feb.19/2015 | 12:50 | 1 | GW | | | | | | | | | | | | | | | | | | | | X | | |

Samples Relinquished By (Print Name and Sign): Matt Ueleniote / Date: Feb 19/2015 Time:

Samples Received By (Print Name and Sign): A. MARTIN Date: 2016/02/19 Time: 13:45

Samples Relinquished By (Print Name and Sign): Date Time

Samples Received By (Print Name and Sign): Date Time

Page ____ of ____

Nº: T 022761

Document ID: DIV-78-1511.010

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: November 2, 2015

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 3000 33273

AGAT WORK ORDER: 16T069988

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 23, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 2:Full Report Issued Feb 22nd 2016.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-02-19
DATE REPORTED: 2016-02-23

| | | | SAMPLE DESCRIPTION: | TW7 (12:50) |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395664 |
| Nitrate as N | mg/L | | 0.25 | 8.00 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7395664 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

# Certificate of Analysis

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-19

DATE REPORTED: 2016-02-23

| | | | SAMPLE DESCRIPTION: | TW7 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395659 |
| Electrical Conductivity | uS/cm | | 2 | 587 |
| pH | pH Units | | NA | 7.88 |
| Saturation pH | | | | 6.99 |
| Langelier Index | | | | 0.89 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 280 |
| Total Dissolved Solids | mg/L | | 20 | 354 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 262 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 262 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.25 | <0.25 |
| Chloride | mg/L | | 0.50 | 18.3 |
| Nitrate as N | mg/L | | 0.25 | 8.52 |
| Nitrite as N | mg/L | | 0.25 | <0.25 |
| Bromide | mg/L | | 0.25 | <0.25 |
| Sulphate | mg/L | | 0.50 | 20.6 |
| Ortho Phosphate as P | mg/L | | 0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | 7.03 |
| Ammonia as N | mg/L | | 0.02 | 0.10 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.6 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 3.9 |
| Calcium | mg/L | | 0.05 | 77.2 |
| Magnesium | mg/L | | 0.05 | 21.2 |
| Sodium | mg/L | | 0.05 | 5.60 |
| Potassium | mg/L | | 0.05 | 1.00 |
| Aluminum | mg/L | | 0.004 | < 0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

Certified By: Amanjot Bhela

# Certificate of Analysis

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-19

DATE REPORTED: 2016-02-23

| | | | SAMPLE DESCRIPTION: | TW7 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/19/2016 |
| Parameter | Unit | G / S | RDL | 7395659 |
| Barium | mg/L | | 0.002 | 0.093 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.106 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.017 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 7.26 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7395659 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 3000 33273
SAMPLING SITE:

AGAT WORK ORDER: 16T069988
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis

| RPT Date: Feb 23, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment (mg/L) | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7397209 | | 1320 | 1320 | 0.0% | < 2 | 98% | 80% | 120% | NA | | | NA | | |
| pH | 7397209 | | 8.11 | 8.02 | 1.1% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7393504 | | 552 | 562 | 1.8% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7397209 | | 336 | 337 | 0.3% | < 5 | 102% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7397209 | | 336 | 337 | 0.3% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7397209 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7397209 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | 99% | 90% | 110% | 93% | 90% | 110% | 89% | 80% | 120% |
| Chloride | 7395664 | 7395664 | 16.8 | 16.8 | 0.0% | < 0.10 | 105% | 90% | 110% | 98% | 90% | 110% | 96% | 80% | 120% |
| Nitrate as N | 7395664 | 7395664 | 8.00 | 7.88 | 1.5% | < 0.05 | 98% | 90% | 110% | 101% | 90% | 110% | 113% | 80% | 120% |
| Nitrite as N | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | NA | 90% | 110% | 98% | 90% | 110% | 113% | 80% | 120% |
| Bromide | 7395664 | 7395664 | <0.25 | <0.25 | NA | < 0.05 | 108% | 90% | 110% | 104% | 90% | 110% | 112% | 80% | 120% |
| Sulphate | 7395664 | 7395664 | 18.9 | 18.4 | 2.7% | < 0.10 | 104% | 90% | 110% | 95% | 90% | 110% | 102% | 80% | 120% |
| Ortho Phosphate as P | 7395664 | 7395664 | <0.50 | <0.50 | NA | < 0.10 | 95% | 90% | 110% | 90% | 90% | 110% | 92% | 80% | 120% |
| Reactive Silica | 7395659 | 7395659 | 7.03 | 6.92 | 1.6% | < 0.05 | 98% | 90% | 110% | 99% | 90% | 110% | 89% | 80% | 120% |
| Ammonia as N | 7395659 | 7395659 | 0.10 | 0.10 | 0.0% | < 0.02 | 94% | 90% | 110% | 96% | 90% | 110% | 85% | 80% | 120% |
| Total Phosphorus | 7396488 | | <0.05 | <0.05 | NA | < 0.05 | 102% | 80% | 120% | 95% | 90% | 110% | 102% | 70% | 130% |
| Total Organic Carbon | 7396282 | | <0.5 | <0.5 | NA | < 0.5 | 96% | 90% | 110% | 103% | 90% | 110% | 99% | 80% | 120% |
| Colour | 7396488 | | <5 | <5 | NA | < 5 | 102% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7396488 | | <0.5 | <0.5 | NA | < 0.5 | 100% | 90% | 110% | NA | | | NA | | |
| Calcium | 7395659 | 7395659 | 77.2 | 76.9 | 0.4% | < 0.05 | 105% | 90% | 110% | 104% | 90% | 110% | 89% | 70% | 130% |
| Magnesium | 7395659 | 7395659 | 21.2 | 21.6 | 1.9% | < 0.05 | 98% | 90% | 110% | 98% | 90% | 110% | 86% | 70% | 130% |
| Sodium | 7395659 | 7395659 | 5.60 | 5.64 | 0.7% | < 0.05 | 101% | 90% | 110% | 102% | 90% | 110% | 95% | 70% | 130% |
| Potassium | 7395659 | 7395659 | 1.00 | 1.02 | 2.0% | < 0.05 | 101% | 90% | 110% | 102% | 90% | 110% | 106% | 70% | 130% |
| Antimony | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 94% | 90% | 110% | 92% | 90% | 110% | 97% | 70% | 130% |
| Arsenic | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 98% | 90% | 110% | 96% | 90% | 110% | 114% | 70% | 130% |
| Barium | 7394156 | | 0.453 | 0.447 | 1.3% | < 0.002 | 96% | 90% | 110% | 97% | 90% | 110% | 92% | 70% | 130% |
| Beryllium | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 91% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Boron | 7394156 | | 0.040 | 0.039 | NA | < 0.010 | 100% | 90% | 110% | 101% | 90% | 110% | 106% | 70% | 130% |
| Cadmium | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 94% | 90% | 110% | 94% | 90% | 110% | 99% | 70% | 130% |
| Chromium | 7394156 | | 0.009 | 0.009 | NA | < 0.003 | 100% | 90% | 110% | 101% | 90% | 110% | 104% | 70% | 130% |
| Cobalt | 7394156 | | < 0.001 | < 0.001 | NA | < 0.001 | 101% | 90% | 110% | 102% | 90% | 110% | 105% | 70% | 130% |
| Copper | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 99% | 90% | 110% | 101% | 90% | 110% | 102% | 70% | 130% |
| Iron | 7394156 | | 7.79 | 7.51 | 3.7% | < 0.010 | 102% | 90% | 110% | 101% | 90% | 110% | 110% | 70% | 130% |
| Lead | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 92% | 90% | 110% | 91% | 90% | 110% | 91% | 70% | 130% |
| Manganese | 7394156 | | 1.35 | 1.35 | 0.0% | < 0.002 | 97% | 90% | 110% | 97% | 90% | 110% | 80% | 70% | 130% |
| Mercury | 7395659 | 7395659 | <0.0001 | <0.0001 | NA | < 0.0001 | 99% | 90% | 110% | 98% | 90% | 110% | 99% | 80% | 120% |
| Molybdenum | 7394156 | | 0.002 | 0.002 | NA | < 0.002 | 94% | 90% | 110% | 95% | 90% | 110% | 101% | 70% | 130% |
| Nickel | 7394156 | | < 0.003 | < 0.003 | NA | < 0.003 | 106% | 90% | 110% | 106% | 90% | 110% | 108% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 3000 33273
SAMPLING SITE:

AGAT WORK ORDER: 16T069988
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Feb 23, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Selenium | 7394156 | | < 0.004 | < 0.004 | NA | < 0.004 | 102% | 90% | 110% | 99% | 90% | 110% | 119% | 70% | 130% |
| Silver | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 95% | 90% | 110% | 105% | 90% | 110% | 102% | 70% | 130% |
| Strontium | 7394156 | | 0.496 | 0.488 | 1.6% | < 0.005 | 94% | 90% | 110% | 96% | 90% | 110% | 95% | 70% | 130% |
| Thallium | 7394156 | | < 0.006 | < 0.006 | NA | < 0.006 | 100% | 90% | 110% | 100% | 90% | 110% | 101% | 70% | 130% |
| Tin | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 97% | 90% | 110% | 92% | 90% | 110% | 98% | 70% | 130% |
| Titanium | 7394156 | | 0.002 | 0.003 | NA | < 0.002 | 97% | 90% | 110% | 96% | 90% | 110% | 104% | 70% | 130% |
| Tungsten | 7394156 | | < 0.010 | < 0.010 | NA | < 0.010 | 96% | 90% | 110% | 90% | 90% | 110% | 101% | 70% | 130% |
| Uranium | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 97% | 90% | 110% | 91% | 90% | 110% | 97% | 70% | 130% |
| Vanadium | 7394156 | | < 0.002 | < 0.002 | NA | < 0.002 | 91% | 90% | 110% | 95% | 90% | 110% | 101% | 70% | 130% |
| Zinc | 7394156 | | < 0.005 | < 0.005 | NA | < 0.005 | 97% | 90% | 110% | 98% | 90% | 110% | 101% | 70% | 130% |
| Zirconium | 7394156 | | < 0.004 | < 0.004 | NA | < 0.004 | 101% | 90% | 110% | 97% | 90% | 110% | 108% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Amanjot Bhela

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 3000 33273
SAMPLING SITE:

AGAT WORK ORDER: 16T069988
ATTENTION TO: Jim Baxter
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT** Laboratories

* TURBIDITY

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 16T 069 988

Cooler Quantity: 1 SMALL BLUE

Arrival Temperatures: 8.2 | 9.7 | 9.5

Custody Seal Intact: ☐Yes ☐No ☒N/A

Notes: ON ICE

## Report Information:

Company: RJ Burnside & Associates Ltd

Contact: Jim Baxter

Address: # 292 Speedvale Ave. west, Unit 20, Guelph ONT N1H 1C4

Phone: Fax:

Reports to be sent to:

1. Email: Jim.Baxter@rjburnside.com
2. Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04

Table (Indicate One)

☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture (Check One)

☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm

Region (Indicate One)

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other (Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*

**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 3000 33273

Site Location:

Sampled By:

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

## Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ $Cr^{6+}$ ☐ EC ☐ FOC ☐ $NO_3/NO_2$ ☐ Total N ☐ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | ~~As~~ / | ~~Metals~~ | WQA | Nitrates |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | Feb 19/2015 | 10:56 | 4 | GW | | | | | | | | | | | | | | | | | | | X | |
| FW2 | Feb 19/2015 | 12:50 | 1 | GW | | | | | | | | | | | | | | | | | | | | X |

Samples Relinquished By (Print Name and Sign): Matt Valeriote / Date: Feb 19/2015 Time:

Samples Received By (Print Name and Sign): A. MARTIN Date: 2016/02/19 Time: 13:45

Samples Relinquished By (Print Name and Sign): Date: Time:

Samples Received By (Print Name and Sign): Date: Time:

Page ____ of ____

Nº: T 022761

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16T070836

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Feb 24, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16T070836
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-02-23

DATE REPORTED: 2016-02-24

| | | | SAMPLE DESCRIPTION: | TW8 - 10 min |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/23/2016 |
| Parameter | Unit | G / S | RDL | 7401689 |
| Nitrate as N | mg/L | | 0.25 | 7.93 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7401689 Sample required dilution prior to analysis in order to keep the analyte within the calibration range of the instrument and/or to minimize any matrix interferences; the RDL was adjusted accordingly.

Certified By:

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T070836
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment - Groundwater Sample

DATE RECEIVED: 2016-02-23

DATE REPORTED: 2016-02-24

| | | | SAMPLE DESCRIPTION: | TW8 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/23/2016 |
| Parameter | Unit | G / S | RDL | 7401690 |
| Electrical Conductivity | uS/cm | | 2 | 606 |
| pH | pH Units | | NA | 8.02 |
| Saturation pH | | | | 6.96 |
| Langelier Index | | | | 1.06 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 315 |
| Total Dissolved Solids | mg/L | | 20 | 368 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 254 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 254 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.25 | <0.25 |
| Chloride | mg/L | | 0.50 | 10.4 |
| Nitrate as N | mg/L | | 0.25 | 8.25 |
| Nitrite as N | mg/L | | 0.25 | <0.25 |
| Bromide | mg/L | | 0.25 | <0.25 |
| Sulphate | mg/L | | 0.50 | 49.1 |
| Ortho Phosphate as P | mg/L | | 0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | 7.60 |
| Ammonia as N | mg/L | | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.6 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 21.1 |
| Calcium | mg/L | | 0.05 | 85.6 |
| Magnesium | mg/L | | 0.05 | 24.7 |
| Sodium | mg/L | | 0.05 | 4.69 |
| Potassium | mg/L | | 0.05 | 1.30 |
| Aluminum | mg/L | | 0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 16T070836
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment - Groundwater Sample

DATE RECEIVED: 2016-02-23
DATE REPORTED: 2016-02-24

| | | | SAMPLE DESCRIPTION: | TW8 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/23/2016 |
| Parameter | Unit | G / S | RDL | 7401690 |
| Barium | mg/L | | 0.002 | 0.110 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.013 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | 0.007 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.437 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.016 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 3.27 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7401690 Sample required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instrument and/or to minimize any matrix interferences; the RDLs were adjusted accordingly.

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T070836
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: Feb 24, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment - Groundwater Sample | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7401323 | | <2 | <2 | NA | < 2 | 101% | 80% | 120% | NA | | | NA | | |
| pH | 7401323 | | 5.51 | 5.16 | 6.6% | NA | 100% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7398229 | | 232 | 238 | 2.6% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7401323 | | <5 | <5 | NA | < 5 | 96% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7401323 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7401323 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7401323 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7401689 | 7401689 | < 0.05 | < 0.05 | NA | < 0.05 | 94% | 90% | 110% | 94% | 90% | 110% | 99% | 80% | 120% |
| Chloride | 7401689 | 7401689 | 12.7 | 12.3 | 3.2% | < 0.10 | 107% | 90% | 110% | 98% | 90% | 110% | 100% | 80% | 120% |
| Nitrate as N | 7401689 | 7401689 | 7.93 | 7.70 | 2.9% | < 0.05 | 100% | 90% | 110% | 106% | 90% | 110% | 106% | 80% | 120% |
| Nitrite as N | 7401689 | 7401689 | < 0.05 | < 0.05 | NA | < 0.05 | NA | 90% | 110% | 108% | 90% | 110% | 113% | 80% | 120% |
| Bromide | 7401689 | 7401689 | < 0.05 | < 0.05 | NA | < 0.05 | 110% | 90% | 110% | 96% | 90% | 110% | 107% | 80% | 120% |
| Sulphate | 7401689 | 7401689 | 159 | 156 | 1.9% | < 0.10 | 90% | 90% | 110% | 101% | 90% | 110% | 96% | 80% | 120% |
| Ortho Phosphate as P | 7401689 | 7401689 | < 0.10 | < 0.10 | NA | < 0.10 | 93% | 90% | 110% | 92% | 90% | 110% | 91% | 80% | 120% |
| Reactive Silica | 7401690 | 7401690 | 7.60 | 7.55 | 0.7% | < 0.05 | 95% | 90% | 110% | 97% | 90% | 110% | 87% | 80% | 120% |
| Ammonia as N | 7399914 | | <0.02 | <0.02 | NA | < 0.02 | 95% | 90% | 110% | 97% | 90% | 110% | 96% | 80% | 120% |
| Total Phosphorus | 7401323 | | <0.05 | <0.05 | NA | < 0.05 | 103% | 80% | 120% | 100% | 90% | 110% | 101% | 70% | 130% |
| Total Organic Carbon | 7401690 | 7401690 | 0.6 | 0.6 | NA | < 0.5 | 102% | 90% | 110% | 99% | 90% | 110% | 97% | 80% | 120% |
| Colour | 7401690 | 7401690 | < 5 | <5 | NA | < 5 | 102% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7401690 | 7401690 | 21.1 | 21.5 | 1.9% | < 0.5 | 101% | 90% | 110% | NA | | | NA | | |
| Calcium | 7401690 | 7401690 | 85.6 | 85.2 | 0.5% | < 0.05 | 104% | 90% | 110% | 102% | 90% | 110% | 100% | 70% | 130% |
| Magnesium | 7401690 | 7401690 | 24.7 | 24.5 | 0.8% | < 0.05 | 98% | 90% | 110% | 97% | 90% | 110% | 100% | 70% | 130% |
| Sodium | 7401690 | 7401690 | 4.69 | 4.70 | 0.2% | < 0.05 | 100% | 90% | 110% | 99% | 90% | 110% | 101% | 70% | 130% |
| Potassium | 7401690 | 7401690 | 1.30 | 1.26 | 3.1% | < 0.05 | 100% | 90% | 110% | 99% | 90% | 110% | 105% | 70% | 130% |
| Aluminum | 7401690 | 7401690 | < 0.004 | <0.004 | NA | < 0.004 | 109% | 90% | 110% | 108% | 90% | 110% | 102% | 70% | 130% |
| Antimony | 7401690 | 7401690 | < 0.003 | <0.003 | NA | < 0.003 | 107% | 90% | 110% | 97% | 90% | 110% | 99% | 70% | 130% |
| Arsenic | 7401690 | 7401690 | < 0.003 | <0.003 | NA | < 0.003 | 101% | 90% | 110% | 100% | 90% | 110% | 93% | 70% | 130% |
| Barium | 7401690 | 7401690 | 0.110 | 0.106 | 3.7% | < 0.002 | 102% | 90% | 110% | 100% | 90% | 110% | 107% | 70% | 130% |
| Beryllium | 7401690 | 7401690 | < 0.001 | <0.001 | NA | < 0.001 | 106% | 90% | 110% | 107% | 90% | 110% | 97% | 70% | 130% |
| Boron | 7401690 | 7401690 | 0.013 | 0.013 | NA | < 0.010 | 107% | 90% | 110% | 101% | 90% | 110% | 91% | 70% | 130% |
| Cadmium | 7401690 | 7401690 | < 0.001 | <0.001 | NA | < 0.001 | 103% | 90% | 110% | 106% | 90% | 110% | 97% | 70% | 130% |
| Chromium | 7401690 | 7401690 | < 0.003 | <0.003 | NA | < 0.003 | 103% | 90% | 110% | 103% | 90% | 110% | 99% | 70% | 130% |
| Cobalt | 7401690 | 7401690 | < 0.001 | <0.001 | NA | < 0.001 | 106% | 90% | 110% | 104% | 90% | 110% | 98% | 70% | 130% |
| Copper | 7401690 | 7401690 | < 0.003 | <0.003 | NA | < 0.003 | 104% | 90% | 110% | 102% | 90% | 110% | 86% | 70% | 130% |
| Iron | 7401690 | 7401690 | < 0.010 | <0.010 | NA | < 0.010 | 108% | 90% | 110% | 103% | 90% | 110% | 104% | 70% | 130% |
| Lead | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 103% | 90% | 110% | 102% | 90% | 110% | 93% | 70% | 130% |
| Manganese | 7401690 | 7401690 | 0.007 | 0.007 | NA | < 0.002 | 103% | 90% | 110% | 103% | 90% | 110% | 103% | 70% | 130% |
| Mercury | 7401690 | 7401690 | <0.0001 | <0.0001 | NA | < 0.0001 | 101% | 90% | 110% | 103% | 90% | 110% | 104% | 80% | 120% |
| Molybdenum | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 101% | 90% | 110% | 96% | 90% | 110% | 108% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T070836
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Feb 24, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nickel | 7401690 | 7401690 | < 0.003 | <0.003 | NA | < 0.003 | 106% | 90% | 110% | 105% | 90% | 110% | 94% | 70% | 130% |
| Selenium | 7401690 | 7401690 | < 0.004 | <0.004 | NA | < 0.004 | 103% | 90% | 110% | 102% | 90% | 110% | 101% | 70% | 130% |
| Silver | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 105% | 90% | 110% | 108% | 90% | 110% | 101% | 70% | 130% |
| Strontium | 7401690 | 7401690 | 0.437 | 0.428 | 2.1% | < 0.005 | 98% | 90% | 110% | 99% | 90% | 110% | 94% | 70% | 130% |
| Thallium | 7401690 | 7401690 | < 0.006 | <0.006 | NA | < 0.006 | 104% | 90% | 110% | 99% | 90% | 110% | 94% | 70% | 130% |
| Tin | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 110% | 90% | 110% | 100% | 90% | 110% | 106% | 70% | 130% |
| Titanium | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 107% | 90% | 110% | 99% | 90% | 110% | 103% | 70% | 130% |
| Tungsten | 7401690 | 7401690 | < 0.010 | <0.010 | NA | < 0.010 | 104% | 90% | 110% | 96% | 90% | 110% | 101% | 70% | 130% |
| Uranium | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 103% | 90% | 110% | 99% | 90% | 110% | 104% | 70% | 130% |
| Vanadium | 7401690 | 7401690 | < 0.002 | <0.002 | NA | < 0.002 | 102% | 90% | 110% | 101% | 90% | 110% | 103% | 70% | 130% |
| Zinc | 7401690 | 7401690 | 0.016 | 0.016 | NA | < 0.005 | 103% | 90% | 110% | 103% | 90% | 110% | 83% | 70% | 130% |
| Zirconium | 7401690 | 7401690 | < 0.004 | <0.004 | NA | < 0.004 | 96% | 90% | 110% | 93% | 90% | 110% | 104% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: ______________________

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T070836
PROJECT: 300033273
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT Laboratories**

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 16T070836

Cooler Quantity:

Arrival Temperatures: 2.6 | 2.1 | 3.3

Custody Seal Intact: ☐Yes ☐No ☒N/A

Notes:

## Report Information:

Company: BURNSIDE
Contact: DWIGHT SMIKLE
Address:
Phone: 519 823-4995 Fax:
Reports to be sent to:
1. Email: Dwight.Smikle@rjburnside.com
2. Email:

## Regulatory Requirements: ☒ No Regulatory Requirement

*(Please check all applicable boxes)*

☐Regulation 153/04
Table ______ *Indicate One*
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture *(Check One)*
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ______ *Indicate One*

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
______ *Indicate One*

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis*** ☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 300033273
Site Location: Belfountain
Sampled By: S Quinlan
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | **ORPs:** ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐NO$_3$/NO$_2$ ☐Total N ☐Hg ☐pH ☐SAR | **Nutrients:** ☐TP ☐NH$_3$ ☐TKN ☐NO$_3$ ☐NO$_2$ ☐NO$_3$/NO$_2$ | **Volatiles:** ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | TDS | Various Inorganics | Metals | Ammonia, Total Phosphorus | TOC | Mercury | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW8-10 min | 23FEB16 | 12:52 | 1 | GW | | | | | | | | | | | | | | | | | ✓ | | | | | | | |
| TW8 | 23FEB16 | 14:42 | 6 | GW | | | | | | | | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
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| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| Sean Quinlan S. Q | 23FEB16 | 15:00 | Sharmin | Feb23/16 | 3:50pm |

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| | | | | | |

Page 1 of 1

Nº: T 021167

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: Belfountain - 300033273

AGAT WORK ORDER: 16T071689

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 26, 2016

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 1:Partial Report Issued Feb 26th 2016 at 1:20pm

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16T071689
PROJECT: Belfountain - 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-02-25

DATE REPORTED: 2016-02-26

| | | | SAMPLE DESCRIPTION: | TW10N |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/25/2016 |
| Parameter | Unit | G / S | RDL | 7408001 |
| Nitrate as N | mg/L | | 0.25 | 2.41 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7408001 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T071689

PROJECT: Belfountain - 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

**Laboratory Use Only**

Work Order #: 16T071689

Cooler Quantity:

Arrival Temperatures: 5.3 | 4.6 5.5

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: R.J. Burnside & Associates Limited
Contact: Jim Baxter
Address: 292 Speedvale Ave. West, unit 20, Guelph, ONT
Phone: 519-823-4995 Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture

Soil Texture (Check One)
☐Coarse
☐Fine

☐ Sewer Use
☐Sanitary
☐Storm
Region ___ Indicate One

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
___ Indicate One

**Is this submission for a Record of Site Condition?**
☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis***
☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: Belfountain - 300033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

## Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

**Sample Matrix Legend**

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | (Check Applicable) ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐NO₃/NO₂ ☐Total N ☐Hg ☐pH ☐SAR | Nutrients: ☐TP ☐NH₃ ☐TKN ☐NO₃ ☐NO₂ ☐NO₃/NO₂ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrates | MWQA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW10N | Feb.25,2016 | 13:40 | 1 | GW | | | | | | | | | | | | | | | | | X | |
| TW10 | Feb.25,2016 | 15:30 | 6 | GW | | | | | | | | | | | | | | | | | | X |

Samples Relinquished By (Print Name and Sign): Matt Valeriote / 
Date Feb. 25, 2016 Time

Samples Relinquished By (Print Name and Sign):
Date Time

Samples Received By (Print Name and Sign): Neil Ramnarayan
Date Feb 25/16 Time 4:41PM

Samples Received By (Print Name and Sign):
Date Time

Page 1 of 1

Nº: T 021168

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16T072180

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Mar 01, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

VERSION 2:Revised Report issued March 07th 2016. Reactive Silica Results corrected.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T072180
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

## Nitrate (Water)

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | SAMPLE DESCRIPTION: | TW9N |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/26/2016 |
| Parameter | Unit | G / S | RDL | 7410958 |
| Nitrate as N | mg/L | | 0.05 | 3.65 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

DR. ANTHONY R. K. DAPAAH

Results relate only to the items tested and to all the items tested

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T072180
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | SAMPLE DESCRIPTION: | TW9 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/26/2016 |
| Parameter | Unit | G / S | RDL | 7410959 |
| Electrical Conductivity | uS/cm | | 2 | 610 |
| pH | pH Units | | NA | 8.02 |
| Saturation pH | | | | 6.94 |
| Langelier Index | | | | 1.08 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 310 |
| Total Dissolved Solids | mg/L | | 20 | 332 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 265 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 265 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.05 | <0.05 |
| Chloride | mg/L | | 0.10 | 9.37 |
| Nitrate as N | mg/L | | 0.05 | 3.26 |
| Nitrite as N | mg/L | | 0.05 | <0.05 |
| Bromide | mg/L | | 0.05 | <0.05 |
| Sulphate | mg/L | | 0.10 | 50.0 |
| Ortho Phosphate as P | mg/L | | 0.10 | <0.10 |
| Reactive Silica | mg/L | | 0.05 | 8.72 |
| Ammonia as N | mg/L | | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.6 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 10.4 |
| Calcium | mg/L | | 0.05 | 82.4 |
| Magnesium | mg/L | | 0.05 | 25.4 |
| Sodium | mg/L | | 0.05 | 3.99 |
| Potassium | mg/L | | 0.05 | 1.19 |
| Aluminum | mg/L | | 0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

DR. ANTHONY R. K. DAPAAH

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 16T072180
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

## Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | SAMPLE DESCRIPTION: | TW9 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/26/2016 |
| Parameter | Unit | G / S | RDL | 7410959 |
| Barium | mg/L | | 0.002 | 0.070 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.014 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | 0.005 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | < 0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.320 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.022 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 3.26 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7410959 Revised March 04, 2016.
Revision: This report replaces the Certificate of Analysis issued on March 01, 2016. The Certificate of analysis has been updated to correct the erroneous Reactive Silica value reported.The discrepancy was due to sampling error during the analysis.

DR. ANTHONY R. K. DAPAAH

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T072180
ATTENTION TO: Jim Baxter
SAMPLED BY:MV

## Water Analysis

| RPT Date: Mar 01, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment (mg/L) | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7410959 | 7410959 | 610 | 611 | 0.2% | < 2 | 102% | 80% | 120% | NA | | | NA | | |
| pH | 7410959 | 7410959 | 8.02 | 8.01 | 0.1% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7410971 | | 436 | 430 | 1.4% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7410959 | 7410959 | 265 | 263 | 0.8% | < 5 | 102% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7410959 | 7410959 | 265 | 263 | 0.8% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7410959 | 7410959 | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7410959 | 7410959 | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7411422 | | <0.5 | <0.5 | NA | < 0.05 | 96% | 90% | 110% | 95% | 90% | 110% | 89% | 80% | 120% |
| Chloride | 7411422 | | 247 | 248 | 0.4% | < 0.10 | 105% | 90% | 110% | 109% | 90% | 110% | 99% | 80% | 120% |
| Nitrate as N | 7411422 | | 1.2 | 1.1 | 8.7% | < 0.05 | 101% | 90% | 110% | 110% | 90% | 110% | 114% | 80% | 120% |
| Nitrite as N | 7411422 | | <0.5 | <0.5 | NA | < 0.05 | NA | 90% | 110% | 109% | 90% | 110% | 112% | 80% | 120% |
| Bromide | 7411422 | | <0.5 | <0.5 | NA | < 0.05 | 108% | 90% | 110% | 109% | 90% | 110% | 109% | 80% | 120% |
| Sulphate | 7411422 | | 162 | 162 | 0.0% | < 0.10 | 101% | 90% | 110% | 108% | 90% | 110% | 105% | 80% | 120% |
| Ortho Phosphate as P | 7411422 | | <1.0 | <1.0 | NA | < 0.10 | 92% | 90% | 110% | 98% | 90% | 110% | 88% | 80% | 120% |
| Reactive Silica | 7402270 | | 1.97 | 2.00 | 1.5% | < 0.05 | 98% | 90% | 110% | 99% | 90% | 110% | 93% | 80% | 120% |
| Ammonia as N | 7408819 | | 4.81 | 4.80 | 0.2% | < 0.02 | 100% | 90% | 110% | 103% | 90% | 110% | 96% | 80% | 120% |
| Total Phosphorus | 7410959 | 7410959 | <0.05 | <0.05 | NA | < 0.05 | 102% | 80% | 120% | 103% | 90% | 110% | 102% | 70% | 130% |
| Total Organic Carbon | 7410959 | 7410959 | 0.6 | 0.5 | NA | < 0.5 | 98% | 90% | 110% | 98% | 90% | 110% | 94% | 80% | 120% |
| Colour | 7410959 | 7410959 | <5 | <5 | NA | < 5 | 100% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7410852 | | 948 | 1020 | 7.3% | < 0.5 | 101% | 90% | 110% | NA | | | NA | | |
| Calcium | 7410959 | 7410959 | 82.4 | 82.5 | 0.1% | < 0.05 | 105% | 90% | 110% | 106% | 90% | 110% | 98% | 70% | 130% |
| Magnesium | 7410959 | 7410959 | 25.4 | 25.5 | 0.4% | < 0.05 | 98% | 90% | 110% | 100% | 90% | 110% | 97% | 70% | 130% |
| Sodium | 7410959 | 7410959 | 3.99 | 3.97 | 0.5% | < 0.05 | 100% | 90% | 110% | 102% | 90% | 110% | 99% | 70% | 130% |
| Potassium | 7410959 | 7410959 | 1.19 | 1.17 | 1.7% | < 0.05 | 101% | 90% | 110% | 103% | 90% | 110% | 101% | 70% | 130% |
| Aluminum | 7410959 | 7410959 | < 0.004 | < 0.004 | NA | < 0.004 | 102% | 90% | 110% | 105% | 90% | 110% | 117% | 70% | 130% |
| Antimony | 7410959 | 7410959 | < 0.003 | < 0.003 | NA | < 0.003 | 98% | 90% | 110% | 96% | 90% | 110% | 101% | 70% | 130% |
| Arsenic | 7410959 | 7410959 | < 0.003 | < 0.003 | NA | < 0.003 | 102% | 90% | 110% | 98% | 90% | 110% | 107% | 70% | 130% |
| Barium | 7410959 | 7410959 | 0.070 | 0.070 | 0.0% | < 0.002 | 99% | 90% | 110% | 99% | 90% | 110% | 110% | 70% | 130% |
| Beryllium | 7410959 | 7410959 | < 0.001 | < 0.001 | NA | < 0.001 | 94% | 90% | 110% | 96% | 90% | 110% | 98% | 70% | 130% |
| Boron | 7410959 | 7410959 | 0.014 | 0.012 | NA | < 0.010 | 107% | 90% | 110% | 109% | 90% | 110% | 111% | 70% | 130% |
| Cadmium | 7410959 | 7410959 | < 0.001 | < 0.001 | NA | < 0.001 | 100% | 90% | 110% | 99% | 90% | 110% | 119% | 70% | 130% |
| Chromium | 7410959 | 7410959 | 0.005 | 0.003 | NA | < 0.003 | 100% | 90% | 110% | 104% | 90% | 110% | 109% | 70% | 130% |
| Cobalt | 7410959 | 7410959 | < 0.001 | < 0.001 | NA | < 0.001 | 100% | 90% | 110% | 101% | 90% | 110% | 108% | 70% | 130% |
| Copper | 7410959 | 7410959 | < 0.003 | < 0.003 | NA | < 0.003 | 99% | 90% | 110% | 102% | 90% | 110% | 109% | 70% | 130% |
| Lead | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 98% | 90% | 110% | 94% | 90% | 110% | 104% | 70% | 130% |
| Manganese | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 98% | 90% | 110% | 98% | 90% | 110% | 101% | 70% | 130% |
| Mercury | 7410971 | | <0.0001 | <0.0001 | NA | < 0.0001 | 100% | 90% | 110% | 102% | 90% | 110% | 102% | 80% | 120% |
| Molybdenum | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 101% | 90% | 110% | 99% | 90% | 110% | 108% | 70% | 130% |
| Nickel | 7410959 | 7410959 | < 0.003 | < 0.003 | NA | < 0.003 | 103% | 90% | 110% | 105% | 90% | 110% | 111% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T072180
ATTENTION TO: Jim Baxter
SAMPLED BY:MV

## Water Analysis (Continued)

| RPT Date: Mar 01, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Selenium | 7410959 | 7410959 | < 0.004 | < 0.004 | NA | < 0.004 | 99% | 90% | 110% | 99% | 90% | 110% | 111% | 70% | 130% |
| Silver | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 102% | 90% | 110% | 107% | 90% | 110% | 120% | 70% | 130% |
| Strontium | 7410959 | 7410959 | 0.320 | 0.307 | 4.1% | < 0.005 | 100% | 90% | 110% | 98% | 90% | 110% | 109% | 70% | 130% |
| Thallium | 7410959 | 7410959 | < 0.006 | < 0.006 | NA | < 0.006 | 104% | 90% | 110% | 102% | 90% | 110% | 115% | 70% | 130% |
| Tin | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 98% | 90% | 110% | 97% | 90% | 110% | 101% | 70% | 130% |
| Titanium | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 102% | 90% | 110% | 97% | 90% | 110% | 105% | 70% | 130% |
| Tungsten | 7410959 | 7410959 | < 0.010 | < 0.010 | NA | < 0.010 | 95% | 90% | 110% | 95% | 90% | 110% | 94% | 70% | 130% |
| Uranium | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 100% | 90% | 110% | 95% | 90% | 110% | 106% | 70% | 130% |
| Vanadium | 7410959 | 7410959 | < 0.002 | < 0.002 | NA | < 0.002 | 96% | 90% | 110% | 95% | 90% | 110% | 103% | 70% | 130% |
| Zinc | 7410959 | 7410959 | 0.022 | 0.021 | NA | < 0.005 | 100% | 90% | 110% | 103% | 90% | 110% | 112% | 70% | 130% |
| Zirconium | 7410959 | 7410959 | < 0.004 | < 0.004 | NA | < 0.004 | 93% | 90% | 110% | 91% | 90% | 110% | 93% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By:

DR. ANTHONY R. K. DAPAAH

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T072180
PROJECT: 300033273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T072180
PROJECT: 300033273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT Laboratories**
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 16T072180
Cooler Quantity:
Arrival Temperatures: 8.0 8.1 8.5
LAB 7.9 7.8 7.4
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

## Report Information:

Company: R J Burnside & Associates Ltd.
Contact: Jim Baxter
Address: 292 Speedvale Ave. West, Unit 20
Guelph, ONT
Phone: 519-823-4995 Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐Regulation 153/04
Table ____ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ____ Indicate One

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other ____ Indicate One

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis*** ☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

***Please provide prior notification for rush TAT***
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 300033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis

## Invoice Information:

Bill To Same: Yes ☐ No ☐
Company:
Contact:
Address:
Email:

### Sample Matrix Legend

| | |
|---|---|
| B | Biota |
| GW | Ground Water |
| O | Oil |
| P | Paint |
| S | Soil |
| SD | Sediment |
| SW | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | (Check Applicable) **ORPs:** ☐B-HWS ☐Cl ☐CN ☐$Cr^{6+}$ ☐EC ☐FOC ☐$NO_3/NO_2$ ☐Total N ☐Hg ☐pH ☐SAR | **Nutrients:** ☐TP ☐$NH_3$ ☐TKN ☐$NO_3$ ☐$NO_2$ ☐$NO_3/NO_2$ | **Volatiles:** ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | MWQA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW9N | Feb.26.2016 | 9:50 | 1 | GW | | | | | | | | | | | | | | | | | x | | | | | | | | |
| TW9 | Feb.26.2016 | 11:40 | 6 | GW | | | | | | | | | | | | | | | | | | x | | | | | | | |
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| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time | |
|---|---|---|---|---|---|---|
| Matt Valeriote | Feb.26, 2016 | | Ranj Singh | 26Feb2016 | 1:00pm | Page 1 of 1 |
| | | | Simon | 27/2/16 | 7:21 | Nº: T 021169 |

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16T072717

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Mar 01, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES*

VERSION 2:Revised Report: Reactive Silica results corrected.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16T072717
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | SAMPLE DESCRIPTION: | TW11N |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/29/2016 |
| Parameter | Unit | G / S | RDL | 7413121 |
| Nitrate as N | mg/L | | 0.10 | 4.61 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7413121 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

DR. ANTHONY R. K. DAPAAH

Certified By:

Results relate only to the items tested and to all the items tested

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T072717
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | | |
|---|---|---|---|---|
| | | | SAMPLE DESCRIPTION: | TW11N |
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/29/2016 |
| Parameter | Unit | G / S | RDL | 7413129 |
| Electrical Conductivity | uS/cm | | 2 | 607 |
| pH | pH Units | | NA | 8.00 |
| Saturation pH | | | | 6.95 |
| Langelier Index | | | | 1.05 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 303 |
| Total Dissolved Solids | mg/L | | 20 | 326 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 267 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 267 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.10 | <0.10 |
| Chloride | mg/L | | 0.20 | 12.8 |
| Nitrate as N | mg/L | | 0.10 | 4.58 |
| Nitrite as N | mg/L | | 0.10 | <0.10 |
| Bromide | mg/L | | 0.10 | <0.10 |
| Sulphate | mg/L | | 0.20 | 21.3 |
| Ortho Phosphate as P | mg/L | | 0.20 | <0.20 |
| Reactive Silica | mg/L | | 0.10 | 8.05 |
| Ammonia as N | mg/L | | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.7 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 2.9 |
| Calcium | mg/L | | 0.05 | 81.7 |
| Magnesium | mg/L | | 0.05 | 24.0 |
| Sodium | mg/L | | 0.05 | 5.39 |
| Potassium | mg/L | | 0.05 | 1.01 |
| Aluminum | mg/L | | 0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

Certified By:

DR. ANTHONY R. K. DAPAAH

# Certificate of Analysis

AGAT WORK ORDER: 16T072717
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-02-29
DATE REPORTED: 2016-03-01

| | | | SAMPLE DESCRIPTION: | TW11N |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2/29/2016 |
| Parameter | Unit | G / S | RDL | 7413129 |
| Barium | mg/L | | 0.002 | 0.060 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | < 0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | < 0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.132 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.013 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 1.24 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7413129 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.
Revised March 04, 2016.
Revision: This report replaces the Certificate of Analysis issued on March 01, 2016. The Certificate of analysis has been updated to correct the erroneous Reactive Silica value reported.The discrepancy was due to sampling error during the analysis.

DR. ANTHONY R. K. DAPAAH

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T072717
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis

| RPT Date: Mar 01, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7412084 | | 754 | 750 | 0.5% | < 2 | 102% | 80% | 120% | NA | | | NA | | |
| pH | 7412084 | | 7.74 | 7.79 | 0.6% | NA | 100% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7413129 | 7413129 | 326 | 324 | 0.6% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7412084 | | 103 | 103 | 0.0% | < 5 | 100% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7412084 | | 103 | 103 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7412084 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7412084 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7413121 | 7413121 | <0.10 | <0.10 | NA | < 0.05 | 106% | 90% | 110% | 100% | 90% | 110% | 104% | 80% | 120% |
| Chloride | 7413121 | 7413121 | 12.9 | 13.1 | 1.5% | < 0.10 | 102% | 90% | 110% | 107% | 90% | 110% | 102% | 80% | 120% |
| Nitrate as N | 7413121 | 7413121 | 4.61 | 4.67 | 1.3% | < 0.05 | 93% | 90% | 110% | 104% | 90% | 110% | 89% | 80% | 120% |
| Nitrite as N | 7413121 | 7413121 | <0.10 | <0.10 | NA | < 0.05 | NA | 90% | 110% | 107% | 90% | 110% | 101% | 80% | 120% |
| Bromide | 7413121 | 7413121 | <0.10 | <0.10 | NA | < 0.05 | 102% | 90% | 110% | 109% | 90% | 110% | 100% | 80% | 120% |
| Sulphate | 7413121 | 7413121 | 21.9 | 22.2 | 1.4% | < 0.10 | 94% | 90% | 110% | 106% | 90% | 110% | 94% | 80% | 120% |
| Ortho Phosphate as P | 7413121 | 7413121 | <0.20 | <0.20 | NA | < 0.10 | 93% | 90% | 110% | 100% | 90% | 110% | 100% | 80% | 120% |
| Reactive Silica | 7402270 | | 1.97 | 2.00 | 1.5% | < 0.05 | 98% | 90% | 110% | 99% | 90% | 110% | 93% | 80% | 120% |
| Ammonia as N | 7413129 | 7413129 | <0.02 | <0.02 | NA | < 0.02 | 92% | 90% | 110% | 101% | 90% | 110% | 89% | 80% | 120% |
| Total Phosphorus | 7410959 | | <0.05 | <0.05 | NA | < 0.05 | 102% | 80% | 120% | 103% | 90% | 110% | 102% | 70% | 130% |
| Total Organic Carbon | 7413129 | 7413129 | 0.7 | 0.7 | NA | < 0.5 | 98% | 90% | 110% | 98% | 90% | 110% | 102% | 80% | 120% |
| Colour | 7413129 | 7413129 | <5 | <5 | NA | < 5 | 100% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7413129 | 7413129 | 2.9 | 3.0 | 3.4% | < 0.5 | 101% | 90% | 110% | NA | | | NA | | |
| Calcium | 7413129 | 7413129 | 81.7 | 82.2 | 0.6% | < 0.05 | 103% | 90% | 110% | 103% | 90% | 110% | 101% | 70% | 130% |
| Magnesium | 7413129 | 7413129 | 24.0 | 24.0 | 0.0% | < 0.05 | 98% | 90% | 110% | 97% | 90% | 110% | 100% | 70% | 130% |
| Sodium | 7413129 | 7413129 | 5.39 | 5.28 | 2.1% | < 0.05 | 101% | 90% | 110% | 100% | 90% | 110% | 100% | 70% | 130% |
| Potassium | 7413129 | 7413129 | 1.01 | 1.01 | 0.0% | < 0.05 | 100% | 90% | 110% | 100% | 90% | 110% | 100% | 70% | 130% |
| Aluminum | 7413129 | 7413129 | < 0.004 | < 0.004 | NA | < 0.004 | 100% | 90% | 110% | 101% | 90% | 110% | 103% | 70% | 130% |
| Antimony | 7413129 | 7413129 | < 0.003 | < 0.003 | NA | < 0.003 | 95% | 90% | 110% | 95% | 90% | 110% | 96% | 70% | 130% |
| Arsenic | 7413129 | 7413129 | < 0.003 | < 0.003 | NA | < 0.003 | 99% | 90% | 110% | 97% | 90% | 110% | 108% | 70% | 130% |
| Barium | 7413129 | 7413129 | 0.060 | 0.058 | 3.4% | < 0.002 | 100% | 90% | 110% | 103% | 90% | 110% | 101% | 70% | 130% |
| Beryllium | 7413129 | 7413129 | < 0.001 | < 0.001 | NA | < 0.001 | 104% | 90% | 110% | 105% | 90% | 110% | 112% | 70% | 130% |
| Boron | 7413129 | 7413129 | < 0.010 | < 0.010 | NA | < 0.010 | 101% | 90% | 110% | 101% | 90% | 110% | 109% | 70% | 130% |
| Cadmium | 7413129 | 7413129 | < 0.001 | < 0.001 | NA | < 0.001 | 97% | 90% | 110% | 93% | 90% | 110% | 110% | 70% | 130% |
| Chromium | 7413129 | 7413129 | < 0.003 | < 0.003 | NA | < 0.003 | 100% | 90% | 110% | 96% | 90% | 110% | 101% | 70% | 130% |
| Cobalt | 7413129 | 7413129 | < 0.001 | < 0.001 | NA | < 0.001 | 96% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Copper | 7413129 | 7413129 | < 0.003 | < 0.003 | NA | < 0.003 | 99% | 90% | 110% | 99% | 90% | 110% | 98% | 70% | 130% |
| Lead | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 99% | 90% | 110% | 97% | 90% | 110% | 96% | 70% | 130% |
| Manganese | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 100% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Mercury | 7413129 | 7413129 | <0.0001 | <0.0001 | NA | < 0.0001 | 101% | 90% | 110% | 103% | 90% | 110% | 100% | 80% | 120% |
| Molybdenum | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 96% | 90% | 110% | 91% | 90% | 110% | 98% | 70% | 130% |
| Nickel | 7413129 | 7413129 | < 0.003 | < 0.003 | NA | < 0.003 | 98% | 90% | 110% | 99% | 90% | 110% | 99% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

SAMPLING SITE:

AGAT WORK ORDER: 16T072717

ATTENTION TO: Jim Baxter

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Mar 01, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Selenium | 7413129 | 7413129 | < 0.004 | < 0.004 | NA | < 0.004 | 97% | 90% | 110% | 98% | 90% | 110% | 111% | 70% | 130% |
| Silver | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 99% | 90% | 110% | 104% | 90% | 110% | 111% | 70% | 130% |
| Strontium | 7413129 | 7413129 | 0.132 | 0.130 | 1.5% | < 0.005 | 99% | 90% | 110% | 96% | 90% | 110% | 100% | 70% | 130% |
| Thallium | 7413129 | 7413129 | < 0.006 | < 0.006 | NA | < 0.006 | 103% | 90% | 110% | 101% | 90% | 110% | 100% | 70% | 130% |
| Tin | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 100% | 90% | 110% | 97% | 90% | 110% | 95% | 70% | 130% |
| Titanium | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 97% | 90% | 110% | 93% | 90% | 110% | 95% | 70% | 130% |
| Tungsten | 7413129 | 7413129 | < 0.010 | < 0.010 | NA | < 0.010 | 96% | 90% | 110% | 92% | 90% | 110% | 96% | 70% | 130% |
| Uranium | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 99% | 90% | 110% | 95% | 90% | 110% | 92% | 70% | 130% |
| Vanadium | 7413129 | 7413129 | < 0.002 | < 0.002 | NA | < 0.002 | 93% | 90% | 110% | 93% | 90% | 110% | 94% | 70% | 130% |
| Zinc | 7413129 | 7413129 | 0.013 | 0.012 | NA | < 0.005 | 99% | 90% | 110% | 99% | 90% | 110% | 99% | 70% | 130% |
| Zirconium | 7413129 | 7413129 | < 0.004 | < 0.004 | NA | < 0.004 | 98% | 90% | 110% | 94% | 90% | 110% | 91% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

CHARTERED
DR. ANTHONY R. K. DAPAAH
CHEMIST

Certified By:

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T072717
PROJECT: 300033273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT Laboratories**

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 16T072717
Cooler Quantity:
Arrival Temperatures: 7.8 | 7.9 | 7.9
LAO 5.9 | 6.0 | 6.2
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: on ice

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days RUSH
**Rush TAT** (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Report Information:

Company: RJ Burnside + Associates Ltd
Contact: Tim Baxter
Address: 292 Speedvale Ave. West, unit 20
Guelph, ONT
Phone: 519-823-4995 Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐Regulation 153/04
Table ___ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ___ Indicate One

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
___ Indicate One

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

**Report Guideline on Certificate of Analysis** ☐ Yes ☒ No

## Project Information:

Project: 30033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

## Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐B-HWS ☐Cl⁻ ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO₃/NO₂ ☐Total N ☐Hg ☐pH ☐SAR | Nutrients: ☐TP ☐NH₃ ☐TKN ☐NO₃ ☐NO₂ ☐NO₃/NO₂ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrates | MWQA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW11N | Feb.29,2016 | 11:00 | 1 | GW | | | | | | | | | | | | | | | | | X | |
| TW11 | Feb.29,2016 | 12:51 | 6 | GW | | | | | | | | | | | | | | | | | | X |

Samples Relinquished By (Print Name and Sign): Matt Valeriote / Matt V
Date: Feb.29,2016
Time:

Samples Received By (Print Name and Sign): M. Kelly Maggie Kelly
Date: 2016/2/29
Time: 2:25 pm

Samples Relinquished By (Print Name and Sign):
Date:
Time:

Samples Received By (Print Name and Sign): S.
Date: 1/3/16
Time: 9:14

Page 1 of 1

Nº: T014312

Document ID: DIV-78-1511.009

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: Jan 8, 2015

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16T101841

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Jun 17, 2016

PAGES (INCLUDING COVER): 8

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16T101841
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2016-06-06

DATE REPORTED: 2016-06-08

| | | | SAMPLE DESCRIPTION: | TW2 | TW6 | TW5 | TW8 | TW9 | TW11 |
|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 |
| Parameter | Unit | G / S | RDL | 7607710 | 7607713 | 7607719 | 7607726 | 7607733 | 7607739 |
| Electrical Conductivity | uS/cm | | 2 | 526 | 585 | 606 | 627 | 601 | 572 |
| pH | pH Units | | NA | 8.03 | 8.07 | 8.10 | 8.17 | 8.10 | 8.08 |
| Saturation pH | | | | 6.97 | 6.96 | 6.99 | 6.95 | 6.95 | 6.95 |
| Langelier Index | | | | 1.06 | 1.11 | 1.11 | 1.22 | 1.15 | 1.13 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 276 | 303 | 298 | 324 | 314 | 289 |
| Total Dissolved Solids | mg/L | | 20 | 290 | 326 | 326 | 358 | 334 | 300 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 264 | 261 | 251 | 251 | 257 | 262 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 264 | 261 | 251 | 251 | 257 | 262 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Fluoride | mg/L | | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Chloride | mg/L | | 0.20 | 5.59 | 15.2 | 24.3 | 11.0 | 9.32 | 18.4 |
| Nitrate as N | mg/L | | 0.10 | 1.18 | 6.32 | 6.72 | 5.35 | 2.99 | 3.00 |
| Nitrite as N | mg/L | | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Bromide | mg/L | | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Sulphate | mg/L | | 0.20 | 19.0 | 16.4 | 16.8 | 58.0 | 50.5 | 17.3 |
| Ortho Phosphate as P | mg/L | | 0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Reactive Silica | mg/L | | 0.05 | 9.90 | 7.14 | 7.49 | 7.75 | 8.60 | 7.67 |
| Ammonia as N | mg/L | | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.7 | 0.5 | <0.5 | 0.7 | 0.6 | 1.1 |
| Colour | TCU | | 5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Turbidity | NTU | | 0.5 | 6.4 | 3.7 | 2.5 | 53.6 | 3.5 | 10.2 |
| Calcium | mg/L | | 0.05 | 73.3 | 83.2 | 81.5 | 88.3 | 82.5 | 78.3 |
| Magnesium | mg/L | | 0.05 | 22.6 | 23.1 | 23.0 | 25.1 | 26.2 | 22.8 |
| Sodium | mg/L | | 0.05 | 2.65 | 5.15 | 9.66 | 4.72 | 3.91 | 7.26 |
| Potassium | mg/L | | 0.05 | 1.03 | 0.89 | 0.91 | 1.34 | 0.98 | 0.99 |
| Aluminum | mg/L | | 0.004 | 0.006 | 0.009 | 0.006 | 0.011 | <0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 16T101841
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2016-06-06

DATE REPORTED: 2016-06-08

| | | | SAMPLE DESCRIPTION: | TW2 | TW6 | TW5 | TW8 | TW9 | TW11 |
|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 | 6/2/2016 |
| Parameter | Unit | G / S | RDL | 7607710 | 7607713 | 7607719 | 7607726 | 7607733 | 7607739 |
| Barium | mg/L | | 0.002 | 0.063 | 0.101 | 0.112 | 0.087 | 0.069 | 0.056 |
| Beryllium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.012 | 0.012 | 0.011 | 0.025 | 0.013 | 0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | 0.004 | <0.002 | <0.002 | 0.005 | <0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.122 | 0.132 | 0.153 | 1.42 | 0.296 | 0.123 |
| Thallium | mg/L | | 0.006 | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.010 | 0.035 | 0.026 | 0.023 | 0.031 | 0.024 |
| Zirconium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 2.23 | 1.11 | 1.02 | 1.52 | 1.52 | 1.67 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7607710-7607739 Samples required dilution prior to analysis for Anions due to the presence of non-target Ions; the RDLs were adjusted to reflect the dilution.

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T101841
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment - Groundwater Samples | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7607726 | 7607726 | 627 | 630 | 0.5% | < 2 | 100% | 80% | 120% | NA | | | NA | | |
| pH | 7607726 | 7607726 | 8.17 | 8.11 | 0.7% | NA | 100% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7606122 | | 858 | 906 | 5.4% | < 20 | 114% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7607726 | 7607726 | 251 | 262 | 4.3% | < 5 | 102% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7607726 | 7607726 | 251 | 262 | 4.3% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7607726 | 7607726 | < 5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7607726 | 7607726 | < 5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7607427 | | <0.10 | <0.10 | NA | < 0.05 | 98% | 90% | 110% | 97% | 90% | 110% | 94% | 80% | 120% |
| Chloride | 7607427 | | 122 | 117 | 4.2% | < 0.10 | 91% | 90% | 110% | 108% | 90% | 110% | NA | 80% | 120% |
| Nitrate as N | 7607427 | | 0.73 | 0.73 | 0.0% | < 0.05 | 92% | 90% | 110% | 90% | 90% | 110% | 95% | 80% | 120% |
| Nitrite as N | 7607427 | | <0.10 | <0.10 | NA | < 0.05 | NA | 90% | 110% | 96% | 90% | 110% | 85% | 80% | 120% |
| Bromide | 7607427 | | <0.10 | <0.10 | NA | < 0.05 | 104% | 90% | 110% | 104% | 90% | 110% | 102% | 80% | 120% |
| Sulphate | 7607427 | | 28.2 | 28.2 | 0.0% | < 0.10 | 105% | 90% | 110% | 100% | 90% | 110% | 101% | 80% | 120% |
| Ortho Phosphate as P | 7607427 | | <0.20 | <0.20 | NA | < 0.10 | 107% | 90% | 110% | 106% | 90% | 110% | 116% | 80% | 120% |
| Ammonia as N | 7605143 | | <0.02 | <0.02 | NA | < 0.02 | 90% | 90% | 110% | 97% | 90% | 110% | 95% | 80% | 120% |
| Total Phosphorus | 7602935 | | 0.44 | 0.43 | 2.3% | < 0.05 | 101% | 80% | 120% | 95% | 90% | 110% | 101% | 70% | 130% |
| Total Organic Carbon | 7603116 | | 2.7 | 2.6 | 3.8% | < 0.5 | 98% | 90% | 110% | 92% | 90% | 110% | 97% | 80% | 120% |
| Colour | 7595900 | | 60 | 63 | 4.9% | < 5 | 101% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7606359 | | <0.5 | <0.5 | NA | < 0.5 | 103% | 90% | 110% | NA | | | NA | | |
| Calcium | 7607710 | 7607710 | 73.3 | 74.7 | 1.9% | < 0.05 | 102% | 90% | 110% | 101% | 90% | 110% | 97% | 70% | 130% |
| Magnesium | 7607710 | 7607710 | 22.6 | 23.0 | 1.8% | < 0.05 | 99% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Sodium | 7607710 | 7607710 | 2.65 | 2.63 | 0.8% | < 0.05 | 96% | 90% | 110% | 97% | 90% | 110% | 94% | 70% | 130% |
| Potassium | 7607710 | 7607710 | 1.03 | 1.02 | 1.0% | < 0.05 | 93% | 90% | 110% | 94% | 90% | 110% | 92% | 70% | 130% |
| Aluminum | 7607710 | 7607710 | 0.006 | 0.009 | NA | < 0.004 | 104% | 90% | 110% | 98% | 90% | 110% | 105% | 70% | 130% |
| Antimony | 7607710 | 7607710 | < 0.003 | <0.003 | NA | < 0.003 | 99% | 90% | 110% | 93% | 90% | 110% | 102% | 70% | 130% |
| Arsenic | 7607710 | 7607710 | < 0.003 | <0.003 | NA | < 0.003 | 104% | 90% | 110% | 99% | 90% | 110% | 107% | 70% | 130% |
| Barium | 7607710 | 7607710 | 0.063 | 0.062 | 1.6% | < 0.002 | 103% | 90% | 110% | 99% | 90% | 110% | 105% | 70% | 130% |
| Beryllium | 7607710 | 7607710 | < 0.001 | <0.001 | NA | < 0.001 | 106% | 90% | 110% | 100% | 90% | 110% | 111% | 70% | 130% |
| Boron | 7607710 | 7607710 | 0.012 | 0.011 | NA | < 0.010 | 110% | 90% | 110% | 103% | 90% | 110% | 110% | 70% | 130% |
| Cadmium | 7607710 | 7607710 | < 0.001 | <0.001 | NA | < 0.001 | 100% | 90% | 110% | 99% | 90% | 110% | 118% | 70% | 130% |
| Chromium | 7607710 | 7607710 | < 0.003 | <0.003 | NA | < 0.003 | 104% | 90% | 110% | 98% | 90% | 110% | 105% | 70% | 130% |
| Cobalt | 7607710 | 7607710 | < 0.001 | <0.001 | NA | < 0.001 | 103% | 90% | 110% | 99% | 90% | 110% | 106% | 70% | 130% |
| Copper | 7607710 | 7607710 | < 0.003 | <0.003 | NA | < 0.003 | 104% | 90% | 110% | 99% | 90% | 110% | 105% | 70% | 130% |
| Iron | 7607710 | 7607710 | < 0.010 | <0.010 | NA | < 0.010 | 104% | 90% | 110% | 91% | 90% | 110% | 94% | 70% | 130% |
| Lead | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 99% | 90% | 110% | 94% | 90% | 110% | 98% | 70% | 130% |
| Manganese | 7607710 | 7607710 | 0.004 | 0.004 | NA | < 0.002 | 104% | 90% | 110% | 99% | 90% | 110% | 108% | 70% | 130% |
| Mercury | 7607710 | 7607710 | <0.0001 | <0.0001 | NA | < 0.0001 | 104% | 90% | 110% | 98% | 90% | 110% | 101% | 80% | 120% |
| Molybdenum | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 101% | 90% | 110% | 94% | 90% | 110% | 105% | 70% | 130% |
| Nickel | 7607710 | 7607710 | < 0.003 | <0.003 | NA | < 0.003 | 106% | 90% | 110% | 101% | 90% | 110% | 107% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16T101841
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Selenium | 7607710 | 7607710 | < 0.004 | <0.004 | NA | < 0.004 | 102% | 90% | 110% | 97% | 90% | 110% | 110% | 70% | 130% |
| Silver | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 104% | 90% | 110% | 109% | 90% | 110% | 120% | 70% | 130% |
| Strontium | 7607710 | 7607710 | 0.122 | 0.121 | 0.8% | < 0.005 | 105% | 90% | 110% | 97% | 90% | 110% | 106% | 70% | 130% |
| Thallium | 7607710 | 7607710 | < 0.006 | <0.006 | NA | < 0.006 | 106% | 90% | 110% | 106% | 90% | 110% | 109% | 70% | 130% |
| Tin | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 101% | 90% | 110% | 97% | 90% | 110% | 105% | 70% | 130% |
| Titanium | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 106% | 90% | 110% | 95% | 90% | 110% | 102% | 70% | 130% |
| Tungsten | 7607710 | 7607710 | < 0.010 | <0.010 | NA | < 0.010 | 106% | 90% | 110% | 100% | 90% | 110% | 100% | 70% | 130% |
| Uranium | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 106% | 90% | 110% | 92% | 90% | 110% | 98% | 70% | 130% |
| Vanadium | 7607710 | 7607710 | < 0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 95% | 90% | 110% | 101% | 70% | 130% |
| Zinc | 7607710 | 7607710 | 0.010 | 0.010 | NA | < 0.005 | 101% | 90% | 110% | 96% | 90% | 110% | 102% | 70% | 130% |
| Zirconium | 7607710 | 7607710 | < 0.004 | <0.004 | NA | < 0.004 | 102% | 90% | 110% | 95% | 90% | 110% | 94% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By:

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16T101841
PROJECT: 300033273
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT Laboratories**

TURBDITY 1L

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Laboratory Use Only

Work Order #: 16T101841

Cooler Quantity:

Arrival Temperatures: 8.0 | 7.6 | 7.8
7.2 | 7.4 | 7.3

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

## Report Information:

Company: RJ Burnside + Associates Ltd.
Contact: Dwight Smikle
Address: 292 Speedvale Ave. West
Unit #20, Guelph ONT, N1H 1C4
Phone: Fax:
Reports to be sent to:
1. Email: dwight.smikle@rjburnside.com
2. Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐Regulation 153/04
Table ____ (Indicate One)
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ____ (Indicate One)

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
____ (Indicate One)

## Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 30033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on *Certificate of Analysis*** ☒ Yes ☐ No

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

**Sample Matrix Legend**

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | **ORPs:** ☐B-HWS ☐Cl⁻ ☐CN⁻<br>☐Cr⁶⁺ ☐EC ☐FOC ☐$NO_3/NO_2$<br>☐Total N ☐Hg ☐pH ☐SAR | **Nutrients:** ☐TP ☐$NH_3$ ☐TKN<br>☐$NO_3$ ☐$NO_2$ ☐$NO_3/NO_2$ | **Volatiles:** ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | WQA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | Jun 2 2016 | | 6 | GW | Filtered Metals | | | | | | | | | | | | | | | | X | | | | | | | |
| TW7 | ↓ | | 6 | GW | + Mercury | | | | | | | | | | | | | | | | X | | | | | | | |
| TW5 | | | 6 | GW | For All Samples | | | | | | | | | | | | | | | | X | | | | | | | |
| TW8 | | | 6 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |
| TW9 | | | 6 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |
| TW11 | | | 6 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |

Samples Relinquished By (Print Name and Sign): Matt Valeriote
Date: June 2, 2016
Time:

Samples Received By (Print Name and Sign): Ranji Singh
Date: 2016-June 2
Time: 5:00pm

Samples Relinquished By (Print Name and Sign):
Date:
Time:

Samples Received By (Print Name and Sign): Bina
Date: 16/6/4
Time: 11:06

Page 1 of 1

Nº: T 022151

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16W073428

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Mar 03, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16W073428
PROJECT: 300033273

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MISSISSAUGA, ONTARIO
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-03-02
DATE REPORTED: 2016-03-03

| | | | SAMPLE DESCRIPTION: | TW12N |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 3/1/2016 |
| Parameter | Unit | G / S | RDL | 7417866 |
| Nitrate as N | mg/L | | 0.25 | <0.25 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
7417866 Sample required dilution prior to analysis for Nitrate due to the presence of non-target Anions; the RDL was adjusted accordingly.

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 16W073428
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-03-02

DATE REPORTED: 2016-03-03

| | | | SAMPLE DESCRIPTION: | TW12 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 3/1/2016 |
| Parameter | Unit | G / S | RDL | 7417874 |
| Electrical Conductivity | uS/cm | | 2 | 1740 |
| pH | pH Units | | NA | 7.92 |
| Saturation pH | | | | 6.60 |
| Langelier Index | | | | 1.32 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 1010 |
| Total Dissolved Solids | mg/L | | 20 | 1480 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 195 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 195 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.25 | <0.25 |
| Chloride | mg/L | | 0.50 | 2.30 |
| Nitrate as N | mg/L | | 0.25 | <0.25 |
| Nitrite as N | mg/L | | 0.25 | <0.25 |
| Bromide | mg/L | | 0.25 | <0.25 |
| Sulphate | mg/L | | 2.0 | 875 |
| Ortho Phosphate as P | mg/L | | 0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | 14.2 |
| Ammonia as N | mg/L | | 0.02 | 0.08 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | <0.5 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 5.0 |
| Calcium | mg/L | | 0.10 | 320 |
| Magnesium | mg/L | | 0.10 | 51.6 |
| Sodium | mg/L | | 0.10 | 7.51 |
| Potassium | mg/L | | 0.10 | 1.91 |
| Aluminum | mg/L | | 0.004 | <0.004 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | 0.013 |

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 16W073428
PROJECT: 300033273

5835 COOPERS AVENUE
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-03-02
DATE REPORTED: 2016-03-03

| | | | SAMPLE DESCRIPTION: | TW12 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 3/1/2016 |
| Parameter | Unit | G / S | RDL | 7417874 |
| Barium | mg/L | | 0.002 | 0.005 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.055 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | 0.401 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | 0.026 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | 0.004 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 3.52 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | 0.012 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.036 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 3.66 |

| | |
|---|---|
| Comments: | RDL - Reported Detection Limit; G / S - Guideline / Standard |
| 7417874 | Sample required dilution prior to analysis for Anions & Cations in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were adjusted accordingly. |

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W073428
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis

| RPT Date: Mar 03, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7415208 | | 751 | 751 | 0.0% | < 2 | 102% | 80% | 120% | NA | | | NA | | |
| pH | 7415208 | | 7.85 | 7.87 | 0.3% | NA | 100% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7417874 | 7417874 | 1480 | 1270 | 15.3% | < 20 | 98% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7415208 | | 102 | 104 | 1.9% | < 5 | 101% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7415208 | | 102 | 104 | 1.9% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7415208 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7415208 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7411105 | | <0.5 | <0.5 | NA | < 0.05 | 107% | 90% | 110% | 109% | 90% | 110% | 99% | 80% | 120% |
| Chloride | 7411105 | | 171 | 172 | 0.6% | < 0.10 | 102% | 90% | 110% | 107% | 90% | 110% | 95% | 80% | 120% |
| Nitrate as N | 7411105 | | <0.5 | <0.5 | NA | < 0.05 | 93% | 90% | 110% | 102% | 90% | 110% | 105% | 80% | 120% |
| Nitrite as N | 7411105 | | <0.5 | <0.5 | NA | < 0.05 | NA | 90% | 110% | 94% | 90% | 110% | 90% | 80% | 120% |
| Bromide | 7411105 | | <0.5 | <0.5 | NA | < 0.05 | 109% | 90% | 110% | 104% | 90% | 110% | 89% | 80% | 120% |
| Sulphate | 7411105 | | <1.0 | <1.0 | NA | < 0.10 | 96% | 90% | 110% | 100% | 90% | 110% | 95% | 80% | 120% |
| Ortho Phosphate as P | 7411105 | | <1.0 | <1.0 | NA | < 0.10 | 93% | 90% | 110% | 101% | 90% | 110% | 94% | 80% | 120% |
| Reactive Silica | 7402270 | | 1.97 | 2.00 | 1.5% | < 0.05 | 98% | 90% | 110% | 101% | 90% | 110% | 93% | 80% | 120% |
| Ammonia as N | 7417865 | | 0.06 | 0.06 | NA | < 0.02 | 103% | 90% | 110% | 102% | 90% | 110% | 94% | 80% | 120% |
| Total Phosphorus | 7417874 | 7417874 | < 0.05 | <0.05 | NA | < 0.05 | 103% | 80% | 120% | 98% | 90% | 110% | 101% | 70% | 130% |
| Total Organic Carbon | 7417874 | 7417874 | < 0.5 | <0.5 | NA | < 0.5 | 96% | 90% | 110% | 92% | 90% | 110% | 99% | 80% | 120% |
| Colour | 7417874 | 7417874 | < 5 | <5 | NA | < 5 | 100% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7417874 | 7417874 | 5.0 | 4.8 | 4.1% | < 0.5 | 104% | 90% | 110% | NA | | | NA | | |
| Calcium | 7413138 | | 17.0 | 16.7 | 1.8% | < 0.05 | 103% | 90% | 110% | 105% | 90% | 110% | 100% | 70% | 130% |
| Magnesium | 7413138 | | 3.77 | 3.75 | 0.5% | < 0.05 | 97% | 90% | 110% | 99% | 90% | 110% | 100% | 70% | 130% |
| Sodium | 7413138 | | 80.8 | 81.6 | 1.0% | < 0.05 | 101% | 90% | 110% | 98% | 90% | 110% | 97% | 70% | 130% |
| Potassium | 7413138 | | 0.79 | 0.79 | 0.0% | < 0.05 | 99% | 90% | 110% | 98% | 90% | 110% | 97% | 70% | 130% |
| Aluminum | 7417874 | 7417874 | < 0.004 | <0.004 | NA | < 0.004 | 102% | 90% | 110% | 110% | 90% | 110% | 101% | 70% | 130% |
| Antimony | 7417874 | 7417874 | < 0.003 | <0.003 | NA | < 0.003 | 102% | 90% | 110% | 98% | 90% | 110% | 96% | 70% | 130% |
| Arsenic | 7417874 | 7417874 | 0.013 | 0.013 | NA | < 0.003 | 106% | 90% | 110% | 103% | 90% | 110% | 107% | 70% | 130% |
| Barium | 7417874 | 7417874 | 0.005 | 0.005 | NA | < 0.002 | 99% | 90% | 110% | 99% | 90% | 110% | 94% | 70% | 130% |
| Beryllium | 7417874 | 7417874 | < 0.001 | <0.001 | NA | < 0.001 | 103% | 90% | 110% | 106% | 90% | 110% | 106% | 70% | 130% |
| Boron | 7417874 | 7417874 | 0.055 | 0.058 | 5.3% | < 0.010 | 108% | 90% | 110% | 104% | 90% | 110% | 101% | 70% | 130% |
| Cadmium | 7417874 | 7417874 | < 0.001 | <0.001 | NA | < 0.001 | 102% | 90% | 110% | 100% | 90% | 110% | 103% | 70% | 130% |
| Chromium | 7417874 | 7417874 | < 0.003 | <0.003 | NA | < 0.003 | 100% | 90% | 110% | 102% | 90% | 110% | 97% | 70% | 130% |
| Cobalt | 7417874 | 7417874 | < 0.001 | <0.001 | NA | < 0.001 | 107% | 90% | 110% | 102% | 90% | 110% | 98% | 70% | 130% |
| Copper | 7417874 | 7417874 | < 0.003 | <0.003 | NA | < 0.003 | 102% | 90% | 110% | 102% | 90% | 110% | 96% | 70% | 130% |
| Iron | 7417874 | 7417874 | 0.401 | 0.400 | 0.2% | < 0.010 | 107% | 90% | 110% | 102% | 90% | 110% | 87% | 70% | 130% |
| Lead | 7417874 | 7417874 | < 0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 97% | 90% | 110% | 90% | 70% | 130% |
| Manganese | 7417874 | 7417874 | 0.026 | 0.025 | 3.9% | < 0.002 | 110% | 90% | 110% | 103% | 90% | 110% | 101% | 70% | 130% |
| Mercury | 7417874 | 7417874 | <0.0001 | <0.0001 | NA | < 0.0001 | 99% | 90% | 110% | 101% | 90% | 110% | 93% | 80% | 120% |
| Molybdenum | 7417874 | 7417874 | 0.004 | 0.004 | NA | < 0.002 | 100% | 90% | 110% | 93% | 90% | 110% | 91% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W073428
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Mar 03, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nickel | 7417874 | 7417874 | < 0.003 | <0.003 | NA | < 0.003 | 105% | 90% | 110% | 100% | 90% | 110% | 95% | 70% | 130% |
| Selenium | 7417874 | 7417874 | < 0.004 | <0.004 | NA | < 0.004 | 104% | 90% | 110% | 102% | 90% | 110% | 112% | 70% | 130% |
| Silver | 7417874 | 7417874 | < 0.002 | <0.002 | NA | < 0.002 | 104% | 90% | 110% | 108% | 90% | 110% | 110% | 70% | 130% |
| Strontium | 7417874 | 7417874 | 3.52 | 3.55 | 0.8% | < 0.005 | 99% | 90% | 110% | 97% | 90% | 110% | 85% | 70% | 130% |
| Thallium | 7417874 | 7417874 | < 0.006 | <0.006 | NA | < 0.006 | 107% | 90% | 110% | 106% | 90% | 110% | 100% | 70% | 130% |
| Tin | 7417874 | 7417874 | < 0.002 | <0.002 | NA | < 0.002 | 99% | 90% | 110% | 99% | 90% | 110% | 95% | 70% | 130% |
| Titanium | 7417874 | 7417874 | 0.012 | 0.012 | 0.0% | < 0.002 | 106% | 90% | 110% | 103% | 90% | 110% | 96% | 70% | 130% |
| Tungsten | 7417874 | 7417874 | < 0.010 | <0.010 | NA | < 0.010 | 93% | 90% | 110% | 91% | 90% | 110% | 91% | 70% | 130% |
| Uranium | 7417874 | 7417874 | < 0.002 | <0.002 | NA | < 0.002 | 103% | 90% | 110% | 97% | 90% | 110% | 92% | 70% | 130% |
| Vanadium | 7417874 | 7417874 | < 0.002 | <0.002 | NA | < 0.002 | 107% | 90% | 110% | 103% | 90% | 110% | 97% | 70% | 130% |
| Zinc | 7417874 | 7417874 | 0.036 | 0.036 | 0.0% | < 0.005 | 105% | 90% | 110% | 104% | 90% | 110% | 110% | 70% | 130% |
| Zirconium | 7417874 | 7417874 | < 0.004 | <0.004 | NA | < 0.004 | 98% | 90% | 110% | 94% | 90% | 110% | 91% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: ____________________

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16W073428
PROJECT: 300033273
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W073428

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance | | SM 1030 E | CALCULATION |

**AGAT** Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
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webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: RJ Burnside & Associates Ltd.
Contact: Jim Baxter
Address: 299 Speedvale Ave. West, Unit 2
Guelph ONT
Phone: Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Project Information:

Project: 300037273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

## Regulatory Requirements: ☐ No Regulatory Requirement

*(Please check all applicable boxes)*

☐ Regulation 153/04
Table ______ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ______ *Indicate One*

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
______ *Indicate One*

**Is this submission for a Record of Site Condition?**
☐ Yes ☒ No

**Report Guideline on Certificate of Analysis**
☐ Yes ☒ No

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

## Laboratory Use Only

Work Order #: 16W073428
Cooler Quantity:
Arrival Temperatures: 7.6 | 7.2 | 7.8
6.9 | 7.1 | 7
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: on ice

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ $Cr^{6+}$ ☐ EC ☐ FOC ☐ $NO_3/NO_2$ ☐ Total N ☐ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN ☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrates | MWQA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW12W | March 1, 2016 | 12:10 | 1 | GW | | | | | | | | | | | | | | | | | x | |
| TW12 | March 1, 2016 | 14:00 | 6 | GW | | | | | | | | | | | | | | | | | | x |

Samples Relinquished By (Print Name and Sign): Matt Valeriote / Date: March 2, 2016 Time:
Samples Relinquished By (Print Name and Sign): Date: Time:

Samples Received By (Print Name and Sign): M. Kelly/Maggie Kelly Date: 2016/03/2 Time: 9:15 Am
Samples Received By (Print Name and Sign): Simran Date: 16/3/3 Time: 9:29

Page 1 of 1

Nº: T014314

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 320033273

AGAT WORK ORDER: 16W074674

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Mar 09, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16W074674
PROJECT: 320033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:MV

## Nitrate (Water)

DATE RECEIVED: 2016-03-08
DATE REPORTED: 2016-03-09

| | | | SAMPLE DESCRIPTION: | TW4 | TW11 | TW8 |
|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water |
| | | | DATE SAMPLED: | 3/7/2016 | 3/7/2016 | 3/7/2016 |
| Parameter | Unit | G / S | RDL | 7426607 | 7426610 | 7426611 |
| Nitrate as N | mg/L | | 0.05 | 2.97 | 5.03 | 7.76 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Parvathi Malemath

Parvathi

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 320033273
SAMPLING SITE:

AGAT WORK ORDER: 16W074674
ATTENTION TO: Jim Baxter
SAMPLED BY:MV

## Water Analysis

| RPT Date: Mar 09, 2016 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 7427214 | | 3.61 | 3.59 | 0.6% | < 0.05 | 104% | 90% | 110% | 109% | 90% | 110% | 101% | 80% | 120% |

Certified By:

Parvathi Malemath

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W074674

PROJECT: 320033273

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:MV

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

**AGAT** Laboratories

/ Brag

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

## Laboratory Use Only

Work Order #: 16W074674

Cooler Quantity:

Arrival Temperatures: 2.8 | 2.8 | 2.9
2.6 | 2.6 | 2.7

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: RJ Burnside & Associates Ltd
Contact: Jim Baxter
Address: 292 Speedvale Ave. West Unit 20
Guelph Ont
Phone: Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐Regulation 153/04
Table ____ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ____ Indicate One

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
____ Indicate One

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

RUSH!

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 300033277
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

**Is this submission for a Record of Site Condition?**
☐ Yes ☒ No

***Report Guideline on Certificate of Analysis***
☒ Yes ~~☐ No~~

## Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐B-HWS ☐Cl⁻ ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO₃/NO₂ ☐Total N ☐Hg ☐pH ☐SAR | Nutrients: ☐TP ☐NH₃ ☐TKN ☐NO₃ ☐NO₂ ☐NO₃/NO₂ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW4 | March 7 2016 | | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |
| TW11 | 〃 | | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |
| TW8 | 〃 | | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | |
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| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time | |
|---|---|---|---|---|---|---|
| Matt Valeriote | March 8 2016 | | M.Kelly Maggie Kelly | 2016/3/8 | 8:30 Am | Page 1 of 1 |
| M.Kelly Maggie Kelly | 2016/3/8 | 12:25 | | 2016/03/08 | 12:25 | Nº: T 014328 |

2016/03/08 1:23

Shaumin & Mar 8/16 1:23

Document ID: DIV-78-1511.009

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: Jan 8, 2015

5835 COOPERS AVENUE
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CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16W074853

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Mar 10, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16W074853
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Jim Baxter
SAMPLING SITE:
SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-03-09
DATE REPORTED: 2016-03-10

| | | | SAMPLE DESCRIPTION: | TW5 | TW7 | TW9 | | TW3 | | TW2 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | | Water | | Water |
| | | | DATE SAMPLED: | 3/8/2016 | 3/8/2016 | 3/8/2016 | | 3/8/2016 | | 3/8/2016 |
| Parameter | Unit | G / S | RDL | 7430208 | 7430212 | 7430214 | RDL | 7430216 | RDL | 7430218 |
| Nitrate as N | mg/L | | 0.05 | 7.80 | 7.27 | 3.41 | 0.25 | 0.54 | 0.05 | 0.58 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
7430216 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By: Amanjot Bhela

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W074853
ATTENTION TO: Jim Baxter
SAMPLED BY:

## Water Analysis

| RPT Date: Mar 10, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 7430216 | 7430216 | 0.54 | 0.56 | 3.6% | < 0.05 | 108% | 90% | 110% | 108% | 90% | 110% | 110% | 80% | 120% |

Certified By: Amanjot Bhela

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

SAMPLING SITE:

AGAT WORK ORDER: 16W074853

ATTENTION TO: Jim Baxter

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

**AGAT** Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

**Laboratory Use Only**

Work Order #: 16W074853

Cooler Quantity:

Arrival Temperatures: 7.6 | 7.0 | 7.2
7.1 | 7.4 | 6.9

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

## Report Information:

Company: RJ Burnside + Associates Ltd
Contact: Jim Baxter
Address: 299 Speedvale Ave. West unit 20
Guelph, ONT
Phone: Fax:
Reports to be sent to:
1. Email: jim.baxter@rjburnside.com
2. Email:

## Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐Regulation 153/04
Table ______ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ______ Indicate One

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
______ Indicate One

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on Certificate of Analysis** ☐ Yes ☒ No

## Turnaround Time (TAT) Required:

RUSH!!

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

## Project Information:

Project: 300033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

**Sample Matrix Legend**

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | (Check Applicable) ORPs: ☐B-HWS ☐Cl⁻ ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO₃/NO₂ ☐Total N ☐Hg ☐pH ☐SAR | Nutrients: ☐TP ☐NH₃ ☐TKN ☐NO₃ ☐NO₂ ☐NO₃/NO₂ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW5 | March 9, 2016 | 10:40 | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | | |
| TW7 | " | 11:15 | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | | |
| TW9 | " | 11:50 | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | | |
| TW3 | " | 12:30 | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | | |
| TW2 | " | 13:00 | 1 | GW | | | | | | | | | | | | | | | | | X | | | | | | | | |
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Samples Relinquished By (Print Name and Sign): Matt Valeriote / Date: March 9, 2016 Time:

Samples Relinquished By (Print Name and Sign): Date: Time:

Samples Received By (Print Name and Sign): M. Kelly Maggie Kelly Date: 2016/3/8 Time: 4:10 pm

Samples Received By (Print Name and Sign): Sima Date: 16/03/3 Time: 9:44

Page 1 of 1

Nº T014329

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: Belfountain

AGAT WORK ORDER: 16W082447

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: Apr 06, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16W082447

PROJECT: Belfountain

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-04-05

DATE REPORTED: 2016-04-05

| | | | SAMPLE DESCRIPTION: | TW11-1 hr | TW11-26 hr | TW6-1 hr | TW6-26 hr |
|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 3/30/2016 | 3/31/2016 | 4/1/2016 | 4/2/2016 |
| Parameter | Unit | G / S | RDL | 7471112 | 7471114 | 7471115 | 7471117 |
| Nitrate as N | mg/L | | 0.05 | 3.46 | 3.37 | 7.89 | 8.23 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: Sofia Pehlyova

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: Belfountain
SAMPLING SITE:

AGAT WORK ORDER: 16W082447
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 7469191 | | 1.99 | 1.92 | 3.6% | < 0.05 | 99% | 90% | 110% | 108% | 90% | 110% | 106% | 80% | 120% |

Certified By: Sofia Pehlyova

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W082447

PROJECT: Belfountain

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

**AGAT Laboratories**

RUSH!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

**Laboratory Use Only**

Work Order #: 16W082447

Cooler Quantity:

Arrival Temperatures: 7.5 | 4.9 | 5.6
4.9 | 5.5 | 5.7

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

Page 5 of 5

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: Burnside
Contact: Dwight Smikle
Address: 292 Speedvale Ave West
Geulph, ON
Phone: 519 823 4995 Fax:
Reports to be sent to:
1. Email: Dwight.Smikle@rjburnside.com
2. Email: Sean.Quinlan@rjburnside.com

## Project Information:

Project: Belfountain
Site Location: 300033273
Sampled By: Sean Quinlan
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

## Regulatory Requirements: ☑ No Regulatory Requirement

*(Please check all applicable boxes)*

☐Regulation 153/04
Table (Indicate One)
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region (Indicate One)

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
(Indicate One)

**Is this submission for a Record of Site Condition?** ☐ Yes ☑ No

**Report Guideline on *Certificate of Analysis*** ☐ Yes ☑ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☑ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

***Please provide prior notification for rush TAT***
**TAT is exclusive of weekends and statutory holidays*

**Sample Matrix Legend**

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| | | | | | | Field Filtered - Metals, Hg, CrVI (Please Circle) | | | | | (Check Applicable) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Y / N | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐ B-HWS ☐ Cl ☐ CN<br>☐ $Cr^{6+}$ ☐ EC ☐ FOC ☐ $NO_3/NO_2$<br>☐ Total N ☐ Hg ☐ pH ☐ SAR | Nutrients: ☐ TP ☐ $NH_3$ ☐ TKN<br>☐ $NO_3$ ☐ $NO_2$ ☐ $NO_3/NO_2$ | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | Nitrate | | | | | | |
| TW11 - 1 hr | 30 Mar 16 | 12:30 | 1 | GW | | N | | | | | | | | | | | | | | | | ☑ | | | | | | |
| TW11 - 26 hr | 31 Mar 16 | 13:00 | 1 | GW | | N | | | | | | | | | | | | | | | | ☑ | | | | | | |
| TW6 - 1 hr | 1 Apr 16 | 12:00 | 1 | GW | | N | | | | | | | | | | | | | | | | ☑ | | | | | | |
| TW6 - 26 hr | 2 Apr 16 | 14:55 | 1 | GW | | N | | | | | | | | | | | | | | | | ☑ | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 24 HR RUSH TAT REQUESTED | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | |
|---|---|---|---|---|---|---|
| Samples Relinquished By (Print Name and Sign): Sean Quinlan | Date 4 April 16 | Time 10:55 | Samples Received By (Print Name and Sign): M. Kelly Maggie Kelly | Date 2016/04/04 | Time 4:30 pm | |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): Sima | Date 16/5/4 | Time 900 | Page 1 of 1 |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time | Nº: |

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16W138240

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: Sep 26, 2016

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 16W138240
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-09-16
DATE REPORTED: 2016-09-26

| | | | SAMPLE DESCRIPTION: | TW5 | | TW2 | | TW7 | TW8 | | TW9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | | Water | | Water | Water | | Water |
| | | | DATE SAMPLED: | 9/15/2016 | | 9/15/2016 | | 9/15/2016 | 9/15/2016 | | 9/15/2016 |
| Parameter | Unit | G / S | RDL | 7853172 | RDL | 7853176 | RDL | 7853182 | 7853189 | RDL | 7853195 |
| Electrical Conductivity | uS/cm | | 2 | 667 | 2 | 575 | 2 | 606 | 598 | 2 | 594 |
| pH | pH Units | | NA | 8.08 | NA | 8.17 | NA | 8.14 | 8.08 | NA | 8.15 |
| Saturation pH | | | | 7.04 | | 6.96 | | 7.01 | 7.01 | | 7.00 |
| Langelier Index | | | | 1.04 | | 1.21 | | 1.13 | 1.07 | | 1.15 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 280 | 0.5 | 294 | 0.5 | 284 | 296 | 0.5 | 289 |
| Total Dissolved Solids | mg/L | | 20 | 358 | 20 | 308 | 20 | 334 | 364 | 20 | 332 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 237 | 5 | 271 | 5 | 247 | 238 | 5 | 249 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 237 | 5 | 271 | 5 | 247 | 238 | 5 | 249 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 | 5 | <5 | 5 | <5 | <5 | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 | 5 | <5 | 5 | <5 | <5 | 5 | <5 |
| Fluoride | mg/L | | 0.10 | <0.10 | 0.05 | <0.05 | 0.10 | <0.10 | <0.10 | 0.05 | <0.05 |
| Chloride | mg/L | | 0.20 | 41.2 | 0.10 | 5.96 | 0.20 | 17.4 | 9.46 | 0.10 | 9.76 |
| Nitrate as N | mg/L | | 0.10 | 7.18 | 0.05 | 0.82 | 0.10 | 6.97 | 7.85 | 0.05 | 2.17 |
| Nitrite as N | mg/L | | 0.10 | <0.10 | 0.05 | <0.05 | 0.10 | <0.10 | <0.10 | 0.05 | <0.05 |
| Bromide | mg/L | | 0.10 | <0.10 | 0.05 | <0.05 | 0.10 | <0.10 | <0.10 | 0.05 | <0.05 |
| Sulphate | mg/L | | 0.20 | 20.1 | 0.10 | 25.6 | 0.20 | 18.5 | 43.5 | 0.10 | 45.3 |
| Ortho Phosphate as P | mg/L | | 0.20 | <0.20 | 0.10 | <0.10 | 0.20 | <0.20 | <0.20 | 0.10 | <0.10 |
| Reactive Silica | mg/L | | 0.05 | 7.43 | 0.05 | 11.8 | 0.05 | 7.12 | 7.49 | 0.05 | 8.77 |
| Ammonia as N | mg/L | | 0.02 | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 | <0.02 | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 | 0.05 | 0.05 | 0.05 | <0.05 | 0.06 | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.6 | 0.5 | 1.1 | 0.5 | 1.0 | 1.5 | 0.5 | 0.9 |
| Colour | TCU | | 5 | <5 | 5 | <5 | 5 | <5 | <5 | 5 | <5 |
| Turbidity | NTU | | 0.5 | 1.7 | 0.5 | 110 | 0.5 | 4.8 | 113 | 0.5 | 2.4 |
| Calcium | mg/L | | 0.05 | 76.6 | 0.05 | 77.6 | 0.05 | 77.5 | 80.6 | 0.05 | 76.2 |
| Magnesium | mg/L | | 0.05 | 21.6 | 0.05 | 24.3 | 0.05 | 21.9 | 22.9 | 0.05 | 23.9 |
| Sodium | mg/L | | 0.05 | 16.0 | 0.05 | 3.10 | 0.05 | 6.44 | 3.22 | 0.05 | 4.03 |
| Potassium | mg/L | | 0.05 | 0.90 | 0.05 | 1.12 | 0.05 | 0.87 | 1.17 | 0.05 | 0.89 |
| Aluminum | mg/L | | 0.004 | 0.010 | 0.004 | 0.014 | 0.004 | 0.012 | 0.011 | 0.004 | 0.010 |
| Antimony | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | 0.003 | <0.003 |

Certified By: Sofia Pehlyova

# Certificate of Analysis

AGAT WORK ORDER: 16W138240
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-09-16

DATE REPORTED: 2016-09-26

| | | | SAMPLE DESCRIPTION: | TW5 | | TW2 | | TW7 | TW8 | | TW9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | | Water | | Water | Water | | Water |
| | | | DATE SAMPLED: | 9/15/2016 | | 9/15/2016 | | 9/15/2016 | 9/15/2016 | | 9/15/2016 |
| Parameter | Unit | G / S | RDL | 7853172 | RDL | 7853176 | RDL | 7853182 | 7853189 | RDL | 7853195 |
| Barium | mg/L | | 0.002 | 0.112 | 0.002 | 0.092 | 0.002 | 0.099 | 0.085 | 0.002 | 0.074 |
| Beryllium | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | 0.022 | 0.010 | 0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | <0.010 | 0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 | 0.002 | 0.003 | 0.002 | <0.002 | 0.005 | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 | 0.0001 | <0.0001 | 0.0001 | <0.0001 | <0.0001 | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | <0.004 | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.155 | 0.005 | 0.134 | 0.005 | 0.124 | 1.66 | 0.005 | 0.279 |
| Thallium | mg/L | | 0.006 | <0.006 | 0.006 | <0.006 | 0.006 | <0.006 | <0.006 | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | <0.010 | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.016 | 0.005 | 0.009 | 0.005 | 0.020 | 0.024 | 0.005 | 0.028 |
| Zirconium | mg/L | | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | <0.004 | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 3.91 | NA | 1.18 | NA | 2.78 | 3.31 | NA | 3.13 |

Certified By: Sofiia Pehlyova

# Certificate of Analysis

AGAT WORK ORDER: 16W138240
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-09-16

DATE REPORTED: 2016-09-26

| | | | SAMPLE DESCRIPTION: | TW11 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 9/15/2016 |
| Parameter | Unit | G / S | RDL | 7853203 |
| Electrical Conductivity | uS/cm | | 2 | 589 |
| pH | pH Units | | NA | 8.20 |
| Saturation pH | | | | 6.99 |
| Langelier Index | | | | 1.21 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 286 |
| Total Dissolved Solids | mg/L | | 20 | 314 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 258 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 258 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 |
| Fluoride | mg/L | | 0.05 | <0.05 |
| Chloride | mg/L | | 0.10 | 12.7 |
| Nitrate as N | mg/L | | 0.05 | 4.08 |
| Nitrite as N | mg/L | | 0.05 | <0.05 |
| Bromide | mg/L | | 0.05 | <0.05 |
| Sulphate | mg/L | | 0.10 | 21.3 |
| Ortho Phosphate as P | mg/L | | 0.10 | <0.10 |
| Reactive Silica | mg/L | | 0.05 | 7.88 |
| Ammonia as N | mg/L | | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.8 |
| Colour | TCU | | 5 | <5 |
| Turbidity | NTU | | 0.5 | 4.9 |
| Calcium | mg/L | | 0.05 | 77.5 |
| Magnesium | mg/L | | 0.05 | 22.4 |
| Sodium | mg/L | | 0.05 | 5.49 |
| Potassium | mg/L | | 0.05 | 0.97 |
| Aluminum | mg/L | | 0.004 | 0.013 |
| Antimony | mg/L | | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 |

Certified By: Sofia Pehlyova

AGAT Laboratories

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 16W138240
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

## Water Quality Assessment

DATE RECEIVED: 2016-09-16
DATE REPORTED: 2016-09-26

| | | | SAMPLE DESCRIPTION: | TW11 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 9/15/2016 |
| Parameter | Unit | G / S | RDL | 7853203 |
| Barium | mg/L | | 0.002 | 0.059 |
| Beryllium | mg/L | | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.128 |
| Thallium | mg/L | | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.016 |
| Zirconium | mg/L | | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 2.28 |

Certified By: Sofiea Pehlyora

## Water Quality Assessment

DATE RECEIVED: 2016-09-16

DATE REPORTED: 2016-09-26

| | |
|---|---|
| Comments: | RDL - Reported Detection Limit; G / S - Guideline / Standard |
| 7853172 | Elevated RDLs for Anions indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.<br>Turbidity Analysis: Hold time of 48 hours for this parameter was exceeded. Samples were received and analyzed past hold time. Review data with discretion. |
| 7853182 | Elevated RDLs for Anions indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.<br>Turbidity Analysis: Hold time of 48 hours for this parameter was exceeded. Samples were received and analyzed past hold time. Review data with discretion. |

Certified By: Sofia Pehlyova

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W138240
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: Sep 26, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | | | | | |
| Electrical Conductivity | 7854077 | | 1770 | 1760 | 0.6% | < 2 | 97% | 80% | 120% | NA | | | NA | | |
| pH | 7854077 | | 7.24 | 7.16 | 1.1% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 7853217 | | 364 | 360 | 1.1% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 7854077 | | 777 | 784 | 0.9% | < 5 | 95% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 7854077 | | 777 | 784 | 0.9% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 7854077 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 7854077 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 7857463 | | <0.25 | <0.25 | NA | < 0.05 | 95% | 90% | 110% | 97% | 90% | 110% | 99% | 80% | 120% |
| Chloride | 7857463 | | 129 | 129 | 0.0% | < 0.10 | 95% | 90% | 110% | 103% | 90% | 110% | 102% | 80% | 120% |
| Nitrate as N | 7857463 | | 14.6 | 14.7 | 0.7% | < 0.05 | 93% | 90% | 110% | 103% | 90% | 110% | 110% | 80% | 120% |
| Nitrite as N | 7857463 | | <0.25 | <0.25 | NA | < 0.05 | NA | 90% | 110% | 90% | 90% | 110% | 93% | 80% | 120% |
| Bromide | 7857463 | | <0.25 | <0.25 | NA | < 0.05 | 106% | 90% | 110% | 103% | 90% | 110% | 107% | 80% | 120% |
| Sulphate | 7857463 | | 35.4 | 35.4 | 0.0% | < 0.10 | 98% | 90% | 110% | 100% | 90% | 110% | 103% | 80% | 120% |
| Ortho Phosphate as P | 7857463 | | <0.50 | <0.50 | NA | < 0.10 | 104% | 90% | 110% | 96% | 90% | 110% | 102% | 80% | 120% |
| Reactive Silica | 7848788 | | 18.3 | 18.3 | 0.0% | < 0.05 | 100% | 90% | 110% | 102% | 90% | 110% | 100% | 80% | 120% |
| Ammonia as N | 7853203 | 7853203 | <0.02 | <0.02 | NA | < 0.02 | 110% | 90% | 110% | 101% | 90% | 110% | 98% | 80% | 120% |
| Total Phosphorus | 7853203 | 7853203 | <0.05 | <0.05 | NA | < 0.05 | 99% | 80% | 120% | 100% | 90% | 110% | 98% | 70% | 130% |
| Total Organic Carbon | 7853182 | 7853182 | 1.0 | 0.8 | NA | < 0.5 | 100% | 90% | 110% | 103% | 90% | 110% | 98% | 80% | 120% |
| Colour | 7853217 | | <5 | <5 | NA | < 5 | 100% | 90% | 110% | NA | | | NA | | |
| Turbidity | 7853172 | 7853172 | 1.7 | 1.5 | NA | < 0.5 | 104% | 90% | 110% | NA | | | NA | | |
| Calcium | 7853398 | | 49.8 | 53.8 | 7.7% | < 0.05 | 100% | 90% | 110% | 97% | 90% | 110% | 99% | 70% | 130% |
| Magnesium | 7853398 | | 8.04 | 8.68 | 7.7% | < 0.05 | 98% | 90% | 110% | 95% | 90% | 110% | 96% | 70% | 130% |
| Sodium | 7853398 | | 7.45 | 8.07 | 8.0% | < 0.05 | 94% | 90% | 110% | 92% | 90% | 110% | 95% | 70% | 130% |
| Potassium | 7853398 | | 3.17 | 3.42 | 7.6% | < 0.05 | 99% | 90% | 110% | 96% | 90% | 110% | 97% | 70% | 130% |
| Aluminum | 7853172 | 7853172 | 0.010 | 0.010 | NA | < 0.004 | 101% | 90% | 110% | 102% | 90% | 110% | 97% | 70% | 130% |
| Antimony | 7853172 | 7853172 | <0.003 | <0.003 | NA | < 0.003 | 98% | 90% | 110% | 91% | 90% | 110% | 92% | 70% | 130% |
| Arsenic | 7853172 | 7853172 | <0.003 | <0.003 | NA | < 0.003 | 104% | 90% | 110% | 99% | 90% | 110% | 100% | 70% | 130% |
| Barium | 7853172 | 7853172 | 0.112 | 0.110 | 1.8% | < 0.002 | 105% | 90% | 110% | 100% | 90% | 110% | 98% | 70% | 130% |
| Beryllium | 7853172 | 7853172 | <0.001 | <0.001 | NA | < 0.001 | 99% | 90% | 110% | 100% | 90% | 110% | 112% | 70% | 130% |
| Boron | 7853172 | 7853172 | <0.010 | <0.010 | NA | < 0.010 | 98% | 90% | 110% | 97% | 90% | 110% | 97% | 70% | 130% |
| Cadmium | 7853172 | 7853172 | <0.001 | <0.001 | NA | < 0.001 | 100% | 90% | 110% | 97% | 90% | 110% | 95% | 70% | 130% |
| Chromium | 7853172 | 7853172 | <0.003 | <0.003 | NA | < 0.003 | 102% | 90% | 110% | 101% | 90% | 110% | 101% | 70% | 130% |
| Cobalt | 7853172 | 7853172 | <0.001 | <0.001 | NA | < 0.001 | 102% | 90% | 110% | 98% | 90% | 110% | 98% | 70% | 130% |
| Copper | 7853172 | 7853172 | <0.003 | <0.003 | NA | < 0.003 | 105% | 90% | 110% | 104% | 90% | 110% | 102% | 70% | 130% |
| Iron | 7853172 | 7853172 | <0.010 | <0.010 | NA | < 0.010 | 107% | 90% | 110% | 97% | 90% | 110% | 94% | 70% | 130% |
| Lead | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 96% | 90% | 110% | 95% | 70% | 130% |
| Manganese | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 105% | 90% | 110% | 99% | 90% | 110% | 101% | 70% | 130% |
| Mercury | 7853172 | 7853172 | <0.0001 | <0.0001 | NA | < 0.0001 | 104% | 90% | 110% | 101% | 90% | 110% | 103% | 80% | 120% |
| Molybdenum | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 98% | 90% | 110% | 94% | 90% | 110% | 98% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W138240
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Sep 26, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nickel | 7853172 | 7853172 | <0.003 | <0.003 | NA | < 0.003 | 103% | 90% | 110% | 100% | 90% | 110% | 98% | 70% | 130% |
| Selenium | 7853172 | 7853172 | <0.004 | <0.004 | NA | < 0.004 | 96% | 90% | 110% | 96% | 90% | 110% | 100% | 70% | 130% |
| Silver | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 102% | 90% | 110% | 104% | 90% | 110% | 107% | 70% | 130% |
| Strontium | 7853172 | 7853172 | 0.155 | 0.153 | 1.3% | < 0.005 | 105% | 90% | 110% | 97% | 90% | 110% | 98% | 70% | 130% |
| Thallium | 7853172 | 7853172 | <0.006 | <0.006 | NA | < 0.006 | 105% | 90% | 110% | 104% | 90% | 110% | 101% | 70% | 130% |
| Tin | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 95% | 90% | 110% | 97% | 90% | 110% | 97% | 70% | 130% |
| Titanium | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 97% | 90% | 110% | 94% | 90% | 110% | 94% | 70% | 130% |
| Tungsten | 7853172 | 7853172 | <0.010 | <0.010 | NA | < 0.010 | 98% | 90% | 110% | 101% | 90% | 110% | 100% | 70% | 130% |
| Uranium | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 99% | 90% | 110% | 97% | 70% | 130% |
| Vanadium | 7853172 | 7853172 | <0.002 | <0.002 | NA | < 0.002 | 96% | 90% | 110% | 94% | 90% | 110% | 95% | 70% | 130% |
| Zinc | 7853172 | 7853172 | 0.016 | 0.016 | NA | < 0.005 | 104% | 90% | 110% | 102% | 90% | 110% | 103% | 70% | 130% |
| Zirconium | 7853172 | 7853172 | <0.004 | <0.004 | NA | < 0.004 | 96% | 90% | 110% | 89% | 90% | 110% | 86% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.
QA Qualifier for Zirconium : In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

Certified By: Sofia Pehlyova

# QA Violation

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

| RPT Date: Sep 26, 2016 | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Sample Id | Sample Description | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment | | | | | | | | | | | |
| Zirconium | 7853172 | TW5 | 96% | 90% | 110% | 89% | 90% | 110% | 86% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.
QA Qualifier for Zirconium : In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 16W138240
PROJECT: 300033273
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | AQ2 EPA-122A & SM 4500 SiO2 D | AQ2 DISCRETE ANALYSER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

SAMPLING SITE:

AGAT WORK ORDER: 16W138240

ATTENTION TO: Dwight Smikle

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT** Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

**Laboratory Use Only**

Work Order #: 16W138240

Cooler Quantity:

Arrival Temperatures: 3.7 | 3.3 | 2.9
C7 2.6 | 2.0 | 3.4

Custody Seal Intact: ☐Yes ☐No ☒N/A

Notes: on ice

**Report Information:**

Company: RJ Burnside + Associates Ltd.
Contact: Dwight Smikle
Address: 292 Speedvale Ave. West
Guelph, ONT
Phone: 519-823-4995 Fax:
Reports to be sent to:
1. Email: D.Smikle@rjburnside.com
2. Email:

**Regulatory Requirements:** ☒ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐ Sewer Use
☐Sanitary
☐Storm
Region ___ Indicate One

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
___ Indicate One

**Turnaround Time (TAT) Required:**

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**Project Information:**

Project: ~~Belfountain~~ 30033273
Site Location: Belfountain
Sampled By: Matt V. Sean Q.
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

**Report Guideline on Certificate of Analysis** ☒ Yes ☐ No

**Invoice Information:** Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

**Sample Matrix Legend**

| | |
|---|---|
| B | Biota |
| GW | Ground Water |
| O | Oil |
| P | Paint |
| S | Soil |
| SD | Sediment |
| SW | Surface Water |

(Check Applicable)

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - [✓ Metals], [✓ Hg], CrVI (Please Circle) [✓ Y]/N | Metals and Inorganics | Metal Scan | Hydride Forming Metals | Client Custom Metals | ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐NO₃/NO₂ ☐Total N ☐Hg ☐pH ☐SAR | Nutrients: ☐TP ☐NH₃ ☐TKN ☐NO₃ ☐NO₂ ☐NO₃/NO₂ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | Chlorophenols | PCBs | Organochlorine Pesticides | TCLP Metals/Inorganics | Sewer Use | WQA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW5 | Sept. 15 2016 | 8:30 | 6 | GW | | Y | | | | | | | | | | | | | | | | X |
| TW2 | ↓ | 12:30 | ↓ | ↓ | * Metals + Mercury BOTH Field Filtered | Y | | | | | | | | | | | | | | | | X |
| TW7 | | 9:15 | | | | Y | | | | | | | | | | | | | | | | X |
| TW8 | | 10:00 | | | | Y | | | | | | | | | | | | | | | | X |
| TW9 | | 11:00 | | | | Y | | | | | | | | | | | | | | | | X |
| TW11 | | 11:45 | | | | Y | | | | | | | | | | | | | | | | X |

Samples Relinquished By (Print Name and Sign): Matt Valeriote Date: Sept. 15, 2016 Time:
Samples Received By (Print Name and Sign): M. Venne M/Venne Date: 2016/9/15 Time: 4:30pm

Samples Relinquished By (Print Name and Sign): Date: Time:
Samples Received By (Print Name and Sign): Date: Time:

Samples Relinquished By (Print Name and Sign): Date: Time:
Samples Received By (Print Name and Sign): Shaumin Sept 17/16 Date: Time: 9:40am

Page 1 of 1

Nº: T 034695

Document ID:Div-78-1511.011

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued Feb 18, 2016

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Matt Valeriote

PROJECT: 300033273

AGAT WORK ORDER: 16W170996

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Dec 15, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 16W170996
PROJECT: 300033273

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Matt Valeriote
SAMPLED BY:

## Nitrate (Water)

DATE RECEIVED: 2016-12-15

DATE REPORTED: 2016-12-15

| | | | SAMPLE DESCRIPTION: | TW2 | TW7 | TW9 | TW5 | TW8 | TW11 |
|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 2016-12-13 | 2016-12-13 | 2016-12-13 | 2016-12-13 | 2016-12-13 | 2016-12-13 |
| Parameter | Unit | G / S | RDL | 8091589 | 8091592 | 8091593 | 8091594 | 8091595 | 8091596 |
| Nitrate as N | mg/L | | 0.05 | 0.67 | 5.96 | 1.51 | 6.34 | 7.41 | 3.58 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By: Amanjot Bhela

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 16W170996
ATTENTION TO: Matt Valeriote
SAMPLED BY:

## Water Analysis

| RPT Date: Dec 15, 2016 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 8086759 | | <0.05 | <0.05 | NA | < 0.05 | 93% | 90% | 110% | 99% | 90% | 110% | 97% | 80% | 120% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Amanjot Bhela

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W170996

PROJECT: 300033273

ATTENTION TO: Matt Valeriote

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

**AGAT Laboratories**

15m

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

## Laboratory Use Only

Work Order #: 16W170996

Cooler Quantity:

Arrival Temperatures: 1.8 | 1.9 6.2
6 | 5.9 | 5.7

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water intended for human consumption)

## Report Information:

Company: BURNSIDE
Contact: Matt Valeriote
Address: 292 Speedvale Ave West
Unit 20, Guelph
Phone: 823-4995 Fax:
Reports to be sent to:
1. Email: Matt.Valeriote@rjburnside.com
2. Email:

## Regulatory Requirements: ☒ No Regulatory Requirement

*(Please check all applicable boxes)*

☐ Regulation 153/04
Table ____ *Indicate One*
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture *(Check One)*
☐Coarse
☐Fine

☐Sewer Use
☐Sanitary
☐Storm
Region ____ *Indicate One*

☐Regulation 558
☐CCME
☐Prov. Water Quality Objectives (PWQO)
☐Other
____ *Indicate One*

**Is this submission for a Record of Site Condition?** ☐ Yes ☒ No

**Report Guideline on Certificate of Analysis** ☐ Yes ☒ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**For 'Same Day' analysis, please contact your AGAT CPM**

## Project Information:

Project: 300033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - Metals, Hg, CrVI Y / N | Metals and Inorganics (O. Reg 153) | ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals (O. Reg 153) | ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR (O. Reg 153) | Full Metals Scan | Regulation/Custom Metals | Nutrients: ☐ TP ☐ NH3 ☐ TKN ☒ NO3 ☐ NO2 ☐ NO3+NO2 | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | PCBs: ☐ Total ☐ Aroclors | Organochlorine Pesticides | TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐PCBs | Sewer Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW2 | 13DEC16 | 11:34 | 1 | GW | | | | | | | | ✓ | | | | | | | | |
| TW7 | | 9:38 | | | | | | | | | | ✓ | | | | | | | | |
| TW9 | | 10:02 | | | | | | | | | | ✓ | | | | | | | | |
| TW5 | | 9:08 | | | | | | | | | | ✓ | | | | | | | | |
| TW8 | | 10:40 | | | | | | | | | | ✓ | | | | | | | | |
| TW11 | | 10:58 | | | | | | | | | | ✓ | | | | | | | | |

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| Matt Valeriote / | Dec. 14, 2016 | 15:00 | | 2016-Dec 15 | 15:00pm |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): Siman | Date 16/12/15 | Time 856 |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |

Page 1 of 1

Nº: T 042376

Document ID: DIV 78-1511.013

Pink Copy - Client I Yellow Copy - AGAT I White Copy- AGAT

Date Issued: September 30, 2016

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 17T211486

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: May 05, 2017

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 17T211486
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Nitrate/Nitrite (Water)

DATE RECEIVED: 2017-05-03

DATE REPORTED: 2017-05-05

| | | | SAMPLE DESCRIPTION: | TW1 | TW2 | TW3 | TW4 | TW5 | | TW6 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | | Water |
| | | | DATE SAMPLED: | 2017-05-02 | 2017-05-02 | 2017-05-02 | 2017-05-02 | 2017-05-02 | | 2017-05-02 |
| Parameter | Unit | G / S | RDL | 8358383 | 8358385 | 8358386 | 8358387 | 8358388 | RDL | 8358389 |
| Nitrate as N | mg/L | | 0.05 | <0.05 | 1.90 | 0.58 | 3.22 | 7.99 | 0.10 | 9.08 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.10 | <0.10 |

| | | | SAMPLE DESCRIPTION: | TW7 | TW8 | TW9 | TW10 | TW11 | | TW12 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | | Water |
| | | | DATE SAMPLED: | 2017-05-02 | 2017-05-02 | 2017-05-02 | 2017-05-02 | 2017-05-02 | | 2017-05-02 |
| Parameter | Unit | G / S | RDL | 8358390 | 8358391 | 8358392 | 8358393 | 8358394 | RDL | 8358397 |
| Nitrate as N | mg/L | | 0.05 | 6.87 | 5.15 | 3.02 | 0.85 | 3.00 | 0.10 | <0.10 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.10 | <0.10 |

| | |
|---|---|
| Comments: | RDL - Reported Detection Limit; G / S - Guideline / Standard |
| 8358389 | Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instrument. |
| 8358397 | Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instrument. |

Certified By: Sofia Pehlyova

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 17T211486
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: May 05, 2017 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nitrate/Nitrite (Water) | | | | | | | | | | | | | | | |
| Nitrate as N | 8358389 | 8358389 | 9.08 | 9.02 | 0.7% | < 0.05 | 102% | 90% | 110% | 107% | 90% | 110% | 114% | 80% | 120% |
| Nitrite as N | 8358389 | 8358389 | <0.10 | <0.10 | NA | < 0.05 | NA | 90% | 110% | 103% | 90% | 110% | 102% | 80% | 120% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Sofia Pehlyova

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 17T211486

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |

**AGAT Laboratories** 1 WED

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

**Laboratory Use Only**

Work Order #: 17T 211486

Cooler Quantity:

Arrival Temperatures: 4.2 | 4.4 | 4.5
3.2 | 3.4 | 3.5

Custody Seal Intact: ☐ Yes ☒ No ☐ N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water consumed by humans)

## Report Information:

Company: RJ Burnside + Associates Ltd.
Contact: Dwight Smikle
Address: 292 Speedvale Ave. W. Unit #20
Guelph ON. N1H 1C4
Phone: Fax:
*Reports to be sent to:*
1. Email: dwight.smikle@rjburnside.com
2. Email:

## Regulatory Requirements: ☐ No Regulatory Requirement

*(Please check all applicable boxes)*

☐ Regulation 153/04
Table ______ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ______ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
______ *Indicate One*

Is this submission for a Record of Site Condition? ☐ Yes ☐ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ Next Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**For 'Same Day' analysis, please contact your AGAT CPM**

## Project Information:

Project: ~~Belfountain~~ 3000 33273
Site Location: Belfountain, ON
Sampled By: Matt Valeriote
AGAT Quote #: PO:
*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| B | Biota |
| GW | Ground Water |
| O | Oil |
| P | Paint |
| S | Soil |
| SD | Sediment |
| SW | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - Metals, Hg, CrVI Y [✓ N] | Metals and Inorganics | O. Reg 153: ☐ All Metals ☐ 153 Metals (excl. Hydrides) | ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides) | ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR | Full Metals Scan | Regulation/Custom Metals | Nutrients: ☐ TP ☐ NH3 ☐ TKN ☐ NO3 ☐ NO2 ☐ NO3+NO2 | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | PCBs: ☐ Total ☐ Aroclors | Organochlorine Pesticides | TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs | Sewer Use | Nitrate + Nitrite |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW1 | May 2, 2017 | 10:00 | 1 | GW | | | | | | | | | | | | | | | | | | X |
| TW2 | | 10:30 | | | | | | | | | | | | | | | | | | | | X |
| TW3 | | 11:00 | | | | | | | | | | | | | | | | | | | | X |
| TW4 | | 11:30 | | | | | | | | | | | | | | | | | | | | X |
| TW5 | | 12:00 | | | | | | | | | | | | | | | | | | | | X |
| TW6 | | 12:30 | | | | | | | | | | | | | | | | | | | | X |
| TW7 | | 13:00 | | | | | | | | | | | | | | | | | | | | X |
| TW8 | | 13:30 | | | | | | | | | | | | | | | | | | | | X |
| TW9 | | 14:00 | | | | | | | | | | | | | | | | | | | | X |
| TW10 | | 14:30 | | | | | | | | | | | | | | | | | | | | X |
| TW11 | | 15:00 | | | | | | | | | | | | | | | | | | | | X |

| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| Matt Valeriote | May 2, 2017 | 16:30 | D. Burns 2017/05/03 | | 12:45 |
| D. Burns 2017/05/03 | | 4:40 | | | |
| | | | | | |

Page 1 of 2

Nº: T 051085

**AGAT Laboratories**

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
**Ph: 905.712.5100 Fax: 905.712.5122**
**webearth.agatlabs.com**

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form** (potable water consumed by humans)

## Laboratory Use Only

Work Order #:

Cooler Quantity:

Arrival Temperatures: 4.2 | 4.3 | 4.5
3.2 | 3.3 | 3.5

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

## Report Information:

Company: RJ Burnside & Associates Ltd.
Contact: Dwight Smikle
Address: 292 Speedvale Ave. W. Unit #20
Guelph ON. N1H 1C4
Phone: Fax:
Reports to be sent to:
1. Email: dwight-Smikle@rjburnside.com
2. Email:

## Regulatory Requirements: ☐ No Regulatory Requirement

*(Please check all applicable boxes)*

- ☐ Regulation 153/04
  - Table ______ *Indicate One*
  - ☐Ind/Com
  - ☐Res/Park
  - ☐Agriculture
  - Soil Texture *(Check One)*
  - ☐Coarse
  - ☐Fine
- ☐ Sewer Use
  - ☐Sanitary
  - ☐Storm
  - Region ______ *Indicate One*
- ☐MISA
- ☐ Regulation 558
- ☐CCME
- ☐Prov. Water Quality Objectives (PWQO)
- ☐Other
  - ______ *Indicate One*

**Is this submission for a Record of Site Condition?** ☐ Yes ☐ No

**Report Guideline on *Certificate of Analysis*** ☒ Yes ☐ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☐ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☒ Next Business Day

**OR** Date Required (Rush Surcharges May Apply):

***Please provide prior notification for rush TAT***
**TAT is exclusive of weekends and statutory holidays*

**For 'Same Day' analysis, please contact your AGAT CPM**

## Project Information:

Project: ~~Belfountain~~ 300033273
Site Location: Belfountain
Sampled By: Matt Valeriote
AGAT Quote #: PO:

*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - Metals, Hg, CrVI Y/[✓ N] | O. Reg 153: Metals and Inorganics | ☐ All Metals ☐ 153 Metals (excl. Hydrides) | ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides) | **ORPs:** ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR | Full Metals Scan | Regulation/Custom Metals | **Nutrients:** ☐ TP ☐ NH₃ ☐ TKN ☐ NO₃ ☐ NO₂ ☐ NO₃+NO₂ | **Volatiles:** ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | PCBs: ☐ Total ☐ Aroclors | Organochlorine Pesticides | TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs | Sewer Use | Nitrate & Nitrite | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW12 | May 2, 2017 | 15:30 | 1 | GW | | | | | | | | | | | | | | | | | | ✓ | | | | |
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| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |
|---|---|---|---|---|---|
| Matt Valeriote | May 2, 2017 | 16:30 | D. Bueno 2017/05/03 | | 12:15 |
| | | | | | |
| D. Bueno 2017/05/03 | | 4:40 | | | |

Page 2 of 2

Nº: T 051086

Document ID: DIV-78-1511.014

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Date Issued: February 22, 2017

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CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7
Guelph, ON N1H1C4
(519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 17W195195

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Mar 22, 2017

PAGES (INCLUDING COVER): 11

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

# Certificate of Analysis

AGAT WORK ORDER: 17W195195
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10

DATE REPORTED: 2017-03-22

|  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | SAMPLE DESCRIPTION: | TW1 |  | TW2 |  | TW3 |  | TW4 | TW5 |
|  |  |  | SAMPLE TYPE: | Water |  | Water |  | Water |  | Water | Water |
|  |  |  | DATE SAMPLED: | 2017-03-10 |  | 2017-03-10 |  | 2017-03-10 |  | 2017-03-10 | 2017-03-10 |
| Parameter | Unit | G / S | RDL | 8244996 | RDL | 8244997 | RDL | 8245003 | RDL | 8245009 | 8245015 |
| Electrical Conductivity | uS/cm |  | 2 | 705 | 2 | 392 | 2 | 802 | 2 | 558 | 604 |
| pH | pH Units |  | NA | 8.14 | NA | 8.02 | NA | 8.14 | NA | 8.10 | 8.12 |
| Saturation pH |  |  |  | 6.89 |  | 7.36 |  | 6.83 |  | 6.99 | 7.00 |
| Langelier Index |  |  |  | 1.25 |  | 0.66 |  | 1.31 |  | 1.11 | 1.12 |
| Total Hardness (as CaCO3) | mg/L |  | 0.5 | 361 | 0.5 | 181 | 0.5 | 433 | 0.5 | 275 | 288 |
| Total Dissolved Solids | mg/L |  | 20 | 396 | 20 | 198 | 20 | 484 | 20 | 284 | 306 |
| Alkalinity (as CaCO3) | mg/L |  | 5 | 256 | 5 | 163 | 5 | 248 | 5 | 250 | 249 |
| Bicarbonate (as CaCO3) | mg/L |  | 5 | 256 | 5 | 163 | 5 | 248 | 5 | 250 | 249 |
| Carbonate (as CaCO3) | mg/L |  | 5 | <5 | 5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Hydroxide (as CaCO3) | mg/L |  | 5 | <5 | 5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Fluoride | mg/L |  | 0.05 | 0.19 | 0.05 | <0.05 | 0.05 | 0.10 | 0.05 | <0.05 | <0.05 |
| Chloride | mg/L |  | 0.10 | 14.3 | 0.10 | 16.7 | 0.10 | 3.41 | 0.10 | 12.6 | 20.2 |
| Nitrate as N | mg/L |  | 0.05 | <0.05 | 0.05 | 1.16 | 0.05 | 0.62 | 0.05 | 3.43 | 6.76 |
| Nitrite as N | mg/L |  | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Bromide | mg/L |  | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Sulphate | mg/L |  | 0.50 | 105 | 0.10 | 13.8 | 0.50 | 193 | 0.10 | 18.9 | 14.1 |
| Ortho Phosphate as P | mg/L |  | 0.10 | <0.10 | 0.10 | <0.10 | 0.10 | <0.10 | 0.10 | <0.10 | <0.10 |
| Reactive Silica | mg/L |  | 0.05 | 12.7 | 0.05 | 3.65 | 0.05 | 10.7 | 0.05 | 7.28 | 7.03 |
| Ammonia as N | mg/L |  | 0.02 | <0.02 | 0.02 | 0.04 | 0.02 | 0.14 | 0.02 | <0.02 | <0.02 |
| Total Phosphorus | mg/L |  | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Total Organic Carbon | mg/L |  | 0.5 | 1.3 | 0.5 | 2.4 | 0.5 | 0.7 | 0.5 | 1.2 | 0.7 |
| Colour | TCU |  | 5 | <5 | 5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Turbidity | NTU |  | 0.5 | 135 | 0.5 | 3.3 | 0.5 | 15.3 | 0.5 | 0.6 | 1.9 |
| Calcium | mg/L |  | 0.05 | 97.9 | 0.05 | 48.8 | 0.05 | 122 | 0.05 | 74.1 | 79.3 |
| Magnesium | mg/L |  | 0.05 | 28.4 | 0.05 | 14.4 | 0.05 | 31.1 | 0.05 | 21.8 | 21.9 |
| Sodium | mg/L |  | 0.05 | 5.27 | 0.05 | 6.39 | 0.05 | 3.42 | 0.05 | 5.36 | 8.93 |
| Potassium | mg/L |  | 0.05 | 1.18 | 0.05 | 1.26 | 0.05 | 1.28 | 0.05 | 1.01 | 0.91 |
| Aluminum | mg/L |  | 0.004 | 0.006 | 0.004 | 0.017 | 0.004 | 0.008 | 0.004 | 0.011 | 0.013 |
| Antimony | mg/L |  | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 |
| Arsenic | mg/L |  | 0.003 | 0.006 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 |

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 17W195195
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10

DATE REPORTED: 2017-03-22

| | | | SAMPLE DESCRIPTION: | TW1 | | TW2 | | TW3 | | TW4 | TW5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | | Water | | Water | | Water | Water |
| | | | DATE SAMPLED: | 2017-03-10 | | 2017-03-10 | | 2017-03-10 | | 2017-03-10 | 2017-03-10 |
| Parameter | Unit | G / S | RDL | 8244996 | RDL | 8244997 | RDL | 8245003 | RDL | 8245009 | 8245015 |
| Barium | mg/L | | 0.002 | 0.073 | 0.002 | 0.030 | 0.002 | 0.045 | 0.002 | 0.053 | 0.110 |
| Beryllium | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 |
| Boron | mg/L | | 0.010 | 0.016 | 0.010 | <0.010 | 0.010 | 0.020 | 0.010 | <0.010 | <0.010 |
| Cadmium | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 |
| Iron | mg/L | | 0.010 | 0.167 | 0.010 | <0.010 | 0.010 | 0.032 | 0.010 | <0.010 | <0.010 |
| Lead | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | 0.019 | 0.002 | <0.002 | 0.002 | 0.005 | 0.002 | <0.002 | <0.002 |
| Mercury | mg/L | | 0.0001 | <0.0001 | 0.0001 | <0.0001 | 0.0001 | <0.0001 | 0.0001 | <0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | 0.002 | 0.002 | <0.002 | <0.002 |
| Nickel | mg/L | | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | 0.003 | <0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.588 | 0.005 | 0.078 | 0.005 | 0.916 | 0.005 | 0.121 | 0.162 |
| Thallium | mg/L | | 0.006 | <0.006 | 0.006 | <0.006 | 0.006 | <0.006 | 0.006 | <0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | 0.003 | 0.002 | <0.002 | <0.002 |
| Tungsten | mg/L | | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | 0.010 | <0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | 0.002 | <0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.034 | 0.005 | 0.011 | 0.005 | 0.032 | 0.005 | 0.013 | 0.024 |
| Zirconium | mg/L | | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | 0.004 | <0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 1.56 | NA | 2.09 | NA | 1.57 | NA | 2.07 | 1.24 |

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 17W195195
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10

DATE REPORTED: 2017-03-22

| | | | SAMPLE DESCRIPTION: | TW6 | TW7 | TW8 | TW9 | TW10 | TW11 | | TW12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | | Water |
| | | | DATE SAMPLED: | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | | 2017-03-10 |
| Parameter | Unit | G / S | RDL | 8245021 | 8245027 | 8245033 | 8245039 | 8245045 | 8245052 | RDL | 8245058 |
| Electrical Conductivity | uS/cm | | 2 | 612 | 592 | 604 | 620 | 430 | 568 | 2 | 1730 |
| pH | pH Units | | NA | 8.10 | 8.11 | 8.12 | 8.10 | 8.06 | 8.16 | NA | 7.95 |
| Saturation pH | | | | 7.01 | 6.98 | 6.98 | 6.90 | 7.26 | 6.99 | | 6.61 |
| Langelier Index | | | | 1.09 | 1.13 | 1.14 | 1.20 | 0.80 | 1.17 | | 1.34 |
| Total Hardness (as CaCO3) | mg/L | | 0.5 | 288 | 291 | 301 | 310 | 202 | 278 | 0.5 | 1020 |
| Total Dissolved Solids | mg/L | | 20 | 308 | 306 | 312 | 326 | 216 | 286 | 20 | 1400 |
| Alkalinity (as CaCO3) | mg/L | | 5 | 245 | 260 | 251 | 294 | 182 | 249 | 5 | 192 |
| Bicarbonate (as CaCO3) | mg/L | | 5 | 245 | 260 | 251 | 294 | 182 | 249 | 5 | 192 |
| Carbonate (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 5 | <5 |
| Hydroxide (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 5 | <5 |
| Fluoride | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.25 | <0.25 |
| Chloride | mg/L | | 0.10 | 21.8 | 12.5 | 9.54 | 8.84 | 14.4 | 13.9 | 0.50 | 2.11 |
| Nitrate as N | mg/L | | 0.05 | 8.52 | 5.77 | 6.68 | 2.68 | 1.68 | 3.94 | 0.25 | <0.25 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.25 | <0.25 |
| Bromide | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.25 | <0.25 |
| Sulphate | mg/L | | 0.10 | 13.5 | 14.4 | 31.1 | 50.1 | 14.3 | 19.1 | 1.0 | 896 |
| Ortho Phosphate as P | mg/L | | 0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.50 | <0.50 |
| Reactive Silica | mg/L | | 0.05 | 7.01 | 6.72 | 7.18 | 8.42 | 4.56 | 7.19 | 0.05 | 13.1 |
| Ammonia as N | mg/L | | 0.02 | <0.02 | 0.03 | 0.15 | 0.09 | 0.03 | <0.02 | 0.02 | <0.02 |
| Total Phosphorus | mg/L | | 0.05 | <0.05 | <0.05 | 0.08 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 |
| Total Organic Carbon | mg/L | | 0.5 | 0.7 | 0.6 | 1.1 | 0.8 | 2.1 | 1.6 | 0.5 | 0.6 |
| Colour | TCU | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 5 | <5 |
| Turbidity | NTU | | 0.5 | <0.5 | 1.8 | 113 | 2.0 | 64.8 | 7.4 | 0.5 | 8.6 |
| Calcium | mg/L | | 0.05 | 79.9 | 80.0 | 81.6 | 81.5 | 54.3 | 75.0 | 0.10 | 318 |
| Magnesium | mg/L | | 0.05 | 21.6 | 22.2 | 23.6 | 25.8 | 16.2 | 22.0 | 0.10 | 54.3 |
| Sodium | mg/L | | 0.05 | 8.87 | 4.86 | 3.67 | 4.17 | 5.76 | 5.82 | 0.10 | 8.43 |
| Potassium | mg/L | | 0.05 | 0.86 | 0.92 | 1.12 | 0.99 | 1.21 | 0.98 | 0.10 | 1.95 |
| Aluminum | mg/L | | 0.004 | 0.006 | 0.009 | <0.004 | 0.009 | 0.014 | 0.011 | 0.004 | 0.008 |
| Antimony | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Arsenic | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.003 | 0.013 |

Certified By:

AGAT Laboratories
5835 COOPERS AVENUE
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http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 17W195195
PROJECT: 300033273

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10

DATE REPORTED: 2017-03-22

| | | | SAMPLE DESCRIPTION: | TW6 | TW7 | TW8 | TW9 | TW10 | TW11 | | TW12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | | Water |
| | | | DATE SAMPLED: | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | 2017-03-10 | | 2017-03-10 |
| Parameter | Unit | G / S | RDL | 8245021 | 8245027 | 8245033 | 8245039 | 8245045 | 8245052 | RDL | 8245058 |
| Barium | mg/L | | 0.002 | 0.105 | 0.109 | 0.099 | 0.074 | 0.036 | 0.061 | 0.002 | 0.012 |
| Beryllium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Boron | mg/L | | 0.010 | <0.010 | 0.010 | 0.011 | 0.012 | <0.010 | 0.010 | 0.010 | 0.058 |
| Cadmium | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Chromium | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Cobalt | mg/L | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Copper | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Iron | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | 0.665 |
| Lead | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Manganese | mg/L | | 0.002 | <0.002 | <0.002 | 0.002 | <0.002 | 0.009 | <0.002 | 0.002 | 0.030 |
| Mercury | mg/L | | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0001 | <0.0001 |
| Molybdenum | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | 0.005 |
| Nickel | mg/L | | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.003 | <0.003 |
| Selenium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | 0.004 | <0.004 |
| Silver | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Strontium | mg/L | | 0.005 | 0.156 | 0.136 | 0.545 | 0.339 | 0.083 | 0.129 | 0.005 | 3.86 |
| Thallium | mg/L | | 0.006 | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 | 0.006 | <0.006 |
| Tin | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Titanium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | 0.013 |
| Tungsten | mg/L | | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | <0.010 |
| Uranium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Vanadium | mg/L | | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 |
| Zinc | mg/L | | 0.005 | 0.017 | 0.029 | 0.017 | 0.037 | 0.016 | 0.015 | 0.005 | 0.046 |
| Zirconium | mg/L | | 0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | <0.004 | 0.004 | <0.004 |
| % Difference/ Ion Balance | % | | NA | 1.84 | 1.69 | 1.59 | 6.98 | 1.56 | 1.85 | NA | 4.11 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8244996-8245058 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Certified By:

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 17W195195
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis

| RPT Date: Mar 22, 2017 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Water Quality Assessment - Groundwater Samples | | | | | | | | | | | | | | | |
| Electrical Conductivity | 8241738 | | 1620 | 1610 | 0.6% | < 2 | 103% | 80% | 120% | NA | | | NA | | |
| pH | 8241738 | | 7.91 | 7.92 | 0.1% | NA | 99% | 90% | 110% | NA | | | NA | | |
| Total Dissolved Solids | 8248350 | | 754 | 800 | 5.9% | < 20 | 96% | 80% | 120% | NA | | | NA | | |
| Alkalinity (as CaCO3) | 8241738 | | 104 | 104 | 0.0% | < 5 | 107% | 80% | 120% | NA | | | NA | | |
| Bicarbonate (as CaCO3) | 8241738 | | 104 | 104 | 0.0% | < 5 | NA | | | NA | | | NA | | |
| Carbonate (as CaCO3) | 8241738 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Hydroxide (as CaCO3) | 8241738 | | <5 | <5 | NA | < 5 | NA | | | NA | | | NA | | |
| Fluoride | 8245009 | 8245009 | < 0.05 | <0.05 | NA | < 0.05 | 98% | 90% | 110% | 104% | 90% | 110% | 105% | 80% | 120% |
| Chloride | 8245009 | 8245009 | 12.6 | 13.1 | 3.9% | < 0.10 | 94% | 90% | 110% | 104% | 90% | 110% | 99% | 80% | 120% |
| Nitrate as N | 8245009 | 8245009 | 3.43 | 3.50 | 2.0% | < 0.05 | 95% | 90% | 110% | 92% | 90% | 110% | 98% | 80% | 120% |
| Nitrite as N | 8245009 | 8245009 | < 0.05 | <0.05 | NA | < 0.05 | NA | 90% | 110% | 96% | 90% | 110% | 89% | 80% | 120% |
| Bromide | 8245009 | 8245009 | < 0.05 | <0.05 | NA | < 0.05 | 109% | 90% | 110% | 98% | 90% | 110% | 100% | 80% | 120% |
| Sulphate | 8245009 | 8245009 | 18.9 | 19.1 | 1.1% | < 0.10 | 93% | 90% | 110% | 97% | 90% | 110% | 101% | 80% | 120% |
| Ortho Phosphate as P | 8245009 | 8245009 | < 0.10 | <0.10 | NA | < 0.10 | 103% | 90% | 110% | 107% | 90% | 110% | 98% | 80% | 120% |
| Reactive Silica | 8244996 | 8244996 | 12.7 | 12.7 | 0.0% | < 0.05 | 96% | 90% | 110% | 98% | 90% | 110% | 82% | 80% | 120% |
| Ammonia as N | 8249575 | | <0.02 | <0.02 | NA | < 0.02 | 97% | 90% | 110% | 91% | 90% | 110% | 84% | 80% | 120% |
| Total Phosphorus | 8243025 | | 0.06 | 0.06 | NA | < 0.05 | 98% | 80% | 120% | 97% | 90% | 110% | 98% | 70% | 130% |
| Total Organic Carbon | 8244996 | 8244996 | 1.3 | 1.4 | NA | < 0.5 | 109% | 90% | 110% | NA | 90% | 110% | 105% | 80% | 120% |
| Colour | 8244996 | 8244996 | < 5 | <5 | NA | < 5 | 106% | 90% | 110% | NA | | | NA | | |
| Turbidity | 8244996 | 8244996 | 135 | 135 | 0.0% | < 0.5 | 101% | 90% | 110% | NA | | | NA | | |
| Calcium | 8244996 | 8244996 | 97.9 | 98.4 | 0.5% | < 0.05 | 103% | 90% | 110% | 102% | 90% | 110% | 96% | 70% | 130% |
| Magnesium | 8244996 | 8244996 | 28.4 | 28.1 | 1.1% | < 0.05 | 100% | 90% | 110% | 100% | 90% | 110% | 97% | 70% | 130% |
| Sodium | 8244996 | 8244996 | 5.27 | 5.22 | 1.0% | < 0.05 | 99% | 90% | 110% | 99% | 90% | 110% | 99% | 70% | 130% |
| Potassium | 8244996 | 8244996 | 1.18 | 1.14 | 3.4% | < 0.05 | 99% | 90% | 110% | 99% | 90% | 110% | 99% | 70% | 130% |
| Aluminum | 8244996 | 8244996 | 0.006 | 0.006 | NA | < 0.004 | 99% | 90% | 110% | 110% | 90% | 110% | 109% | 70% | 130% |
| Antimony | 8244996 | 8244996 | < 0.003 | <0.003 | NA | < 0.003 | 97% | 90% | 110% | 105% | 90% | 110% | 106% | 70% | 130% |
| Arsenic | 8244996 | 8244996 | 0.006 | 0.006 | NA | < 0.003 | 103% | 90% | 110% | 102% | 90% | 110% | 107% | 70% | 130% |
| Barium | 8244996 | 8244996 | 0.073 | 0.072 | 1.4% | < 0.002 | 100% | 90% | 110% | 102% | 90% | 110% | 99% | 70% | 130% |
| Beryllium | 8244996 | 8244996 | < 0.001 | <0.001 | NA | < 0.001 | 103% | 90% | 110% | 109% | 90% | 110% | 108% | 70% | 130% |
| Boron | 8244996 | 8244996 | 0.016 | 0.016 | NA | < 0.010 | 100% | 90% | 110% | 108% | 90% | 110% | 103% | 70% | 130% |
| Cadmium | 8244996 | 8244996 | < 0.001 | <0.001 | NA | < 0.001 | 98% | 90% | 110% | 106% | 90% | 110% | 117% | 70% | 130% |
| Chromium | 8244996 | 8244996 | < 0.003 | <0.003 | NA | < 0.003 | 100% | 90% | 110% | 107% | 90% | 110% | 110% | 70% | 130% |
| Cobalt | 8244996 | 8244996 | < 0.001 | <0.001 | NA | < 0.001 | 96% | 90% | 110% | 103% | 90% | 110% | 104% | 70% | 130% |
| Copper | 8244996 | 8244996 | < 0.003 | <0.003 | NA | < 0.003 | 100% | 90% | 110% | 109% | 90% | 110% | 110% | 70% | 130% |
| Iron | 8244996 | 8244996 | 0.167 | 0.145 | 14.1% | < 0.010 | 106% | 90% | 110% | 105% | 90% | 110% | 98% | 70% | 130% |
| Lead | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 107% | 90% | 110% | 103% | 70% | 130% |
| Manganese | 8244996 | 8244996 | 0.019 | 0.018 | 5.4% | < 0.002 | 103% | 90% | 110% | 107% | 90% | 110% | 104% | 70% | 130% |
| Mercury | 8245003 | 8245003 | < 0.0001 | <0.0001 | NA | < 0.0001 | 102% | 90% | 110% | 101% | 90% | 110% | 94% | 80% | 120% |
| Molybdenum | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 100% | 90% | 110% | 102% | 90% | 110% | 104% | 70% | 130% |

# Quality Assurance

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 17W195195
ATTENTION TO: Dwight Smikle
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Mar 22, 2017 | | | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Nickel | 8244996 | 8244996 | < 0.003 | <0.003 | NA | < 0.003 | 103% | 90% | 110% | 109% | 90% | 110% | 107% | 70% | 130% |
| Selenium | 8244996 | 8244996 | < 0.004 | <0.004 | NA | < 0.004 | 100% | 90% | 110% | 102% | 90% | 110% | 110% | 70% | 130% |
| Silver | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 97% | 90% | 110% | 108% | 90% | 110% | 113% | 70% | 130% |
| Strontium | 8244996 | 8244996 | 0.588 | 0.560 | 4.9% | < 0.005 | 106% | 90% | 110% | 108% | 90% | 110% | 112% | 70% | 130% |
| Thallium | 8244996 | 8244996 | < 0.006 | <0.006 | NA | < 0.006 | 104% | 90% | 110% | 110% | 90% | 110% | 108% | 70% | 130% |
| Tin | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 97% | 90% | 110% | 102% | 90% | 110% | 104% | 70% | 130% |
| Titanium | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 96% | 90% | 110% | 100% | 90% | 110% | 102% | 70% | 130% |
| Tungsten | 8244996 | 8244996 | < 0.010 | <0.010 | NA | < 0.010 | 94% | 90% | 110% | 100% | 90% | 110% | 98% | 70% | 130% |
| Uranium | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 104% | 90% | 110% | 108% | 90% | 110% | 106% | 70% | 130% |
| Vanadium | 8244996 | 8244996 | < 0.002 | <0.002 | NA | < 0.002 | 94% | 90% | 110% | 102% | 90% | 110% | 104% | 70% | 130% |
| Zinc | 8244996 | 8244996 | 0.034 | 0.031 | 9.2% | < 0.005 | 102% | 90% | 110% | 108% | 90% | 110% | 110% | 70% | 130% |
| Zirconium | 8244996 | 8244996 | < 0.004 | <0.004 | NA | < 0.004 | 96% | 90% | 110% | 96% | 90% | 110% | 95% | 70% | 130% |

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: ______________________

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
PROJECT: 300033273
SAMPLING SITE:

AGAT WORK ORDER: 17W195195
ATTENTION TO: Dwight Smikle
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Electrical Conductivity | INOR-93-6000 | SM 2510 B | PC TITRATE |
| pH | INOR-93-6000 | SM 4500-H+ B | PC TITRATE |
| Saturation pH | | SM 2320 B | CALCULATION |
| Langelier Index | | SM 2330B | CALCULATION |
| Total Hardness (as CaCO3) | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Total Dissolved Solids | INOR-93-6028 | SM 2540 C | BALANCE |
| Alkalinity (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Bicarbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Carbonate (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Hydroxide (as CaCO3) | INOR-93-6000 | SM 2320 B | PC TITRATE |
| Fluoride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Chloride | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrate as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Bromide | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Ortho Phosphate as P | INOR-93-6004 | SM 4110 B | ION CHROMATOGRAPH |
| Reactive Silica | INOR-93-6047 | SmartChem Method SIL-001-A & SM 4500 Si-F 18 &19th | DISCRETE ANALYZER |
| Ammonia as N | INOR-93-6059 | QuikChem 10-107-06-1-J & SM 4500 NH3-F | LACHAT FIA |
| Total Phosphorus | INOR-93-6057 | QuikChem 10-115-01-3-A & SM 4500-P I | LACHAT FIA |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 | SHIMADZU CARBON ANALYZER |
| Colour | INOR-93-6046 | SM 2120 B | SPECTROPHOTOMETER |
| Turbidity | INOR-93-6044 | SM 2130 B | NEPHELOMETER |
| Calcium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Magnesium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Sodium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Potassium | MET-93-6105 | EPA SW-846 6010C & 200.7 | ICP/OES |
| Aluminum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Antimony | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Arsenic | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Barium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Beryllium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Boron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cadmium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Chromium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Cobalt | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Copper | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Iron | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Lead | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Manganese | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Mercury | MET-93-6100 | EPA SW 846 7470 & 245.1 | CVAAS |
| Molybdenum | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Nickel | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Selenium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Silver | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Strontium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Thallium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
AGAT WORK ORDER: 17W195195
PROJECT: 300033273
ATTENTION TO: Dwight Smikle
SAMPLING SITE:
SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Tin | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Titanium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Tungsten | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Uranium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Vanadium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zinc | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| Zirconium | MET-93-6103 | EPA SW-846 6020A & 200.8 | ICP-MS |
| % Difference/ Ion Balance |  | SM 1030 E | CALCULATION |

**AGAT Laboratories**

2 Lq.

**Short Holding Time**

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

**Laboratory Use Only**

Work Order #: 17W195195

Cooler Quantity:

Arrival Temperatures: 6.7 | 5.9 | 5.8
6/5.9/4.8 / 4.6 / 5.1 / 5.3

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking ~~Water Chain of Custody Form~~** (potable water intended for human consumption)

## Report Information:

Company: RJ Burnside & Associates Ltd.
Contact: Dwight Smikle
Address: 292 Speedvale Ave. West
Unit #20 Guelph, ONT
Phone:
Fax:
Reports to be sent to:
1. Email: dwight.smikle@rjburnside.com
2. Email: matt.valeriote@rjburnside.com

## Regulatory Requirements:

(Please check all applicable boxes)

☒ No Regulatory Requirement

☐ Regulation 153/04
Table ___ Indicate One
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ___ Indicate One

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
___ Indicate One

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

Report Guideline on Certificate of Analysis: ☒ Yes ☐ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**For 'Same Day' analysis, please contact your AGAT CPM**

## Project Information:

Project: 300033273
Site Location: Belfountain, ONT
Sampled By: Matt Valeriote
AGAT Quote #:
PO:

*Please note: If quotation number is not provided, client will be billed full price for analysis.*

## Sample Matrix Legend

| | |
|---|---|
| B | Biota |
| GW | Ground Water |
| O | Oil |
| P | Paint |
| S | Soil |
| SD | Sediment |
| SW | Surface Water |

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - [✓ Metals] [✓ Hg], CrVI [✓ Y] N | O. Reg 153 Metals and Inorganics | ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals | ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR | Full Metals Scan | Regulation/Custom Metals | Nutrients: ☐ TP ☐ NH₃ ☐ TKN ☐ NO₃ ☐ NO₂ ☐ NO₃+NO₂ | Volatiles: ☐ VOC ☐ BTEX ☐ THM | CCME Fractions 1 to 4 | ABNs | PAHs | PCBs: ☐ Total ☐ Aroclors | Organochlorine Pesticides | TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs | Sewer Use | Wed | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW1 | March 10, 2017 | 8:25 | 6 | GW | * Field Filtered metals + Mercury * | Y | | | | | | | | | | | | | | | X | | | | | |
| TW2 | | 10:00 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW3 | | 9:35 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW4 | | 13:45 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW5 | | 12:25 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW6 | | 12:00 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW7 | | 11:30 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW8 | | 12:56 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW9 | | 11:05 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW10 | | 10:30 | | | | Y | | | | | | | | | | | | | | | X | | | | | |
| TW11 | ↓ | 13:18 | ↓ | ↓ | | Y | | | | | | | | | | | | | | | X | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Samples Relinquished By (Print Name and Sign): Matt Valeriote | Date March 10 2017 | Time | Samples Received By (Print Name and Sign): RanjiSingh | Date 2017 March 10 | Time 3:45pm |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date 17/3/11 | Time 7 38 |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |

Page 1 of 2

Nº: T 047459

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

AGAT Laboratories

Short Holding Time

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

# Chain of Custody Record

**If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)**

## Laboratory Use Only

Work Order #:

Cooler Quantity:

Arrival Temperatures: 7.1 | 6.5 | 5.1

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

## Report Information:

Company: RJ Burnside & Associates Ltd

Contact: dwight.Smikle

Address: 292 Speedvale Ave. West
unit #20, guelph ONT

Phone: Fax:

*Reports to be sent to:*

1. Email: dwight.smikle@rjburnside.com
2. Email: matt.valeriote@rjburnside.com

## Regulatory Requirements:

*(Please check all applicable boxes)*

☒ No Regulatory Requirement

☐ Regulation 153/04
Table *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region *Indicate One*

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
*Indicate One*

Is this submission for a Record of Site Condition? ☐ Yes ☒ No

Report Guideline on Certificate of Analysis ☒ Yes ☐ No

## Turnaround Time (TAT) Required:

**Regular TAT** ☒ 5 to 7 Business Days

**Rush TAT** (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

**OR** Date Required (Rush Surcharges May Apply):

*Please provide prior notification for rush TAT*
**TAT is exclusive of weekends and statutory holidays*

**For 'Same Day' analysis, please contact your AGAT CPM**

## Project Information:

Project: Belfountain # 30003273

Site Location: Belfountain, ONT

Sampled By: Matt Valeriote

AGAT Quote #: — PO:

*Please note: If quotation number is not provided, client will be billed full price for analysis*

## Sample Matrix Legend

| | |
|---|---|
| **B** | Biota |
| **GW** | Ground Water |
| **O** | Oil |
| **P** | Paint |
| **S** | Soil |
| **SD** | Sediment |
| **SW** | Surface Water |

## Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:

Contact:

Address:

Email:

| Sample Identification | Date Sampled | Time Sampled | # of Containers | Sample Matrix | Comments/ Special Instructions | Field Filtered - [✓ Metals], [✓ Hg], CrVI<br>[✓ Y] N |
|---|---|---|---|---|---|---|
| TW12 | March 10, 2017 | 9:00 | 6 | GW | *Field Filtered Mercury + Metals* | Y |

| Sample Identification | O. Reg 153 | | | Full Metals Scan | Regulation/Custom Metals | Nutrients: ☐TP ☐NH$_3$ ☐TKN ☐NO$_3$ ☐NO$_2$ ☐NO$_3$+NO$_2$ | Volatiles: ☐VOC ☐BTEX ☐THM | CCME Fractions 1 to 4 | ABNs | PAHs | PCBs: ☐Total ☐Aroclors | Organochlorine Pesticides | TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs | Sewer Use | WQA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metals and Inorganics | ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals | ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr$^{6+}$ ☐EC ☐FOC ☐Hg ☐pH ☐SAR | | | | | | | | | | | | | | | | | |
| TW12 | | | | | | | | | | | | | | | X | | | | | |

| | | | | |
|---|---|---|---|---|
| Samples Relinquished By (Print Name and Sign): Matt Valeriote | Date March 10, 2017 | Time | Samples Received By (Print Name and Sign): Ranji Singh | Date 2017 Mar 10 | Time 3:45 PM |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): [illegible] | Date 17/3/11 | Time 9:35 |
| Samples Relinquished By (Print Name and Sign): | Date | Time | Samples Received By (Print Name and Sign): | Date | Time |

Page 2 of 2

Nº: T 047460

Document ID: DIV-78-1511.013

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: September 20, 2016

# Appendix H

# MOECC Well Records Search

| Well ID | Zone | Easting | Northing | First Use | Second Use | Final Status |
|---|---|---|---|---|---|---|
| 4908977 | 17 | 579679 | 4849026 |  |  | Abandoned-Other |
| 7226686 | 17 | 579410 | 4849408 |  |  | Abandoned-Other |
| 7226687 | 17 | 579458 | 4849364 |  |  | Abandoned-Other |
| 7227270 | 17 | 579267 | 4849590 |  |  | Abandoned-Other |
| 7244358 | 17 | 579305 | 4849431 |  |  | Abandoned-Other |
| 4900935 | 17 | 580130 | 4849589 | Not Used |  | Abandoned-Supply |
| 4901017 | 17 | 579561 | 4849643 |  |  | Abandoned-Supply |
| 4902928 | 17 | 580334 | 4849763 |  |  | Abandoned-Supply |
| 4902973 | 17 | 580414 | 4849923 |  |  | Abandoned-Supply |
| 7104809 | 17 | 579297 | 4849532 | Domestic |  | Abandoned-Supply |
| 7109610 | 17 | 579143 | 4848750 | Not Used |  | Abandoned-Supply |
| 7225052 | 17 | 579813 | 4848777 | Monitoring and Test Hole |  | Monitoring and Test Hole |
| 4906840 | 17 | 579466 | 4848761 | Not Used |  | Observation Wells |
| 4906842 | 17 | 579567 | 4848299 | Not Used |  | Observation Wells |
| 4906845 | 17 | 579466 | 4848759 | Not Used |  | Observation Wells |
| 4906846 | 17 | 579180 | 4849396 | Not Used |  | Observation Wells |
| 4906847 | 17 | 579567 | 4848301 | Not Used |  | Observation Wells |
| 4906848 | 17 | 579584 | 4848324 | Not Used |  | Observation Wells |
| 7225053 | 17 | 579814 | 4848771 | Monitoring |  | Observation Wells |
| 6712134 | 17 | 578800 | 4848946 | Not Used |  | Test Hole |
| 7140490 | 17 | 579080 | 4848673 | Test Hole |  | Test Hole |
| 7225054 | 17 | 579491 | 4848283 | Test Hole |  | Test Hole |
| 7225055 | 17 | 579995 | 4849204 | Test Hole |  | Test Hole |
| 7225056 | 17 | 579614 | 4848788 | Test Hole |  | Test Hole |
| 7225057 | 17 | 580008 | 4849203 | Test Hole |  | Test Hole |
| 7226632 | 17 | 579631 | 4849072 | Test Hole |  | Test Hole |
| 4906841 | 17 | 579469 | 4848760 | Not Used |  | Unfinished |
| 4900936 | 17 | 580155 | 4849605 | Domestic |  | Water Supply |
| 4900937 | 17 | 580329 | 4849762 | Domestic |  | Water Supply |
| 4900938 | 17 | 580347 | 4849883 | Domestic |  | Water Supply |
| 4901005 | 17 | 580366 | 4849130 | Domestic |  | Water Supply |
| 4901006 | 17 | 579779 | 4849344 | Livestock | Domestic | Water Supply |
| 4901007 | 17 | 579352 | 4849464 | Domestic |  | Water Supply |
| 4901008 | 17 | 579460 | 4849367 | Domestic |  | Water Supply |
| 4901009 | 17 | 578984 | 4848882 | Public |  | Water Supply |
| 4901010 | 17 | 579304 | 4849391 | Domestic |  | Water Supply |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4901011 | 17 | 579622 | 4849394 | Domestic | | Water Supply |
| 4901012 | 17 | 579011 | 4849211 | Domestic | | Water Supply |
| 4901016 | 17 | 579285 | 4849524 | Domestic | | Water Supply |
| 4901018 | 17 | 579581 | 4849479 | Domestic | | Water Supply |
| 4901020 | 17 | 579076 | 4849263 | Domestic | | Water Supply |
| 4901021 | 17 | 578822 | 4848994 | Domestic | | Water Supply |
| 4901022 | 17 | 579329 | 4849559 | Domestic | | Water Supply |
| 4901023 | 17 | 578871 | 4849235 | Domestic | | Water Supply |
| 4901025 | 17 | 579347 | 4849667 | Domestic | | Water Supply |
| 4901048 | 17 | 578747 | 4848905 | Domestic | | Water Supply |
| 4902929 | 17 | 580334 | 4849753 | Domestic | | Water Supply |
| 4902940 | 17 | 580524 | 4849773 | Domestic | | Water Supply |
| 4902941 | 17 | 580524 | 4849793 | Domestic | | Water Supply |
| 4902947 | 17 | 580364 | 4849723 | Domestic | | Water Supply |
| 4902948 | 17 | 580234 | 4849683 | Domestic | | Water Supply |
| 4903143 | 17 | 579089 | 4849323 | Domestic | | Water Supply |
| 4903144 | 17 | 579139 | 4849533 | Domestic | | Water Supply |
| 4903703 | 17 | 579614 | 4849823 | Domestic | | Water Supply |
| 4903832 | 17 | 579314 | 4849473 | Domestic | | Water Supply |
| 4903893 | 17 | 579564 | 4849763 | Domestic | | Water Supply |
| 4904041 | 17 | 579374 | 4849613 | Domestic | | Water Supply |
| 4904255 | 17 | 579712 | 4849856 | Livestock | Domestic | Water Supply |
| 4904256 | 17 | 579882 | 4849907 | Domestic | | Water Supply |
| 4904407 | 17 | 578846 | 4848676 | Domestic | | Water Supply |
| 4904412 | 17 | 580774 | 4849521 | Domestic | | Water Supply |
| 4904488 | 17 | 580349 | 4849567 | Domestic | | Water Supply |
| 4904489 | 17 | 580624 | 4849458 | Domestic | | Water Supply |
| 4904555 | 17 | 579438 | 4849307 | Domestic | | Water Supply |
| 4904661 | 17 | 580509 | 4849246 | Domestic | | Water Supply |
| 4904662 | 17 | 580648 | 4849216 | Domestic | | Water Supply |
| 4904689 | 17 | 580618 | 4849631 | Domestic | | Water Supply |
| 4904724 | 17 | 580682 | 4849561 | Domestic | | Water Supply |
| 4904725 | 17 | 580580 | 4849183 | Domestic | | Water Supply |
| 4904726 | 17 | 580541 | 4849306 | Domestic | | Water Supply |
| 4904727 | 17 | 580640 | 4849222 | Domestic | | Water Supply |
| 4904728 | 17 | 580555 | 4849441 | Domestic | | Water Supply |
| 4904750 | 17 | 579384 | 4849547 | Domestic | | Water Supply |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4904772 | 17 | 580617 | 4849298 | Domestic | | Water Supply |
| 4904798 | 17 | 580670 | 4849458 | Domestic | | Water Supply |
| 4904812 | 17 | 580541 | 4849360 | Domestic | | Water Supply |
| 4904813 | 17 | 578861 | 4849089 | Domestic | | Water Supply |
| 4904816 | 17 | 579434 | 4849486 | Domestic | | Water Supply |
| 4904854 | 17 | 579373 | 4849527 | Domestic | | Water Supply |
| 4904879 | 17 | 578914 | 4849123 | Domestic | | Water Supply |
| 4904971 | 17 | 580464 | 4849323 | Domestic | | Water Supply |
| 4904973 | 17 | 580664 | 4849573 | Domestic | | Water Supply |
| 4905014 | 17 | 580549 | 4849543 | Domestic | | Water Supply |
| 4905033 | 17 | 579164 | 4849523 | Domestic | | Water Supply |
| 4905085 | 17 | 578914 | 4849273 | Domestic | | Water Supply |
| 4905174 | 17 | 580414 | 4849423 | Domestic | | Water Supply |
| 4905176 | 17 | 580784 | 4849463 | Domestic | | Water Supply |
| 4905259 | 17 | 579114 | 4849323 | Domestic | | Water Supply |
| 4905271 | 17 | 579364 | 4849623 | Domestic | | Water Supply |
| 4905347 | 17 | 580364 | 4849473 | Domestic | | Water Supply |
| 4905356 | 17 | 579064 | 4849123 | Domestic | | Water Supply |
| 4905490 | 17 | 579514 | 4849523 | Domestic | | Water Supply |
| 4905619 | 17 | 578914 | 4849273 | Domestic | | Water Supply |
| 4905863 | 17 | 578864 | 4849023 | Domestic | | Water Supply |
| 4905867 | 17 | 578814 | 4848873 | Domestic | | Water Supply |
| 4906310 | 17 | 579338 | 4849346 | Public | | Water Supply |
| 4906377 | 17 | 579397 | 4849397 | Domestic | | Water Supply |
| 4906378 | 17 | 579513 | 4849315 | Domestic | | Water Supply |
| 4906385 | 17 | 579728 | 4849854 | Domestic | | Water Supply |
| 4906488 | 17 | 579324 | 4849607 | Domestic | | Water Supply |
| 4906608 | 17 | 579325 | 4849619 | Domestic | | Water Supply |
| 4906673 | 17 | 579338 | 4849346 | Domestic | | Water Supply |
| 4906792 | 17 | 579549 | 4849813 | Domestic | | Water Supply |
| 4906802 | 17 | 579320 | 4849612 | Domestic | | Water Supply |
| 4906918 | 17 | 579035 | 4849190 | Domestic | | Water Supply |
| 4906948 | 17 | 579627 | 4848237 | | | Water Supply |
| 4906996 | 17 | 579033 | 4849190 | Domestic | | Water Supply |
| 4907142 | 17 | 579458 | 4849367 | Domestic | | Water Supply |
| 4907143 | 17 | 579465 | 4848760 | Domestic | | Water Supply |
| 4907305 | 17 | 579325 | 4849619 | Domestic | | Water Supply |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4907450 | 17 | 579342 | 4848016 | Domestic | | Water Supply |
| 4907527 | 17 | 579431 | 4849421 | Domestic | | Water Supply |
| 4907566 | 17 | 579432 | 4849369 | Domestic | | Water Supply |
| 4907588 | 17 | 579513 | 4848057 | Domestic | | Water Supply |
| 4907667 | 17 | 579467 | 4849324 | Domestic | | Water Supply |
| 4907835 | 17 | 580054 | 4849565 | Domestic | | Water Supply |
| 4907914 | 17 | 579020 | 4849145 | Domestic | | Water Supply |
| 4907937 | 17 | 578605 | 4848620 | Domestic | | Water Supply |
| 4908028 | 17 | 579359 | 4849439 | Domestic | | Water Supply |
| 4908046 | 17 | 579773 | 4849928 | Domestic | | Water Supply |
| 4908201 | 17 | 579212 | 4849382 | Domestic | | Water Supply |
| 4908259 | 17 | 579615 | 4849394 | Domestic | | Water Supply |
| 4908260 | 17 | 579070 | 4849102 | Domestic | | Water Supply |
| 4908261 | 17 | 578985 | 4849116 | Domestic | | Water Supply |
| 4908300 | 17 | 579279 | 4849618 | Domestic | | Water Supply |
| 4908348 | 17 | 579255 | 4848557 | Domestic | | Water Supply |
| 4908409 | 17 | 579237 | 4849428 | Domestic | | Water Supply |
| 4908458 | 17 | 579548 | 4848006 | Domestic | | Water Supply |
| 4908511 | 17 | 580573 | 4849178 | Domestic | | Water Supply |
| 4908686 | 17 | 579519 | 4849115 | Domestic | | Water Supply |
| 4908830 | 17 | 579562 | 4849797 | Domestic | | Water Supply |
| 4908979 | 17 | 579679 | 4849026 | Domestic | | Water Supply |
| 4909426 | 17 | 579463 | 4849114 | Domestic | | Water Supply |
| 4909875 | 17 | 578977 | 4848892 | Public | | Water Supply |
| 7106064 | 17 | 578821 | 4848647 | Domestic | | Water Supply |
| 7206790 | 17 | 578914 | 4848423 | Domestic | | Water Supply |
| 7206791 | 17 | 578897 | 4848407 | Domestic | | Water Supply |
| 7224239 | 17 | 579530 | 4849753 | Domestic | | Water Supply |
| 7255729 | 17 | 579229 | 4849417 | Domestic | | Water Supply |
| 7259263 | 17 | 580086 | 4849091 | Domestic | | Water Supply |
| 7259264 | 17 | 579801 | 4849157 | Domestic | Test Hole | Water Supply |
| 7259265 | 17 | 579945 | 4848906 | Domestic | Test Hole | Water Supply |
| 7259266 | 17 | 579789 | 4848906 | Domestic | Test Hole | Water Supply |
| 7259267 | 17 | 579692 | 4849093 | Domestic | | Water Supply |
| 7259268 | 17 | 579469 | 4848667 | Domestic | Test Hole | Water Supply |
| | | | | | | |
| | | | | | | |

# Appendix I

# Water Balance Analysis

**Monthly Water Balance Analysis - Thornthwaite and Mather model**
**Existing conditions Belfountain (Pre-development)**

| **Total Site Area (ha)** | 70.28 | | |
|---|---|---|---|
| **Land Description Factors** | **Area A (Agricultural)** | **Sub-Area B (Forest)** | |
| Topography | 0.30 | 0.10 | |
| Soils | 0.40 | 0.40 | |
| Cover | 0.10 | 0.20 | |
| Sum (Infiltration Factor) | 0.80 | 0.70 | |
| Soil Moisture Capacity (mm) | 75 | 200 | |
| Site Area | 50.27 | 20.01 | |
| Percentage of Total Site Area | 72% | 28% | |

**100%**

| | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** | **Year** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Climate Data** (Data from Orangeville MOE station, Ontario via Environment Canada Website - 1981-2010, Climate ID: 6155790 | | | | | | | | | | | | | |
| Average Daily Temperature (°C) | -7.5 | -6.5 | -2.1 | 5.3 | 11.7 | 16.9 | 19.4 | 18.4 | 14.3 | 7.8 | 2.0 | -4.1 | **6.3** |
| Precipitation (mm) | 64.3 | 54.5 | 60.9 | 70.1 | 86.6 | 81.3 | 80.8 | 88.2 | 87.0 | 76.6 | 87.1 | 64.2 | **901.6** |
| **Evapotranspiration Analysis (Sub-Area A)** | | | | | | | | | | | | | |
| Heat Index | 0.0 | 0.0 | 0.0 | 1.1 | 3.6 | 6.3 | 7.8 | 7.2 | 4.9 | 2.0 | 0.2 | 0.0 | **33** |
| Unadjusted Potential Evapotranspiration (mm) | 0.0 | 0.0 | 0.0 | 25.9 | 58.1 | 84.7 | 97.5 | 92.4 | 71.4 | 38.4 | 9.5 | 0.0 | **478** |
| Potential Evapotranspiration Adjusting Factor for Latitude | 0.81 | 0.82 | 1.03 | 1.12 | 1.27 | 1.28 | 1.30 | 1.20 | 1.05 | 0.95 | 0.81 | 0.78 | |
| Adjusted Potential Evapotranspiration (mm) | 0 | 0 | 0 | 29 | 74 | 109 | 127 | 111 | 75 | 36 | 8 | 0 | **568** |
| PET (Malstrom, 1969) (mm/month) | 0 | 0 | 0 | 29 | 74 | 109 | 127 | 111 | 75 | 36 | 8 | 0 | **568** |
| Precipitation - PET (mm) | 64 | 55 | 61 | 41 | 13 | -27 | -46 | -23 | 12 | 40 | 79 | 64 | **334** |
| Accumulated Potential Water Loss (APWL) | 0 | 0 | 0 | 0 | 0 | -27 | -73 | -96 | -61 | -2 | 0 | 0 | **-260** |
| Storage (S) | 75 | 75 | 75 | 75 | 75 | 52 | 28 | 21 | 33 | 73 | 75 | 75 | |
| Change in Storage | 0 | 0 | 0 | 0 | 0 | -23 | -24 | -7 | 12 | 40 | 2 | 0 | **0** |
| **Actual Evapotranspiration (mm)** | **0** | **0** | **0** | **29** | **74** | **104** | **105** | **96** | **75** | **36** | **8** | **0** | **526** |
| **Recharge/Runoff Analysis** | | | | | | | | | | | | | |
| Water Surplus (mm) | 64 | 55 | 61 | 41 | 13 | 0 | 0 | 0 | 0 | 0 | 78 | 64 | **376** |
| Potential Infiltration (I) | 51 | 44 | 49 | 33 | 10 | 0 | 0 | 0 | 0 | 0 | 62 | 51 | **300** |
| **Potential Direct Surface Water Runoff (R)** | **13** | **11** | **12** | **8** | **3** | **0** | **0** | **0** | **0** | **0** | **16** | **13** | **75** |
| Evapotranspiration ($m^3$) | 0 | 0 | 0 | 14,591 | 37,037 | 52,398 | 52,618 | 48,050 | 37,542 | 18,304 | 3,883 | 0 | 264,422 |
| Runoff ($m^3$) | 6,465 | 5,479 | 6,123 | 4,130 | 1,299 | 0 | 0 | 0 | 0 | 0 | 7,812 | 6,455 | 37,762 |
| Infiltration ($m^3$) | 25,859 | 21,918 | 24,492 | 16,518 | 5,198 | 0 | 0 | 0 | 0 | 0 | 31,246 | 25,819 | 151,050 |

| **Evapotranspiration Analysis (Sub-Area B)** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accumulated Potential Water Loss (APWL) | 0 | 0 | 0 | 0 | 0 | -27 | -73 | -96 | -77 | -25 | 0 | 0 | |
| Storage (S) | 200 | 200 | 200 | 200 | 200 | 174 | 139 | 124 | 136 | 176 | 200 | 200 | |
| Change in Storage | 0 | 0 | 0 | 0 | 0 | -26 | -36 | -15 | 12 | 40 | 24 | 0 | **0** |
| **Actual Evapotranspiration (mm)** | **0** | **0** | **0** | **29** | **74** | **107** | **117** | **103** | **75** | **36** | **8** | **0** | **548** |
| **Recharge/Runoff Analysis** | | | | | | | | | | | | | |
| Water Surplus (mm) | 64 | 55 | 61 | 41 | 13 | 0 | 0 | 0 | 0 | 0 | 56 | 64 | **353** |
| Potential Infiltration (I) | 45 | 38 | 43 | 29 | 9 | 0 | 0 | 0 | 0 | 0 | 39 | 45 | **247** |
| **Potential Direct Surface Water Runoff (R)** | **19** | **16** | **18** | **12** | **4** | **0** | **0** | **0** | **0** | **0** | **17** | **19** | **106** |
| Evapotranspiration ($m^3$) | 0 | 0 | 0 | 5808 | 14742 | 21387 | 23339 | 20633 | 14944 | 7286 | 1546 | 0 | 109684 |
| Runoff ($m^3$) | 3860 | 3272 | 3656 | 2466 | 776 | 0 | 0 | 0 | 0 | 0 | 3335 | 3854 | 21218 |
| Infiltration ($m^3$) | 9007 | 7634 | 8530 | 5753 | 1810 | 0 | 0 | 0 | 0 | 0 | 7781 | 8992 | 49508 |

| **Water Balance Total** | **Inputs** | **Outputs** |
|---|---|---|
| Precipitation (mm) | 901.6 | |
| Soil Storage (mm) | | 0.0 |
| Evapotranspiration+Evaporation (mm) | | 532 |
| Infiltration (mm) | | 285 |
| Runoff (mm) | | 84 |
| **Total** | **901.6** | **901.6** |

| **Water Balance** | **Inputs** | **Outputs** |
|---|---|---|
| Precipitation (m^ | 633644.5 | |
| Soil Storage (m^3) | | |
| Evapotranspiration (m^3) | | 374107 |
| Infiltration (m^3) | | 200558 |
| Runoff (m^3) | | 58980 |
| **Total** | **633644.5** | **633644.5** |

# Appendix J

# Pumping Test Data

**Belfountain**
**6 Hour Pupmping Test Results TW1 - Test Well**
**TW1 (fully penetrating)**

| | |
|---|---|
| Well depth (mbgs) | 53.94 |
| Open hole interval (mbgs) | 30.78 to 53.94 |
| standing water level (mbTOC) | 19.19 |
| stick up (m above gs) | 1.1 |
| Datalogger at (mbTOC) | 28.2 |
| Pumping Rate L/sec | 0.75 |
| Pumping Rate L/min | 45 |

| **TW1 Pumping** | | | **TW1 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 19.02 | -0.17 | 0.1 | 34.58 | 0 |
| 1 | 23.3 | 4.11 | 1 | 32.51 | 2.07 |
| 2 | 26.27 | 7.08 | 2 | 30.57 | 4.01 |
| 4 | 30.12 | 10.93 | 3 | 28.93 | 5.65 |
| 5 | 31.7 | 12.51 | 4 | 27.51 | 7.07 |
| 6 | 32.59 | 13.4 | 5 | 26.29 | 8.29 |
| 7 | 33.23 | 14.04 | 6 | 25.28 | 9.3 |
| 8 | 33.54 | 14.35 | 7 | 24.39 | 10.19 |
| 9 | 33.66 | 14.47 | 8 | 23.65 | 10.93 |
| 10 | 33.72 | 14.53 | 9 | 23.03 | 11.55 |
| 12 | 33.86 | 14.67 | 10 | 22.53 | 12.05 |
| 15 | 34.06 | 14.87 | 12 | 21.76 | 12.82 |
| 17 | 34.07 | 14.88 | 14 | 21.27 | 13.31 |
| 18 | 34.08 | 14.89 | 15 | 21.08 | 13.5 |
| 20 | 34.1 | 14.91 | 16 | 20.92 | 13.66 |
| 25 | 34.05 | 14.86 | 18 | 20.72 | 13.86 |
| 30 | 34.26 | 15.07 | 20 | 20.56 | 14.02 |
| 35 | 34.22 | 15.03 | 25 | 20.33 | 14.25 |
| 40 | 34.16 | 14.97 | 30 | 20.19 | 14.39 |
| 45 | 34.19 | 15 | 40 | 20.13 | 14.45 |
| 50 | 34.25 | 15.06 | 45 | 20.11 | 14.47 |
| 55 | 34.23 | 15.04 | 50 | 20.02 | 14.56 |
| 60 | 34.24 | 15.05 | 55 | 19.96 | 14.62 |
| 70 | 34.26 | 15.07 | 60 | 19.92 | 14.66 |
| 80 | 34.27 | 15.08 | | | |
| 90 | 34.22 | 15.03 | | | |
| 100 | 34.28 | 15.09 | | | |
| 120 | 34.26 | 15.07 | | | |
| 135 | 34.27 | 15.08 | | | |
| 150 | 34.31 | 15.12 | | | |
| 165 | 34.4 | 15.21 | | | |
| 180 | 34.29 | 15.1 | | | |
| 195 | 34.23 | 15.04 | | | |
| 210 | 34.52 | 15.33 | | | |
| 225 | 34.43 | 15.24 | | | |
| 240 | 34.41 | 15.22 | | | |
| 255 | 34.39 | 15.2 | | | |
| 270 | 34.52 | 15.33 | | | |
| 285 | 34.54 | 15.35 | | | |
| 300 | 34.55 | 15.36 | | | |
| 315 | 34.58 | 15.39 | | | |
| 330 | 34.58 | 15.39 | | | |
| 345 | 34.62 | 15.43 | | | |
| 360 | 34.59 | 15.4 | | | |

**Belfountain**
**6 Hour Pupmping Test Results TW2 - Test Well**

| **TW2 (partially penetrating)** | |
|---|---|
| Well depth (mbgs) | 20.11 |
| Open hole interval (mbgs) | 12.49 to 20.11 |
| standing water level (mbTOC) | 14.07 |
| stick up (m above gs) | 0.88 |
| Datalogger at (mbTOC) | 20 |
| Pumping Rate L/sec | 0.189 |
| Pumping Rate L/min | 11.34 |

| **TW2 Pumping** | | | **TW2 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 14.07 | 0.01 | 0.1 | 14.16 | 0 |
| 1 | 14.1 | 0.04 | 1 | 14.13 | 0.03 |
| 2 | 14.11 | 0.05 | 2 | 14.12 | 0.04 |
| 3 | 14.11 | 0.05 | 3 | 14.12 | 0.04 |
| 4 | 14.11 | 0.05 | 4 | 14.12 | 0.04 |
| 5 | 14.11 | 0.05 | 5 | 14.12 | 0.04 |
| 6 | 14.11 | 0.05 | 6 | 14.12 | 0.04 |
| 7 | 14.11 | 0.05 | 7 | 14.12 | 0.04 |
| 8 | 14.11 | 0.05 | 8 | 14.12 | 0.04 |
| 9 | 14.12 | 0.06 | 9 | 14.11 | 0.05 |
| 10 | 14.12 | 0.06 | 10 | 14.11 | 0.05 |
| 12 | 14.12 | 0.06 | 12 | 14.11 | 0.05 |
| 14 | 14.12 | 0.06 | 15 | 14.11 | 0.05 |
| 15 | 14.12 | 0.06 | 20 | 14.11 | 0.05 |
| 16 | 14.12 | 0.06 | 25 | 14.1 | 0.06 |
| 18 | 14.12 | 0.06 | 30 | 14.1 | 0.06 |
| 20 | 14.12 | 0.06 | 40 | 14.1 | 0.06 |
| 25 | 14.13 | 0.07 | 50 | 14.09 | 0.07 |
| 30 | 14.13 | 0.07 | 60 | 14.09 | 0.07 |
| 35 | 14.13 | 0.07 | | | |
| 40 | 14.13 | 0.07 | | | |
| 45 | 14.13 | 0.07 | | | |
| 50 | 14.13 | 0.07 | | | |
| 55 | 14.135 | 0.075 | | | |
| 60 | 14.14 | 0.08 | | | |
| 75 | 14.14 | 0.08 | | | |
| 90 | 14.15 | 0.09 | | | |
| 105 | 14.15 | 0.09 | | | |
| 120 | 14.15 | 0.09 | | | |
| 135 | 14.15 | 0.09 | | | |
| 150 | 14.15 | 0.09 | | | |
| 165 | 14.15 | 0.09 | | | |
| 180 | 14.16 | 0.1 | | | |
| 195 | 14.16 | 0.1 | | | |
| 210 | 14.16 | 0.1 | | | |
| 225 | 14.16 | 0.1 | | | |
| 240 | 14.16 | 0.1 | | | |
| 255 | 14.16 | 0.1 | | | |
| 270 | 14.16 | 0.1 | | | |
| 285 | 14.16 | 0.1 | | | |
| 300 | 14.16 | 0.1 | | | |
| 315 | 14.16 | 0.1 | | | |
| 330 | 14.16 | 0.1 | | | |
| 345 | 14.16 | 0.1 | | | |
| 360 | 14.16 | 0.1 | | | |

**Belfountain**
**6 Hour Pupmping Test Results TW3 - Test Well**

| **TW3 (fully penetrating)** | |
|---|---|
| Well depth (mbgs) | 35.96 |
| Open hole interval (mbgs) | 22.8 to 35.96 |
| standing water level (mbTOC) | 15.8 |
| stick up (m above gs) | 0.79 |
| Datalogger at (mbTOC) | 21.62 |
| Pumping Rate L/sec | 1.61 |
| Pumping Rate L/min | 96.6 |

| **TW3 Pumping** | | | **TW3 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 15.8 | 0 | 0.1 | 23.62 | 0 |
| 1 | 19.01 | 3.21 | 1.1 | 20.01 | 3.61 |
| 2 | 20.77 | 4.97 | 2.1 | 18.43 | 5.19 |
| 3 | 21.42 | 5.62 | 3.1 | 17.55 | 6.07 |
| 4 | 21.84 | 6.04 | 4.1 | 17.09 | 6.53 |
| 5 | 22.22 | 6.42 | 5.1 | 16.86 | 6.76 |
| 6 | 22.3 | 6.5 | 6.1 | 16.73 | 6.89 |
| 7 | 22.3 | 6.5 | 7.1 | 16.64 | 6.98 |
| 8 | 22.6 | 6.8 | 8.1 | 16.59 | 7.03 |
| 9 | 22.6 | 6.8 | 9.1 | 16.54 | 7.08 |
| 10 | 22.76 | 6.96 | 10.1 | 16.51 | 7.11 |
| 12 | 23.02 | 7.22 | 11.1 | 16.45 | 7.17 |
| 15 | 23.08 | 7.28 | 12.1 | 16.41 | 7.21 |
| 16 | 23.12 | 7.32 | 13.1 | 16.38 | 7.24 |
| 18 | 23.18 | 7.38 | 14.1 | 16.36 | 7.26 |
| 20 | 23.22 | 7.42 | 15.1 | 16.32 | 7.3 |
| 25 | 23.32 | 7.52 | 16.1 | 16.28 | 7.34 |
| 30 | 23.38 | 7.58 | 17.1 | 16.22 | 7.4 |
| 35 | 23.41 | 7.61 | 18.1 | 16.16 | 7.46 |
| 40 | 23.46 | 7.66 | 19.1 | 16.11 | 7.51 |
| 45 | 23.5 | 7.7 | 20.1 | 16.07 | 7.55 |
| 50 | 23.52 | 7.72 | 21.1 | 16.02 | 7.6 |
| 55 | 23.53 | 7.73 | 22.1 | 16.01 | 7.61 |
| 60 | 23.55 | 7.75 | 23.1 | 15.99 | 7.63 |
| 70 | 23.59 | 7.79 | | | |
| 80 | 23.62 | 7.82 | | | |
| 90 | 23.64 | 7.84 | | | |
| 100 | 23.65 | 7.85 | | | |
| 110 | 23.65 | 7.85 | | | |
| 120 | 23.64 | 7.84 | | | |
| 135 | 23.65 | 7.85 | | | |
| 150 | 23.66 | 7.86 | | | |
| 165 | 23.63 | 7.83 | | | |
| 186 | 23.63 | 7.83 | | | |
| 195 | 23.63 | 7.83 | | | |
| 210 | 23.63 | 7.83 | | | |
| 225 | 23.64 | 7.84 | | | |
| 240 | 23.64 | 7.84 | | | |
| 255 | 23.65 | 7.85 | | | |
| 270 | 23.64 | 7.84 | | | |
| 285 | 23.64 | 7.84 | | | |
| 300 | 23.64 | 7.84 | | | |
| 315 | 23.65 | 7.85 | | | |
| 330 | 23.64 | 7.84 | | | |
| 345 | 23.62 | 7.82 | | | |
| 360 | 23.62 | 7.82 | | | |

**Belfountain**
**6 Hour Pupmping Test Results TW4 - Test Well**
**TW4 (fully penetrating)**

| | |
|---|---|
| Well depth (mbgs) | 35.66 |
| Open hole interval (mbgs) | 17.67 to 35.66 |
| standing water level (mbTOC) | 19.56 |
| stick up (m above gs) | 0.94 |
| Datalogger at (mbTOC) | 27.72 |
| Pumping Rate L/sec | 0.5 |
| Pumping Rate L/min | 30 |

| **TW4 Pumping** | | | **TW4 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 19.56 | 0 | 0.1 | 19.71 | 0 |
| 1 | 19.68 | 0.12 | 1 | 19.51 | |
| 2 | 19.69 | 0.13 | 2 | 19.58 | 0.13 |
| 3 | 19.69 | 0.13 | 3 | 19.58 | 0.13 |
| 4 | 19.69 | 0.13 | 4 | 19.58 | 0.13 |
| 5 | 19.69 | 0.13 | 5 | 19.575 | 0.135 |
| 6 | 19.69 | 0.13 | 6 | 19.575 | 0.135 |
| 7 | 19.69 | 0.13 | 7 | 19.575 | 0.135 |
| 8 | 19.69 | 0.13 | 8 | 19.575 | 0.135 |
| 9 | 19.69 | 0.13 | 9 | 19.575 | 0.135 |
| 10 | 19.69 | 0.13 | 10 | 19.575 | 0.135 |
| 12 | 19.69 | 0.13 | 12 | 19.575 | 0.135 |
| 15 | 19.69 | 0.13 | 14 | 19.575 | 0.135 |
| 16 | 19.69 | 0.13 | 15 | 19.575 | 0.135 |
| 18 | 19.69 | 0.13 | 16 | 19.575 | 0.135 |
| 20 | 19.69 | 0.13 | 18 | 19.575 | 0.135 |
| 25 | 19.69 | 0.13 | 20 | 19.575 | 0.135 |
| 30 | 19.69 | 0.13 | 25 | 19.575 | 0.135 |
| 35 | 19.69 | 0.13 | 30 | 19.575 | 0.135 |
| 40 | 19.695 | 0.135 | 35 | 19.575 | 0.135 |
| 45 | 19.695 | 0.135 | 40 | 19.575 | 0.135 |
| 50 | 19.695 | 0.135 | 45 | 19.575 | 0.135 |
| 55 | 19.7 | 0.14 | 50 | 19.57 | 0.14 |
| 60 | 19.7 | 0.14 | 55 | 19.57 | 0.14 |
| 70 | 19.7 | 0.14 | 60 | 19.57 | 0.14 |
| 80 | 19.7 | 0.14 | | | |
| 90 | 19.705 | 0.145 | | | |
| 100 | 19.705 | 0.145 | | | |
| 110 | 19.705 | 0.145 | | | |
| 120 | 19.705 | 0.145 | | | |
| 135 | 19.705 | 0.145 | | | |
| 150 | 19.705 | 0.145 | | | |
| 165 | 19.705 | 0.145 | | | |
| 186 | 19.705 | 0.145 | | | |
| 195 | 19.705 | 0.145 | | | |
| 210 | 19.705 | 0.145 | | | |
| 225 | 19.705 | 0.145 | | | |
| 240 | 19.705 | 0.145 | | | |
| 255 | 19.705 | 0.145 | | | |
| 270 | 19.705 | 0.145 | | | |
| 285 | 19.705 | 0.145 | | | |
| 300 | 19.705 | 0.145 | | | |
| 315 | 19.71 | 0.15 | | | |
| 330 | 19.71 | 0.15 | | | |
| 345 | 19.71 | 0.15 | | | |
| 360 | 19.71 | 0.15 | | | |

**Belfountain**
**6 Hour Pupmping Test Results TW5 - Test Well**
**TW5 (fully penetrating)**

| | |
|---|---|
| Well depth (mbgs) | 32.3 |
| Open hole interval (mbgs) | 13.41 to 32.30 |
| standing water level (mbTOC) | 15.34 |
| stick up (m above gs) | 0.83 |
| Datalogger at (mbTOC) | 30 |
| Pumping Rate L/sec | 1.26 |
| Pumping Rate L/min | 75.6 |

| **TW5 Pumping** | | | **TW5 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 15.34 | 0 | 0.1 | 22.48 | 0 |
| 1 | 16.97 | 1.63 | 1 | 22.01 | 0.47 |
| 2 | 18.23 | 2.89 | 2 | 21.33 | 1.15 |
| 3 | 20.34 | 5 | 3 | 19.76 | 2.72 |
| 4 | 22.89 | 7.55 | 4 | 18.47 | 4.01 |
| 5 | 23.09 | 7.75 | 5 | 18.13 | 4.35 |
| 6 | 21.98 | 6.64 | 6 | 17.8 | 4.68 |
| 7 | 21.95 | 6.61 | 7 | 17.52 | 4.96 |
| 8 | 21.95 | 6.61 | 8 | 17.36 | 5.12 |
| 9 | 21.97 | 6.63 | 9 | 17.24 | 5.24 |
| 10 | 22 | 6.66 | 13 | 17.14 | 5.34 |
| 12 | 22.13 | 6.79 | 15 | 16.96 | 5.52 |
| 14 | 22.19 | 6.85 | 20 | 16.89 | 5.59 |
| 16 | 22.24 | 6.9 | 25 | 16.81 | 5.67 |
| 18 | 22.3 | 6.96 | 35 | 16.76 | 5.72 |
| 20 | 22.38 | 7.04 | 45 | 16.7 | 5.78 |
| 25 | 22.56 | 7.22 | 60 | 16.66 | 5.82 |
| 30 | 22.65 | 7.31 | | | |
| 35 | 22.74 | 7.4 | | | |
| 40 | 22.81 | 7.47 | | | |
| 45 | 22.9 | 7.56 | | | |
| 50 | 22.99 | 7.65 | | | |
| 55 | 23.02 | 7.68 | | | |
| 60 | 23.06 | 7.72 | | | |
| 70 | 23.16 | 7.82 | | | |
| 80 | 23.28 | 7.94 | | | |
| 90 | 23.31 | 7.97 | | | |
| 100 | 23.37 | 8.03 | | | |
| 115 | 23.52 | 8.18 | | | |
| 130 | 23.64 | 8.3 | | | |
| 145 | 23.8 | 8.46 | | | |
| 160 | 23.85 | 8.51 | | | |
| 175 | 24.13 | 8.79 | | | |
| 190 | 24.4 | 9.06 | | | |
| 205 | 24.56 | 9.22 | | | |
| 220 | 24.67 | 9.33 | | | |
| 235 | 24.84 | 9.5 | | | |
| 250 | 25.04 | 9.7 | | | |
| 265 | 25.79 | 10.45 | | | |
| 280 | 25.96 | 10.62 | | | |
| 295 | 26.21 | 10.87 | | | |
| 310 | 26.49 | 11.15 | | | |
| 322 | 27.12 | 11.78 | | | |

**Belfountain**

**6 Hour Pupmping Test Results TW6 - Test Well**

**TW6 (fully penetrating)**

| | |
|---|---|
| Well depth (mbgs) | 32.39 |
| Open hole interval (mbgs) | 13.41 to 32.30 |
| standing water level (mbTOC) | 14.69 |
| stick up (m above gs) | 0.79 |
| Datalogger at (mbTOC) | 30 |
| Pumping Rate L/sec | 1.14 |
| Pumping Rate L/min | 68.4 |

| **TW6 Pumping** | | | **TW6 Recovery** | | |
|---|---|---|---|---|---|
| Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) | Elapsed Time Manual (min) | Water Level Manual (mbTOC) | Drawdown manual (m) |
| 0.1 | 14.69 | 0 | 0.1 | 20.41 | 0 |
| 2 | 18.21 | 3.52 | 1 | 18.49 | 1.92 |
| 3 | 18.49 | 3.8 | 2 | 17.19 | 3.22 |
| 5 | 19.8 | 5.11 | 3 | 16.38 | 4.03 |
| 6 | 19.86 | 5.17 | 4 | 16.01 | 4.4 |
| 7 | 19.96 | 5.27 | 5 | 15.82 | 4.59 |
| 8 | 19.94 | 5.25 | 6 | 15.74 | 4.67 |
| 9 | 19.93 | 5.24 | 7 | 15.7 | 4.71 |
| 10 | 20.36 | 5.67 | 9 | 15.66 | 4.75 |
| 12 | 20.02 | 5.33 | 10 | 15.65 | 4.76 |
| 14 | 19.83 | 5.14 | 12.5 | 15.62 | 4.79 |
| 15 | 19.76 | 5.07 | 15 | 15.6 | 4.81 |
| 16 | 19.72 | 5.03 | 22 | 15.55 | 4.86 |
| 18 | 19.69 | 5 | 25 | 15.55 | 4.86 |
| 23 | 19.68 | 4.99 | 30 | 15.53 | 4.88 |
| 25 | 19.68 | 4.99 | 35 | 15.51 | 4.9 |
| 30 | 19.7 | 5.01 | 40 | 15.5 | 4.91 |
| 35 | 19.73 | 5.04 | 45 | 15.47 | 4.94 |
| 40 | 19.75 | 5.06 | 50 | 15.46 | 4.95 |
| 45 | 19.78 | 5.09 | 55 | 15.44 | 4.97 |
| 50 | 19.84 | 5.15 | 60 | 15.42 | 4.99 |
| 55 | 19.81 | 5.12 | | | |
| 60 | 19.83 | 5.14 | | | |
| 70 | 19.87 | 5.18 | | | |
| 80 | 19.9 | 5.21 | | | |
| 90 | 19.93 | 5.24 | | | |
| 100 | 19.96 | 5.27 | | | |
| 110 | 19.98 | 5.29 | | | |
| 120 | 20.01 | 5.32 | | | |
| 135 | 20.03 | 5.34 | | | |
| 150 | 20.06 | 5.37 | | | |
| 165 | 20.09 | 5.4 | | | |
| 180 | 20.12 | 5.43 | | | |
| 195 | 20.15 | 5.46 | | | |
| 210 | 20.18 | 5.49 | | | |
| 225 | 20.22 | 5.53 | | | |
| 240 | 20.24 | 5.55 | | | |
| 255 | 20.27 | 5.58 | | | |
| 270 | 20.29 | 5.6 | | | |
| 285 | 20.32 | 5.63 | | | |
| 300 | 20.34 | 5.65 | | | |
| 315 | 20.35 | 5.66 | | | |
| 330 | 20.36 | 5.67 | | | |
| 345 | 20.38 | 5.69 | | | |
| 360 | 20.41 | 5.72 | | | |

# Appendix K

## Long-term Drawdown Analysis

## Long-term Drawdown Calculations (20 and 50 years)

**Table 1 - Based on Peak Pumping Rates (27,000 L/day)**

| Well ID | Estimated Transmissivity (m^2/day) | Pumping rate (m^3/day) | Radius from pumping well (m) | Storage | 20 years | | | 50 years | | | Static Water Level (mbgs) | Available Drawdown (m) | Calculated Drawdown (m) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Time (days) 20 years | u | W(u) | Time (days) 50 years | u | W(u) | | | 20 years | 50 years |
| TW1 | 9.37 | 27 | 0.075 | 5 | 7300 | 1.0E-07 | 15.5409 | 18250 | 4.1E-08 | 16.4825 | 19.19 | 23.17 | 3.56 | 3.78 |
| TW2 | 14.94 | 27 | 0.075 | 5 | 7300 | 6.4E-08 | 15.9872 | 18250 | 2.6E-08 | 16.888 | 14.07 | 2.23 | 2.30 | 2.43 |
| TW3 | 84.85 | 27 | 0.075 | 5 | 7300 | 1.1E-08 | 17.7482 | 18250 | 4.5E-09 | 18.642 | 15.8 | 13.58 | 0.45 | 0.47 |
| TW4 | 403.19 | 27 | 0.075 | 5 | 7300 | 2.4E-09 | 19.2706 | 18250 | 9.6E-10 | 20.1869 | 19.56 | 7.105 | 0.10 | 0.11 |
| TW5 | 26.60 | 27 | 0.075 | 5 | 7300 | 3.6E-08 | 16.5625 | 18250 | 1.4E-08 | 17.507 | 15.34 | 7.515 | 1.34 | 1.41 |
| TW6 | 72.10 | 27 | 0.075 | 5 | 7300 | 1.3E-08 | 17.5811 | 18250 | 5.3E-09 | 18.4783 | 14.69 | 8.165 | 0.52 | 0.55 |

**Table 2 - Based on Average Pumping Rates (2,250 L/day)**

| Well ID | Estimated Transmissivity (m^2/day) | Pumping rate (m^3/day) | Radius from pumping well (m) | Storage | 20 years | | | 50 years | | | Static Water Level (mbgs) | Available Drawdown (m) | Calculated Drawdown (m) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Time (days) 20 years | u | W(u) | Time (days) 50 years | u | W(u) | | | 20 years | 50 years |
| TW1 | 9.37 | 2.25 | 0.075 | 5 | 7300 | 1.0E-07 | 15.5409 | 18250 | 4.1E-08 | 16.4825 | 19.19 | 23.17 | 0.30 | 0.31 |
| TW2 | 14.94 | 2.25 | 0.075 | 5 | 7300 | 6.4E-08 | 15.9872 | 18250 | 2.6E-08 | 16.888 | 14.07 | 2.23 | 0.19 | 0.20 |
| TW3 | 84.85 | 2.25 | 0.075 | 5 | 7300 | 1.1E-08 | 17.7482 | 18250 | 4.5E-09 | 18.642 | 15.8 | 13.58 | 0.04 | 0.04 |
| TW4 | 403.19 | 2.25 | 0.075 | 5 | 7300 | 2.4E-09 | 19.2706 | 18250 | 9.6E-10 | 20.1869 | 19.56 | 7.105 | 0.01 | 0.01 |
| TW5 | 26.60 | 2.25 | 0.075 | 5 | 7300 | 3.6E-08 | 16.5625 | 18250 | 1.4E-08 | 17.507 | 15.34 | 7.515 | 0.11 | 0.12 |
| TW6 | 72.10 | 2.25 | 0.075 | 5 | 7300 | 1.3E-08 | 17.5811 | 18250 | 5.3E-09 | 18.4783 | 14.69 | 8.165 | 0.04 | 0.05 |

Notes:
Where available drawdown is considered to be the distance between the static water level and the centre of the well screer

# Appendix L

# Radius of Influence Analysis

## Radius of Influence for TW1

Observation Well = PW1

| **Variables** | |
|---|---|
| Peak Pumping Rate (m^3/day) | 27 |
| Average Pumping Rate (m^3/day) | 2.25 |
| Transmissivity (m^2/day) | 9.37 |
| Storage for Limestone (dimensionless) | 5 |
| Time (days) | 18250 |
| Radius from pumping well (m) - TW1 | 0.075 |
| Radius from pumping well (m) - PW1 | 87 |
| Ro = radius of influence where drawdown is zero | |

### TW1 - Peak Pumping Rate

| | |
|---|---|
| u = | 4.11E-08 |
| W(u) = | 16.4325 |
| drawdown, s (m) = | 3.77 |

### PW1 - Peak Pumping Rate

| | |
|---|---|
| u = | 5.53E-02 |
| W(u) = | 2.3775 |
| drawdown, s (m) = | 0.54 |

### TW1 - Average Pumping Rate

| | |
|---|---|
| u = | 4.11E-08 |
| W(u) = | 16.4325 |
| drawdown, s (m) = | 0.31 |

### PW1 - Average Pumping Rate

| | |
|---|---|
| u = | 5.53E-02 |
| W(u) = | 2.3775 |
| drawdown, s (m) = | 0.05 |

### Radius of Influence

Therefore, pumping at peak pumping rate results in radius of infleunce of approximately 300 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

### Theis (1935)

$$s = \frac{Q}{4\pi T} W(u) \qquad (1)$$

and,

$$u = \frac{r^2 S}{4Tt} \qquad (2)$$

Where:

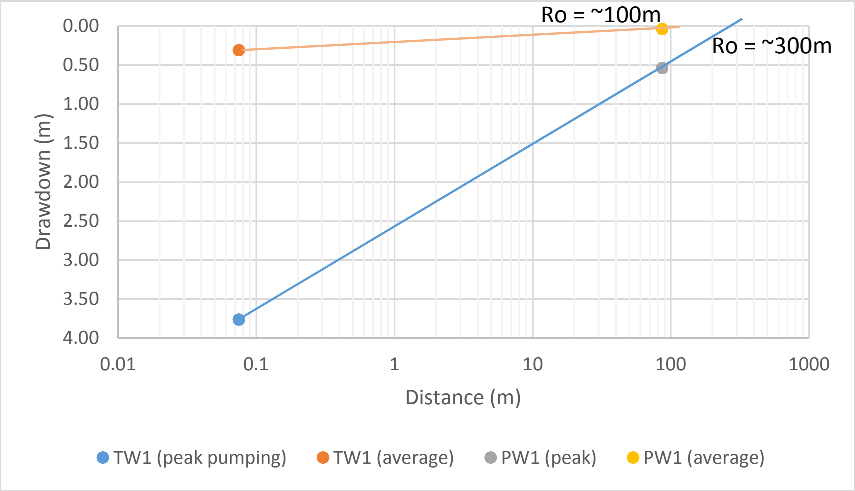
| | |
|---|---|
| s | *is drawdown (m)* |
| Q | *is pumping rate ($m^3/d$)* |
| T | *is transmissivity ($m^2/d$)* |
| W(u) | *is the well function* |
| S | *is storativity (-)* |
| t | *is time (d)* |
| r | *is the distance from the pumping well to the observation well or point of interest (m)* |

The assumptions that are implicit in the mathematics used in the Theis derivation include:

a) The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.

b) The aquifer is uniform in thickness and infinite in areal extent.

c) The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.



## Radius of Influence for TW1 at 15 m

Observation Well = PW1

**Theis (1935)**

$$s = \frac{Q}{4\pi T} W(u) \qquad (1)$$

and,

$$u = \frac{r^2 S}{4Tt} \qquad (2)$$

Where:

| | |
|---|---|
| s | *is drawdown (m)* |
| Q | *is pumping rate ($m^3$/d)* |
| T | *is transmissivity ($m^2$/d)* |
| W(u) | *is the well function* |
| S | *is storativity (-)* |
| t | *is time (d)* |
| r | *is the distance from the pumping well to the observation well or point of interest (m)* |

The assumptions that are implicit in the mathematics used in the Theis derivation include:

a) The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.

b) The aquifer is uniform in thickness and infinite in areal extent.

c) The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.

| **Variables** | |
|---|---|
| Peak Pumping Rate (m^3/day) | 27 |
| Average Pumping Rate (m^3/day) | 2.25 |
| Transmissivity (m^2/day) | 9.37 |
| Storage for Limestone (dimensionless) | 5 |
| Time (days) | 18250 |
| Radius from pumping well (m) - TW1 | 0.075 |
| Radius from pumping well (m) | 15 |
| Ro = radius of influence where drawdown is zero | |

**TW1 - Peak Pumping Rate**

| | |
|---|---|
| u = | 4.11E-08 |
| W(u) = | 16.4325 |
| drawdown, s (m) = | 3.77 |

**PW1 - Peak Pumping Rate**

| | |
|---|---|
| u = | 1.64E-03 |
| W(u) = | 5.8621 |
| drawdown, s (m) = | 1.34 |

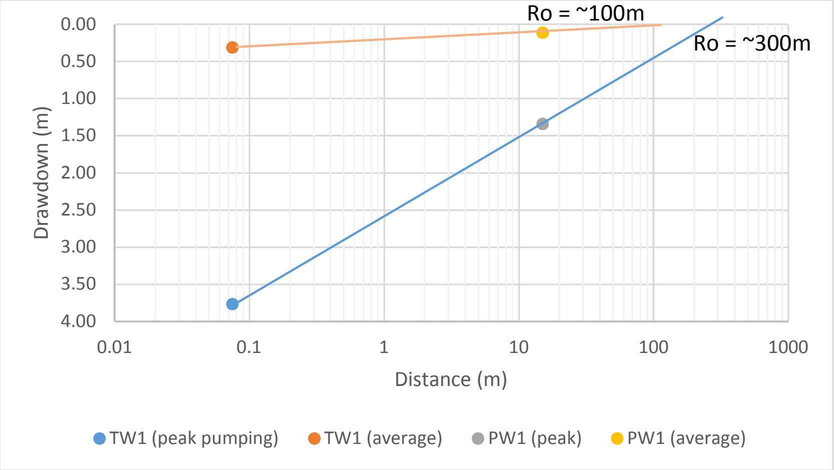
**TW1 - Average Pumping Rate**

| | |
|---|---|
| u = | 4.11E-08 |
| W(u) = | 16.4325 |
| drawdown, s (m) = | 0.31 |

**PW1 - Average Pumping Rate**

| | |
|---|---|
| u = | 1.64E-03 |
| W(u) = | 5.8621 |
| drawdown, s (m) = | 0.11 |

**Radius of Influence**



Therefore, pumping at peak pumping rate results in radius of infleunce of approximately 300 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

## Radius of Influence for TW4

Observation Well = immaginary at 87 m

| Variables | |
|---|---|
| Peak Pumping Rate (m^3/day) | 27 |
| Average Pumping Rate (m^3/day) | 2.25 |
| Transmissivity (m^2/day) | 403.20 |
| Storage for Limestone (dimensionless) | 5 |
| Time (days) | 18250 |
| Radius from pumping well (m) - TW1 | 0.075 |
| Radius from pumping well (m) | 87 |
| Ro = radius of influence where drawdown is zero | |

### TW4 - Peak Pumping Rate

| | |
|---|---|
| u = | 9.56E-10 |
| W(u) = | 20.1869 |
| drawdown, s (m) = | 0.11 |

### Obs well - Peak Pumping Rate

| | |
|---|---|
| u = | 1.29E-03 |
| W(u) = | 6.0695 |
| drawdown, s (m) = | 0.03 |

### TW4 - Average Pumping Rate

| | |
|---|---|
| u = | 9.56E-10 |
| W(u) = | 20.1869 |
| drawdown, s (m) = | 0.01 |

### Obs Well - Average Pumping Rate

| | |
|---|---|
| u = | 1.29E-03 |
| W(u) = | 6.0695 |
| drawdown, s (m) = | 0.00 |

### Radius of Influence

Therefore, pumping at peak pumping rate results in radius of infleunce of approximately 1100 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

**Theis (1935)**

$$s = \frac{Q}{4\pi T} W(u) \qquad (1)$$

and,

$$u = \frac{r^2 S}{4Tt} \qquad (2)$$

Where:

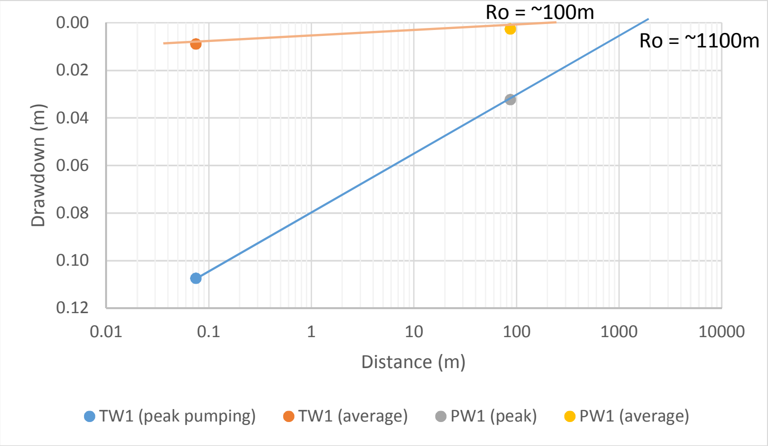
| | |
|---|---|
| s | *is drawdown (m)* |
| Q | *is pumping rate ($m^3/d$)* |
| T | *is transmissivity ($m^2/d$)* |
| W(u) | *is the well function* |
| S | *is storativity (-)* |
| t | *is time (d)* |
| r | *is the distance from the pumping well to the observation well or point of interest (m)* |

The assumptions that are implicit in the mathematics used in the Theis derivation include:

a) The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.

b) The aquifer is uniform in thickness and infinite in areal extent.

c) The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.



# Appendix M

# Typical Water and Wastewater Treatment Systems

# The Waterloo Advantage

**Waterloo Biofilter Systems Inc.** is a Canadian-owned and operated company that has for over 20 years developed, designed, manufactured, and maintained advanced onsite wastewater treatment systems.

We are committed to helping protect the environment with technology focused on high quality treatment, low energy usage, and system robustness.

## A Waterloo is designed to perform on difficult sites

Small or Remote Lots

Bedrock or Clay Soils

High Watertable

Environmentally Sensitive Areas

***The environmentally friendly choice***

UNIVERSITY OF WATERLOO

The patented Waterloo Biofilter system was developed at the University of Waterloo’s Centre for Groundwater Research.

## Permanent Filter Medium

The key to the Waterloo Biofilter system is the absorbent foam filter medium that has been optimized to physically filter and biologically treat sewage. This filter medium is warrantied for 20 years and will likely last generations.

### *Step 1*

Wastewater is collected and distributed over the Waterloo foam filter medium.

### *Step 2*

Wastewater slowly trickles down through the foam pieces where natural occurring bacteria remove contaminants.

### *Step 3*

After passing through the foam, the treated water is put back into the environment.

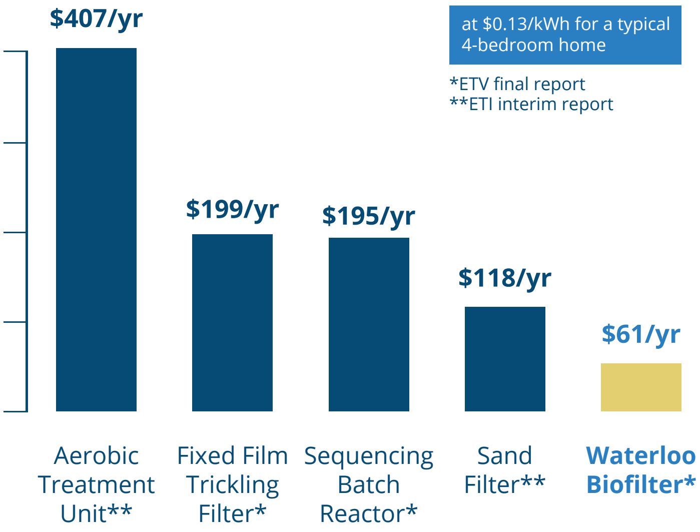
## Low Energy, Low Operating Cost

Waterloo Biofilters use very little energy; up to **85% less** power than aeration technologies using air compressors. In the long-term we have the lowest operating costs.

***Few moving parts***

***Less energy use***

***No noisy air compressor***



at $0.13/kWh for a typical 4-bedroom home

*ETV final report
**ETI interim report

## Nitrogen Removal

Standard Waterloo systems remove up to **50-65% total nitrogen**, helping to reduce nitrate levels in groundwater and protect surface waters. With the **WaterNOx-LS™** system add-on, up to **95% TN removal** can be achieved passively and cost-effectively.

## Phosphorous Removal

With the **Waterloo EC-P™** system add-on, greater than **95% total phosphorus** can be removed – helping protect surface waters from blue-green algae and lake eutrophication. Compact and low energy, the Waterloo EC-P™ permanently removes phosphorus without chemicals or additional sludge production.

## Small Footprint

A Waterloo is discrete and minimizes raised mounding and tree removal. A variety of product configurations are available to suit your unique site conditions and personal tastes.

## Seasonal Performance

Whether for seasonal or year-round use, the Waterloo is designed to withstand extreme cold temperatures and can easily handle variable flow rates.

**Made in Canada**
**Tough Enough for Canada**

# Residential Products

**Waterloo Shed Biofilters** are spray foam insulated for winter operation, clad in attractive composite siding, and roofed with 50-year shingles. Shed Biofilters are compact and require only a single pump to operate.

**Waterloo Flat Bed Biofilters** are constructed of strong yet lightweight fibreglass shells. Flat Bed Biofilters easily blend in with landscaping and require only a single pump to operate.

**Waterloo Basket Biofilters** are constructed of a rigid steel mesh coated for corrosion protection. Basket Biofilters are placed in a below-ground concrete tank and are ideal for larger homes or increased nitrogen removal.

**Waterloo HDPE Tank Biofilters** are constructed using very durable below-ground high-density polyethylene tanks. HDPE Tank Biofilters are ideal for difficult access sites and increased nitrogen removal.

## Proved and Approved

The Waterloo Biofilter has been thoroughly tested and proven effective by numerous 3rd party verification programs. We pride ourselves on the high treatment levels our technology consistently demonstrates.

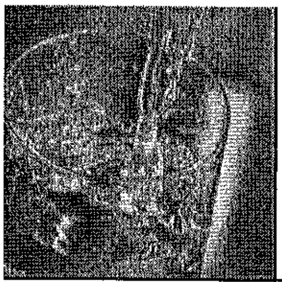
## Is *yours* a Waterloo?

### CAN/BNQ Certification

| | Median Concentration | Percent Removal |
|---|---|---|
| $cBOD_5$ | 4 mg/L | 98% |
| TSS | 4 mg/L | > 98% |
| Fecal Coliforms | 17,900 cfu/100mL | > 99% |

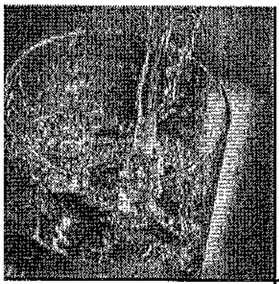
### ETV Verification

| | Median Concentration | Percent Removal |
|---|---|---|
| $cBOD_5$ | 7 mg/L | 96% |
| TSS | 5 mg/L | 97% |
| Total Nitrogen | 13 mg/L | 65% |



Culligan®

# Culligan® Aqua-Cleer® Advanced Drinking Water Systems Owners Guide



## About Your System

Thank you for choosing a Culligan Aqua-Cleer advanced drinking water system. Your new system is designed to bring you years of deliciously crystal-clear Culligan water. The best part is it comes right from the tap. No more lugging around bottles or waiting for pitchers to slowly fill up. With your continuous supply of great tasting water, not only can you get your 8 glasses a day but you can easily use it for cooking, coffee, juice, baby formula, ice cubes, anything you use water with.

The important thing to remember is to change out your filters on a regular basis. The quality of your water is only as good as the quality of your filters. Each filter is designed to last for 1,000 gallons (roughly 12 months). Membranes will last longer if used with pre-filtration. A flow monitor is available with your system to let you know when you have consumed 1,000 gallons of water through your system. If you did not purchase one with your system, you may consider asking your Culligan man about having one installed. Faucets with reminder lights are also available.

**System Specifications:**

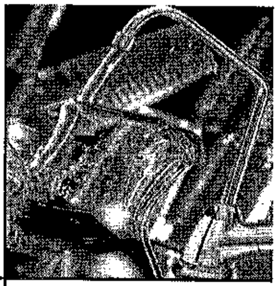
| | | |
|---|---|---|
| **Dimensions** | Filter Assembly | 13.8" wide x 4.2" deep x 15.5" high |
| | Standard Storage Tank | 9" diameter x 14" high |
| | Medium Storage Tank | 11" diameter x 14" high |
| | Large Storage Tank | 15.5: diameter x 24" high |
| **Storage Tank Capacity** | Standard | 2 gallons |
| | Medium | [✓ 3 gallons] |
| | Large | 9 gallons |
| **Reverse Osmosis Efficiency Rating** | Standard | 16.86% |
| | Medium | [✓ 16.86%] |
| | Large | 16.86% |
| **Reverse Osmosis Recovery Rating** | Standard | 33.49% |
| | Medium | [✓ 33.49%] |
| | Large | 33.49% |

**Filtration Options:**

| **Sequence of Filtration** | **Type of Filtration** | **Specification** |
|---|---|---|
| Pre-Filtration | Sediment | 1<br>2<br>3 |
| | Carbon | Block<br>Granulated Active Carbon<br>Granulated Active Carbon - Large |
| Membrane | Reverse Osmosis | [✓ 30 gpd]<br>50 gpd* |
| | Nano Filtration† | 30 gpd |

* Cartridges not for sale in California.

† Cartridges not for sale in California or Iowa.



## About Your System (con't)

| Sequence of Filtration | Type of Filtration | Specification |
|---|---|---|
| Advanced Filtration | Total Defense<br>Arsenic<br>Perchlorate* | Speciality Carbon Block<br>Specialty Media [1]<br>Specialty Media [1] |
| Post-Filtration | Carbon | Granulated Activated Carbon Block |

* Cartridges not for sale in California

[1] Specialty media cartridges must be installed after the RO membrane and system must have a Performance Indicator Device (PID) installed to track gallon usage.

## Purpose of each level of filtration:

### Pre-Filtration:

Pre-filtration for this system is used to reducing large contaminants from the water before they reach either the reverse osmosis or nano filtration membrane. The use of pre-filtration cartridges helps extent the membrane's life. There are two types of pre-filtration available with this system: sediment filtration and carbon filtration.

**Sediment Filtration:** Sediment is defined as sand, dirt, silt, fine sand and or coarse sand that can be found in many water supplies.

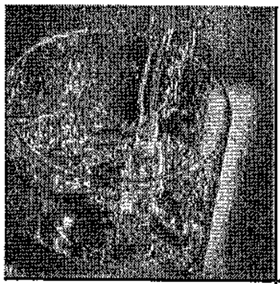
**Carbon Filtration:** Carbon is used to reduce chlorine taste and odor. Most people often describe this taste as being slightly chemical or they equate their drinking water to that of the local pool. Municipalities use chlorine to disinfect the water on the way to your home. This is a necessary step to delivering safe water to your home but depending on the level of chlorine by the time it reaches your home the taste of your water may be unpalatable.

### Membrane Technologies:

The Aqua-Cleer system can utilize two different membrane technologies; reverse osmosis and nano filtration. Each one of these technologies use a tightly woven membrane that acts as a barrier to contaminants. Water is pushed up against this membrane at pressure. Depending on the weave of the membrane only a certain percentage of contaminants can pass through. Reverse Osmosis can reduce up to 99% of contaminants. The reason you may choose nano filtration versus reverse osmosis is often a question of taste. Some of the things that give water its taste are minerals such as calcium and magnesium. A nano filtration membrane will leave more of those minerals in the water.

### Advanced Filtration:

The advanced filtration cartridges are specifically designed to reduce contaminants that reverse osmosis membranes are not efficient in removing.



## About Your System (con't)

**Total Defense:** OPTIONAL 5 Stage system only.

The Total Defense cartridge should be added to your system to deal with lead, mercury, aesthetic chloramines, aesthetic chlorine taste and odor, cysts, Volatile Organic Compounds (VOC) and MTBE.

- Chloramines have a stronger taste and are more difficult to remove than chlorine.
- Mercury is a toxin that can cause kidney damage.
- Lead is a toxin that can cause kidney problems or high blood pressure in adults and developmental problems in children.
- Cysts are a common cause of health issues. They can be found in some municipal water sources but more often found in wells under the influence of surface water.
- VOC is a name given to a wide range of organic contaminants, some are known to be carcinogenic.
- MTBE was used in gasoline to reduce emissions and is considered harmful.

***Perchlorate*:***

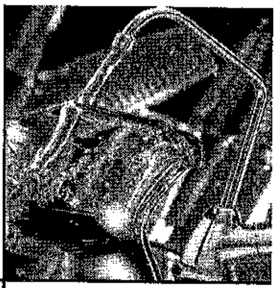
Perchlorate is a by-product of munitions manufacturing (common in solid rocket fuel, road flares, etc) that can be found in some water sources.

***Arsenic:***

Arsenic (As) is found naturally in some well water. Arsenic in water has no color, taste or odor. It must be measured by a lab test. Public water utilities must have their water tested for arsenic. You can get the result from your water utility. If you have your own well, you can have the water tested by an accredited lab. The local health department or the state environmental health agency can provide a list of certified labs. Culligan International is one such lab. For more information please contact your local Culligan dealer. For additional information about the arsenic in water can be found through the EPA's website at www.epa.gov/safewater/arsenic.html.

There are two forms of arsenic: pentavalent arsenic (As (V)) and trivalent arsenic (As (III)). Special sampling procedures are needed for a lab to determine what type and how much of each type of arsenic is in the water. In well water, arsenic may be pentavalent, trivalent, or a combination of both. Reverse osmosis membranes are effective at reducing pentavalent arsenic but not trivalent arsenic. The Arsenic specific cartridge was specifically designed to reduce trivalent arsenic.

* Cartridges not for sale in California.



**Carbon Block (CB)**
The Carbon Block pre-filter has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

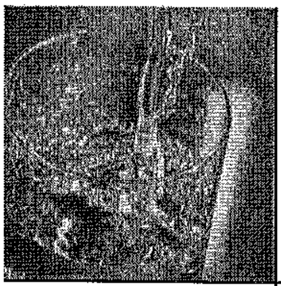
| Substance | Influent Challenge Concentration | Maximum Permissible Product water Concentration | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Standard 42 | | | | | |
| Aesthetic Chlorine | 2.0 mg/L + 10% | | >50% | 97.6% | 97.3% |

**Granular Activated Carbon (GAC)**
The Granular Activated Carbon has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

| Substance | Influent Challenge Concentration | Maximum Permissible Product water Concentration | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Standard 42 | | | | | |
| Aesthetic Chlorine | 2.0 mg/L + 10% | | >50% | 79.4% | 64.4% |

**Granular Activated Carbon - Large (GAC-L)**
The Granular Activated Carbon - Large has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

| Substance | Influent Challenge Concentration | Maximum Permissible Product water Concentration | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Standard 42 | | | | | |
| Aesthetic Chlorine | 2.0 mg/L + 10% | | >50% | 86.1% | 80.3% |



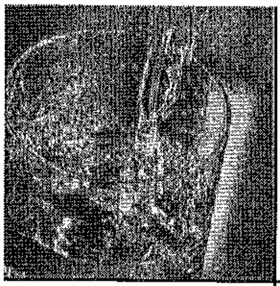
## Performance Data Sheet (con't)

**Total Defense (TD)** ✓ 5 Stage only.

The Total Defense has been tested according to NSF/ANSI 42 and 53 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42 and 53.

| Substance | Influent Challenge Concentration | Maximum Permissible Product water Concentration | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Standard 42 | | | | | |
| Aesthetic Chlorine | 2.0 mg/L + 10% | | >50% | 97.6% | 98.0% |
| Aesthetic Chloramines | 3.0 mg/L + 10% | 0.5 mg/L | | 97.6% | 98.0% |
| Particulate (0.5 - < um) Class I | At least 10,000 particles/mL | | >85% | 99.9% | 99.9% |
| Standard 53 | | | | | |
| MTBE | 0.015 + 20% | 0.005 mg/L | | 74.6% | 83.3% |
| Cyst [t] | Minimum 50,000/L | | 99.95% | 99.99% | 99.99% |
| Turbidity | 11 mg/L + 1 NTU | 0.5 NTU | | 96.6% | 98.0% |
| Lead (pH 6.5) | 0.15 mg/L + 10% | 0.010 mg/L | | 99.3% | 99.3% |
| Lead (pH 8.5) | 0.15 mg/L + 10% | 0.010 mg/L | | 99.3% | 99.3% |
| Mercury (pH 6.5) | 0.006 mg/L + 10% | 0.002 mg/L | | 96.6% | 96.6% |
| Mercury (pH 8.5) | 0.006 mg/L + 10% | 0.002 mg/L | | 72.4% | 95.4% |
| Chloro-form (VOC surrogate chemical) | 0.300 mg/L + 10% | 0.015 mg/L | | 95.2% | 91.0% |

Flow Rate = 0.5 gpm (1.89 Lpm)
Capacity = 1,000 gallons (3786 L)
[t] Based on the use of microspheres or Cryptospordium parvum oocysts
Testing was performed under standard laboratory conditions, actual performance may vary.



## Performance Data Sheet (con't)

### RO30 with TD ·

These systems have been tested and certified by NSF International according to NSF/ ANSI 42, 53, and 58 for the reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ ANSI 42, 53, and 58.

This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.

### Substance Reduction[1]

| Substance | Influent Challenge Concentration mg/L | Maximum Permissible Product water Concentration mg/L | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Arsenic (pentavalent)[2] | 0.050 +/- 10% | 0.01 | | | 97.4% |
| Barium | 10.0 +/- 10% | 2 | | | 98.3% |
| Cadmium | 0.03 +/- 10% | 0.005 | | | 98.7% |
| Hexavalent Chromium | 0.30 +/- 10% | 0.05 | | | 91.2% |
| Trivalent Chromium | 0.30 +/- 10% | 0.05 | | | 97.8% |
| Copper | 3.00 +/- 10% | 1.3 | | | 98.9% |
| Fluoride | 8.0 +/- 10% | 1.5 | | | 95.6% |
| Lead | 0.15 +/- 10% | 0.010 | | | 98.7% |
| Nitrate/Nitrite (both as N) | 30 +/- 10% | | | 83.1% | 86.8% |
| Nitrate[5] | 27.0 +/- 10% | 10.0 | | 83.4% | 87.0% |
| Nitrite | 3.0 +/- 10% | 1.0 | | 79.5% | 84.8% |
| Radium 226/2283 | 25pCi/L +/- 10% | 5pCi/L | | | 80.0% |
| Selenium | 0.10 +/- 10% | 0.05 | | | 96.0% |
| Cyst[4] | >50,000/mL | | 99.95% | 99.99% | 99.99% |
| Turbidity | 11 +/- 1 NTU | 0.5 NTU | | | 99.00% |

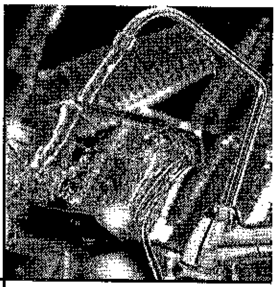
1 While testing was performed under standard laboratory conditions, actual performance may vary depending on water pressure, temperatures and other substances, which may be found in your water.

2 This system has been tested for the treatment of water containing pentavalent arsenic (also known as As(V), As(+5) or arsenate) at concentrations of 0.050 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramines (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts Sheet for further information.

3 Based upon testing methods using Barium as a surrogate. All concentrations in pCi/L pico curie/L.

4 Includes Giardia lamblia, Entamoeba histolyca and Cryptosporidium.

5 Units are not certified on water supplies with a pressure less than 40 psi (280 kPa). A booster pump is strongly recommended.



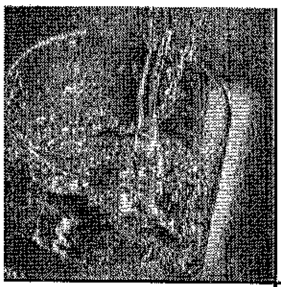
### Total Defense (TD)

The Total Defense has been tested according to NSF/ANSI 42 and 53 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42 and 53.

### Substance Reduction[1]

| Substance | Influent Challenge Concentration mg/L | Maximum Permissible Product water Concentration mg/L | Reduction Requirements | Minimum Reduction | Average Reduction |
|---|---|---|---|---|---|
| Standard 42 | | | | | |
| Aesthetic Chlorine | 2.0 mg/L + 10% | | >50% | 97.6% | 98.0% |
| Aesthetic Chloramines | 3.0 mg/L + 10% | 0.5 mg/L | | 97.6% | 98.0% |
| Particulate (0.5 - < um) Class I | at least 10,000 particles/mL | | >85% | 99.9% | 99.9% |
| Standard 53 | | | | | |
| MTBE | 0.015 + 20% | 0.005 mg/L | | 74.6% | 83.3% |
| Cyst[†] | Minimum 50,000/L | | 99.95% | 99.99% | 99.99% |
| Turbidity | 11 mg/L + 1 NTU | 0.5 NTU | | 96.6% | 98.0% |
| Lead (pH 6.5) | 0.15 mg/L + 10% | 0.010 mg/L | | 99.3% | 99.3% |
| Lead (pH 8.5) | 0.15 mg/L + 10% | 0.010 mg/L | | 99.3% | 99.3% |
| Mercury (pH 6.5) | 0.006 mg/L + 10% | 0.002 mg/L | | 96.6% | 96.6% |
| Mercury (pH 8.5) | 0.006 mg/L + 10% | 0.002 mg/L | | 72.4% | 95.4% |
| Chloroform (VOC surrogate chemical) | 0.300 mg/L + 10% | 0.015 mg/L | | 95.2% | 91.0% |

Flow Rate = 0.5 gpm (1.89 Lpm)
Capacity = 1,000 gallons (3786 L)
t Based on the use of microspheres or Cryptosporidium parvum oocysts
Testing was performed under standard laboratory conditions, actual performance may vary
Organic Chemicals Included in Surrogate Testing:
Applies to Total Defense (TD) only



## Performance Data Sheet (con't)

4 Stage

The Aqua-Cleer Advanced Drinking Water System with CB, GAC, or GAC-L cartridge has been tested and certified by NSF International against NSF/ANSI Standard 42 for the effective reduction of aesthetic Chlorine Taste and Odor, the TD cartridge for the effective reduction of aesthetic Chlorine Taste and Odor and Nominal Particulate Class 1 and against CSA B483.1.

C US

5 Stage

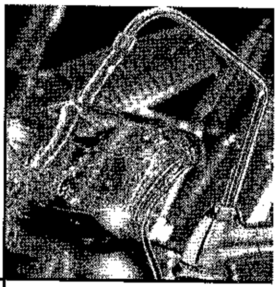
The Aqua-Cleer Advanced Drinking Water System with TD cartridge has been tested and certified by NSF International against NSF/ANSI Standard 53 for the effective reduction of Cyst, Lead, Mercury, VOC, MTBE and Turbidity and against CSA B483.1.

The Aqua-Cleer Advanced Drinking Water System with RO30 or RO50* has been tested and certified by NSF International against NSF/ANSI Standard 58 for the effective reduction of TDS, pentavalent arsenic, barium, cadmium, hexavalent and trivalent chromium, copper, lead, nitrate/nitrite, radium 226/228 and selenium. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58 and against CSA B483.1.

The Aqua-Cleer Advanced Drinking Water System with AS3 has been tested and certified by NSF International against NSF/ANSI Standard 53 for the effective reduction of arsenic (trivalent and pentavalent) when following an RO and against CSA B483.1.

Refer to your Installation and Operating Instructions and printed limited Warranties for more specific product information. To avoid contamination from improper handling and installation, your system should only be installed and serviced by your Culligan Man. Performance will vary based on local water conditions. The substances reduced by these systems are not necessarily in your water.

*RO50 not for sale in California.



# Culligan Lifetime Limited Warranty

## Culligan Aqua-Cleer Advanced Drinking Water System

You have just purchased one of the finest drinking water systems made. As an expression of our confidence in Culligan products, your drinking water system is warranted to the original end-user, when installed in accordance with Culligan International Company specifications, against defects in material and workmanship from the date of original installation, as follows:

| | |
|---|---|
| • **For the LIFETIME of the original end-user** | **The entire reverse osmosis water conditioning unit, EXCLUDING THE EXPENDABLE FILTER CARTRIDGES AND REVERSE OSMOSIS MEMBRANE FILTER USED IN THE UNIT.** |
| • **For a period of ONE YEAR** | **The Culligan brand reverse osmosis membrane filter.** |

If a part described above is found defective within the specified period, you should notify your independently operated Culligan dealer and arrange a time during normal business hours for the dealer to inspect the drinking water system on your premises. Any part found defective within the terms of this warranty will be repaired or replaced by the dealer. You pay only freight from our factory and local dealer charges.

Damage caused by accident, fire, flood, freezing, Act of God, misuse, misapplication, neglect, alteration, installation or operation contrary to our printed instructions, or by the use of accessories or components which do not meet Culligan specifications, is not covered by this warranty.

Our product performance specifications are furnished with each drinking water system. TO THE EXTENT PERMITTED BY LAW, CULLIGAN DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE; TO THE EXTENT REQUIRED BY LAW, ANY SUCH IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE ONE-YEAR PERIOD SPECIFIED ABOVE FOR THE PARTS DESCRIBED IN THIS LIMITED WARRANTY. As manufacturer, we do not know the characteristics of your water supply or the purpose for which you are purchasing a drinking water system. Please understand that the quality of water supplies may vary seasonally or over a period of time, and that your water usage rate may vary as well. Water characteristics can also change considerably if your drinking water system is moved to a new location. For these reasons, we assume no liability for the determination of the proper equipment necessary to meet your requirements, and we do not authorize others to assume such obligations for us. Further, we assume no liability and extend no warranties, express or implied, for the use of this product on a non-potable water source. OUR OBLIGATIONS UNDER THIS WARRANTY ARE LIMITED TO THE REPAIR OR REPLACEMENT OF THE FAILED PARTS OF THE DRINKING WATER SYSTEM, AND WE ASSUME NO LIABILITY WHATSOEVER FOR DIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL, GENERAL, OR OTHER DAMAGES, WHETHER FROM CORROSION OR OTHER CAUSES.

CONSUMERS:
Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Similarly, some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Consult your telephone directory for your local independently-operated Culligan dealer, or write Culligan International Company, for warranty and service information.

**Culligan International Company**
9399 W. Higgins Road, Suite 1100
Rosemont, Illinois 60018

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