2020 Annual Report, Crystal Lake Transfer Station

Environmental Compliance Approval No. A341202

April 20, 2021

Prepared for:
The Corporation of the Municipality of Trent Lakes

Cambium Reference: 10520-003

CAMBIUM INC.
866.217.7900
cambium-inc.com

Peterborough | Barrie | Oshawa | Kingston

Executive Summary

The Crystal Lake transfer station operates under the Ministry of Environment, Conservation and Parks Environmental Compliance Approval No. A341202. The site is at 1018 Crystal Lake Road, 8.5 km southeast of the Village of Kinmount. The total site area is 12.13 ha and has an approved landfill area of 1.2 ha. The site ceased landfilling in 2002 and now operates as a waste transfer station.

Groundwater elevations indicated that groundwater flow is primarily controlled by bedrock topography and flows toward the northwest with an isolated component of flow to the southwest immediately south of the waste mound. Based on the conceptual site model, impacted groundwater is expected to primarily discharge immediately to surface at the toe of the waste mound and eventually flow into a tributary of Union Creek. Impacts to the south of the waste mound were not expected to extend past the southwest property boundary.

Elevated concentrations were occurring at surface water stations SW3 and SW2 due to the ponded stagnant nature of the surface water, as well as impacts from the adjacent site access road and Crystal Lake Road; however, given the proximity to the waste mound, site impacts were possible. All remaining surface water locations were either not impacted or exhibited elevated parameter concentrations attributed to road salt impacts and/or natural sources. No impacts were present at the down-gradient/downstream tributary of Union Creek or the Burnt River.

The Crystal Lake waste disposal site and transfer station were operated in compliance with the ECA in 2020.

Respectfully submitted,

Cambium Inc.

Becky Yarnell

Becky Yarnell B.A. Hons, Dipl.
Technologist

PROFESSIONAL GEOSCIENTIST
apr 20/21
STEPHANIE REEDER
PRACTISING MEMBER
2516
ONTARIO

Stephanie Reeder, P.Geo., C.E.T.
Senior Project Manager

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1.0 Introduction

Cambium Inc. (Cambium) was retained by the Corporation of the Municipality of Trent Lakes (Municipality) to complete the 2020 monitoring program for the Crystal Lake transfer station (Site). The Site operates in accordance with the Ontario Ministry of Environment, Conservation and Parks (Ministry) Environmental Compliance Approval (ECA) No. A341202, issued on January 10, 2017 (Appendix A).

To aid in the understanding of the Site history and development, the following information is included digitally in the report package:

- Memorandum, RE: Crystal Lake Landfill Site Closure Plan (TSH, 2006)
- Site Inspection (WSP, 2016)
- ECA Application and supporting documents, submitted May 16, 2016
- *Transfer Station Safety, Emergency and Spills Procedures* (MTL, 2020a)
- *Transfer Station Standard Operating Procedures* (MTL, 2020a)
- Historical water quality (2005 to 2010) (WSP, 2017)

1.1 Site Location

The Site is on part of Lots 10 and 11, Concession 11, geographic Galway Township, Municipality of Trent Lakes, County of Peterborough (Figure 1). The Site is at 1018 Crystal Lake Road, on the north side of the road, 8.5 km southeast of the Village of Kinmount. The Universal Transverse Mercator (UTM) coordinates for the Site entrance are Zone 17, 4956615 m north, 693047 m east.

1.2 Site Description

The Site operated as a natural attenuation 1.2 ha landfill within a 12.53 ha site for the disposal of domestic, commercial, and non-hazardous solid industrial waste from 1980 until it ceased accepting waste in 2002. The Site is an approved Transfer Station for the receipt, temporary storage, and transfer of solid, non-hazardous municipal waste, municipal hazardous and

special wastes (MHSW), waste electrical and electronic equipment (WEEE), and organic waste. Site details are found in Embedded Table 1; a Local Topography Plan, Sample Location Plan, and an Existing Conditions Plan are attached as Figure 2, Figure 3, and Figure 4, respectively.

Embedded Table 1 Site Details

Total Site Area	12.73 ha
Total Licensed Waste Disposal Site Area	12.53 ha
Approved Area of Refuse Placement	1.2 ha

1.3 Scope of Work

The scope of the 2020 work program was based on the results of the 2019 monitoring program (Cambium, 2019), the requirements of the ECA, and included:

- Groundwater elevation monitoring
- Surface water and groundwater sampling and analysis
- Evaluation of groundwater quality against the Ontario Drinking Water Quality Standards (ODWQS) and Reasonable Use Concept (RUC) values developed in accordance with Ministry Guideline B-7
- Evaluation of surface water against the Provincial Water Quality Objectives (PWQO)
- An overview of site development and operations
- Preparation of this annual report

This report presents the results of the 2020 work program, provides an assessment of the current landfill impact of the Site on the surrounding groundwater and surface water environments, and a summary of the operational activities at the Site. Cambium has provided recommendations for the 2021 monitoring program and site operations based on the 2020 results and assessment.

2.0 Methodology

The 2020 work program was completed to maintain compliance with the Site ECA and Ministry guidelines and regulations. As such, the monitoring program was completed consistent with the *Guidance Manual for Landfill Sites Receiving Municipal Waste* (MOEE, 1993) and *Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water, Technical Guidance Document* (MOE, 2010).

Field tasks were completed following Cambium's Standard Operating Procedures developed from recognized standard procedures such as those listed above and *Guidance on Sampling and Analytical Methods for use at Contaminated Sites in Ontario* (MOEE, 1996). A health and safety program was developed for site-specific conditions and all Cambium personnel working on the project were familiarized and required to follow the identified protocol.

Groundwater and surface water samples were stored in coolers with freezer packs and maintained at less than 10°C during transport to Caduceon Environmental Laboratories (Caduceon) in Kingston, Ontario. Caduceon is accredited by the Canadian Associations for Laboratory Accreditation Inc. for specific environmental tests listed in the scope of accreditation. Groundwater and surface water samples were submitted at the frequency and for analysis of the parameters outlined in Table 1.

2.1 Groundwater Monitoring Program

The following tasks were completed as part of the 2020 groundwater monitoring program:

- Prior to sampling, water levels were measured at each monitoring well using an electronic water level tape.
- The purge volume was calculated on-site during each monitoring even using the measured water level, well depth, and the borehole diameter. Each groundwater monitoring well to be sampled was purged of approximately three well bore volumes. For wells with low recovery, at least one saturated borehole volume was purged prior to sampling. Purged water was disposed on-site, down-gradient of each respective well.

- Samples were collected using dedicated polyethylene tubing equipped with inertial-lift foot valves.
- Groundwater samples for metals and dissolved organic carbon (DOC) analysis were field filtered.
- Field measurements were recorded for pH, conductivity, temperature, dissolved oxygen (DO), and oxygen reduction potential (ORP).

Groundwater samples were collected on April 21 and November 12 from the monitoring wells listed below. Monitoring wells included in the program are shown on Figure 3, Figure 4, and Figure 5. The UTM coordinates for the monitoring locations are in Table 2. Groundwater results are discussed in Section 4.2. Field data sheets are in Appendix B, laboratory Certificates of Analysis provided by Caduceon are in Appendix C, and photographs of the monitoring wells are in Appendix D.

- MW1-U
- MW1-L
- DP1
- DP2
- DP3
- DP4
- BH16-1S
- BH16-1D
- BH16-2

Blind duplicate groundwater samples were collected from BH16-2 in April and November as part of the Quality Assurance/Quality Control (QA/QC) program. As this represents about 10% of the samples collected, this program is considered sufficient. In addition to these samples, the laboratory completes internal QA/QC. The results of the QA/QC program are presented in Section 4.1.

2.2 Surface Water Monitoring Program

The following tasks were completed as part of the 2020 surface water monitoring program:

- Weather conditions prior to and during field events were recorded.
- Surface water samples were collected by immersing the sample container into the water body.

- When sample bottles were prefilled with preservatives, a clean bottle was used to collect and decant the water directly into the sample bottle.
- Surface water samples for mercury (0.45 µm) analysis were filtered by the laboratory.
- Field measurements including pH, conductivity, temperature, DO, and ORP were recorded at each sample location.
- Where possible, depth, width, and flow velocity measurements were collected at each surface water location.

The surface water monitoring program included collection of samples from surface water sample stations SW2, SW3, SW4, SW5, and SW6 on April 21, July 8, and November 12, with the following exceptions:

- SW3 was dry in July and November
- SW6 had insufficient volume to allow sample collection in July and November

Surface water monitoring locations are on Figure 3. The UTM coordinates for the monitoring locations are in Embedded Table 2. Surface water results are discussed in Section 4.3. Field data sheets are in Appendix B, laboratory Certificates of Analysis provided by Caduceon are in Appendix C, and photographs of sampling stations are in Appendix D.

Blind duplicate surface water samples were collected from SW5 in April, July and November, as part of the QA/QC program. As this represents 10 percent of the samples taken, this program is considered sufficient. The results of the QA/QC program are presented in Section 4.1.

2.3 Landfill Gas Monitoring Program

Landfill gas (LFG) is not actively managed at the Site. The large, open site area and isolated location from the public supports passive landfill gas management, which allows generated landfill gas to naturally disperse through the waste and naturally-permeable cover to the atmosphere.

LFG monitoring was conducted at the monitoring wells during the spring and autumn sampling events using an RKI Eagle 1 Gas Monitor, equipped with a methane sensor. The LFG monitoring results are discussed in Section 4.4.

2.4 Site Inspection and Operation Overview

Site operations were observed during the visits conducted by Cambium staff in April, July, and November 2020. During site visits, the following items were inspected on accessed areas of the Site and observations noted in the field file. In February 2020, the Municipality provided additional Site maintenance information from 2019. The results of the Site inspections conducted are presented in Section 5.0.

- Litter control
- Condition and layout of recycling bins
- Status of monitoring well security
- Condition and layout of access roads, access gates
- Condition of final cover

3.0 Geological and Hydrogeological Context

3.1 Topography and Drainage

The Site is on a topographic upland which is comprised of rolling hummocky Precambrian metasedimentary bedrock, veneered by glaciofluvial fine-medium grained sand deposits that are generally less than 0.6 m thick. Immediately adjacent to the north flank of the bedrock upland, there is an unnamed tributary of Union Creek. Based on topographic mapping, the Site is about 30 m in elevation above the surface water network. (WSP, 2017)

The Site is in the Lake Ontario and Niagara Peninsula secondary watershed and the Gull tertiary watershed. The flow in the area generally collects from the northeast areas of Peterborough County and drains southwest through Trent Lakes and into Cameron Lake. Locally, drainage from the Site collects in low-lying wet areas migrating southwest via natural depressions and channels, where it flows into Union Creek and discharges to the Burnt River, which is 7.8 km west of the Site.

A prominent depression trends toward the west near the southern property boundary of the Site and drains through a culvert passing beneath Crystal Lake Road, about 50 m west of the access road to the Site. This depression is discontinuous and likely only transports surface water run-off during the spring snowmelt period. Another depression drains through a densely wooded area from the west-central areas of the Site. Surface water surrounding the Site is characterized as a ponded (unevaluated) wetland environment.

There are currently five surface water stations on and around the Site, as described below and shown on Figure 3.

- SW2 is on the east side of the Site access road, 40 m north of Crystal Lake Road.
- SW3 is adjacent to the western Site entrance on the north side of Crystal Lake Road, 70 m south of the waste mound.

- SW4 is sampled from a culvert and is on the west side of Allen's Alley, 320 m north of the waste mound. This station samples a tributary which drains into another stream that flows southwest towards Crystal Lake Road.
- SW5 is sampled from a culvert and is on the north side of Crystal Lake Road, 560 m southwest of the waste mound. This station samples water from the tributary which flows southwest from surface water station SW4.
- SW6 is a historical seep and is 40 m northwest of the waste mound at the edge of a low-lying wetland area.

The geospatial coordinates (NAD 83) for the surface water monitoring stations are in Embedded Table 2. Flow and discharge rates measured during the monitoring events are in Appendix B. There was no staining observed at any of the surface water monitoring stations that would be indicative of leachate impacted groundwater discharging to surface. Photographs of surface water monitoring stations are provided in Appendix D.

Embedded Table 2 Coordinates of Surface Water Stations

Surface Water Station	UTM (Zone 17)
SW2	693091 4956649
SW3	693044 4956584
SW4	693034 4957090
SW5	692488 4956386
SW6	692465 4956779

A review of the 2020 precipitation data for Sprucedale (Government of Canada, 2020) in comparison to the average precipitation data for 1981 to 2010 (Government of Canada, 2015) indicated the total annual precipitation was consistent with historical normal; however, individual months varied. August and October received more precipitation than normal, while February, May, June, and November received less. The monthly precipitation, as well as the amount of precipitation during and in the three days prior to the sampling events is summarized in Embedded Table 3. Refer to Appendix B for field sheets and climate data.

Embedded Table 3 Historical and 2020 Precipitation Data

Sampling Date	Average Monthly Precipitation (mm) (1981 – 2010)	2020 Precipitation (mm)	Precipitation During and Prior to Sampling (mm)
April 21	75.6	70.8	17
July 8	90.1	113.0	0
November 12	116.4	66.2	12

3.2 Hydrogeology

The waste mound is on a topographic divide which is controlled by bedrock topography. This divide causes groundwater to flow north toward the adjacent wetland and south toward local bedrock depressions that outlet farther downstream of the wetland from the Site. Based on the wetland area to the north of the Site, groundwater flow discharges immediately to surface (WSP, 2017).

The current monitoring program consists of the following nine monitoring wells.

- MW1 is a multi-level monitor in the waste mound and is completed in the bedrock unit (granite). This monitor is screened from 6.7 to 9.8 m below ground surface (bgs) (MW1-U) and from 18.3 to 21.3 mbgs (MW1-L).
- BH16-1D is completed in the bedrock unit (pink granite) and is screened between 6.3 and 10.1 mbgs.
- BH16-1S is completed in the bedrock unit (pink granite) unit and is screened between 3.8 and 5.5 mbgs.
- BH16-2 is completed in the overburden unit (silt, trace gravel) and is screened between 5.5 and 8.5 mbgs.
- DP1, DP2, DP3, and DP4 are shallow-drive point piezometers completed to 1.76, 1.42, 0.98, and 1.21 mbgs, respectively.

BH16-1 and BH16-2 were installed in 2016, sampled for the first time in October 2016, and surveyed in early 2018. It is noted, BH16-2 was proposed to be in the southwest property boundary, as documented in the *2016 Annual Report* (WSP, 2017); however, upon reviewing

the water well record (UTM coordinates; Figure 2) and surveying this well in 2018, it became apparent the well is actually 100 m west of the property boundary.

No well records are available for DP1 to DP4; however, given their construction depth and their surroundings, it is assumed that the piezometers are installed in the shallow overburden. Available borehole logs can be found in Appendix E.

3.2.1 Water Well Records

A Ministry water well search was completed and no water well records were identified within 500 m of the waste mound other than the records for wells MW1, BH16-1, and BH16-2 (Figure 2) (Cambium, 2018). Well records available in the vicinity of the Site (beyond 500 m) indicated that the domestic water supply aquifer was in the deep granite bedrock, usually reported between 60 and 130 mbgs. It is not anticipated that impacts from the Site will adversely impact the surrounding water supply aquifer.

3.2.2 Groundwater Flow Direction

Groundwater elevations collected in 2020 were used to define the horizontal groundwater flow direction at the Site. A summary of the groundwater elevation data is in Table 2 and is on Figure 6.

Water elevations indicated that groundwater predominantly flowed to the northwest; however, was to the west-southwest in the immediate vicinity of the transfer station and south of the waste mound. The horizontal hydraulic gradients calculated in 2020 are summarized in Embedded Table 4.

Embedded Table 4 Summary of Horizontal Hydraulic Gradients

Location	Spring	Autumn
North of the Waste Mound	0.194 m/m northwest	0.206 m/m northwest
West of the Waste Mound	0.105 m/m northwest	0.105 m/m northwest
South of Waste Mound (in vicinity of well DP1)	0.042 m/m southwest	0.040 m/m southwest

3.3 Vertical Gradients

Vertical gradients were calculated at clustered monitors BH16-1S/1D and nested monitors MW1-U/L (Table 3). Consistent with historical results, vertical gradients were calculated to be downward, which indicated that groundwater gradually infiltrates through the shallow fractured metasedimentary rocks to the deeper bedrock.

3.4 Conceptual Site Model

Groundwater flow is primarily controlled by bedrock topography and flows to the northwest of the waste mound with a minor component of flow in the waste mound area to the west-southwest toward monitor DP1. Groundwater flow in the vicinity of the waste mound and Site is largely captured within the organic-rich depressions (discharges to surface). Surface water on and adjacent the Site either enters the tributary to Union Creek and flows southwest toward the Burnt River (north of the waste mound and Site) or infiltrates back into the ground (south of the Site and Crystal Lake Road). Where groundwater does not discharge to surface, this water gradually migrates west and northwest, infiltrating downward through to the shallow fractured metasedimentary rocks, as evidenced by the downward vertical gradients at nested monitors MW1-U/L and clustered monitors BH16-1S/-2D.

4.0 Results and Discussion

Water quality analytical results from the monitoring program are used to assess the existence, extent, and level of impacts to the surface water and groundwater environments related to landfilling activities. Water quality data are compared against background water quality and historical data for the Site to permit an analysis of any significant changes or trends in the water quality over time.

This section presents the results of the 2020 monitoring program at the Site.

4.1 Quality Assurance/Quality Control

Results from the analyses completed on the blind date duplicate QA/QC samples were evaluated. Parameter concentrations were considered significantly different if the relative percent difference (RPD) between the duplicate and the parent samples was greater than 30% when at least one result was greater than five times the reported detection limit (RDL).

The duplicate groundwater and surface water analyses were compared to the originals. Overall, the duplicate samples correlated well with the parent samples and met the data quality objective of 30%. Exceptions noted included:

- ammonia in April at monitor BH16-2
- nitrate in November at monitor BH16-2
- arsenic and zinc in April at SW5
- chemical oxygen demand (COD), ammonia, and zinc in November at SW5

Evaluation of the parent/duplicate samples did not identify any significant data quality issues and concentrations were consistent with historical ranges. The water quality data were considered suitable for their intended use, which was to identify changes in water quality at concentrations greater than the applicable standards, and was interpreted with confidence.

4.2 Groundwater Quality

The groundwater chemistry data obtained from the analysis of water samples collected from the monitoring wells at the Site from 2006 to 2011 (WSP, 2017) are included digitally with this report package. Water quality data from 2012 to 2020 are summarized in Table 4 and Table 5.

To asses water quality impacts related to landfill site operations, the analytical results for groundwater samples collected on-site were compared to background water quality and historical data. Compliance was assessed using the Ministry RUC (MOEE, 1994a).

4.2.1 Background Groundwater Quality

When evaluating the impact of any waste disposal site on a groundwater resource, a reference point or value must be established to assist in determining the magnitude of the impact. The quality of the groundwater that is non-impacted by the waste disposal site/transfer station operation (i.e., background water quality) should be used for comparison purposes.

Monitors BH16-1S and BH16-1D were installed in 2016 to characterize background groundwater quality and were sampled for the first time in the autumn of 2016. Road salt impacts have been evident given the elevated total dissolved solids (TDS), chloride, sodium, hardness, calcium, and magnesium, particularly at BH16-1D. Further, DOC was elevated at BH16-1D and BH16-1S (Figure 13).

In 2020, parameter concentrations were generally consistent with historical concentrations with the exception of elevated iron (Figure 19) and manganese (Figure 21) at BH16-1D in April. Given the limited data available for these monitors, at least eight data sets should be collected prior to definitively identifying them as appropriate background monitors for the Site.

4.2.2 Leachate Characteristics

Multi-level monitor MW1 is installed in the waste mound and is used to characterize leachate quality at the Site. Historically, this monitor has exhibited high concentrations of most parameters, but most notably for the following:

- MW1-U: alkalinity, conductivity, TDS, DOC, chemical oxygen demand (COD), chloride, hardness, calcium, iron, manganese, and sodium
- MW1-L: conductivity, TDS, DOC, chloride, sodium

A number of these parameters were identified to be elevated at the background monitor(s) (e.g., TDS, chloride, sodium, DOC, manganese, etc.) and therefore may not be site-related. Continued monitoring at the background location will aid in differentiating between naturally elevated concentrations and site-related impacts.

The greatest parameter concentrations have been identified in the shallow bedrock unit, which supports the conceptual site model that indicates groundwater flow is restricted to the overburden/shallow bedrock unit. Embedded Table 5 outlines the leachate indicator parameters (LIPs) associated with the Site to date.

Embedded Table 5 Leachate Indicator Parameters

Alkalinity	Conductivity	TDS
DOC	Chloride	Hardness
Calcium	Iron	Manganese
Sodium		

In 2020, parameter concentrations were generally within historical ranges. Concentrations of sulphate, hardness, barium, boron, calcium, and magnesium at MW1-L continued to increase. Monitor MW1-U displayed all parameters concentrations within historical ranges, with stable or decreasing trends. Refer to Figure 7 through Figure 22 for time concentration graphs of the LIPs.

4.2.3 Down-gradient Groundwater Quality

Down-gradient groundwater quality is characterized by shallow-drive point monitors DP3 and DP4 directly north of the waste mound. Historically, these monitors have exhibited low concentrations of most parameters and have had water quality similar to the background monitors (BH16-1S and BH16-1D) with the exception of elevated iron and manganese. Given the location of these monitors in the low-lying wetland area to the north of the waste

mound, the elevated iron and manganese concentrations were not unexpected and were not considered to be site-related.

In 2020, all LIP concentrations were within historical ranges, as well as ranges in the background monitors with the exception of iron (Figure 19) and manganese (Figure 21). Given that no impacts were identified at these monitors, this supported the conceptual site model that groundwater discharges to surface immediately northwest of the waste mound to the low-lying area.

Monitors DP1 and DP2 characterize down-gradient groundwater quality south of the waste mound. Historically, monitor DP2 exhibited similar concentrations to monitor DP3, with the exception of slightly elevated concentrations of alkalinity, conductivity, TDS, ammonia, and iron; this continued in 2020. Impacts at DP2 were related to the wetland environment and/or impacts from road salting activities.

Leachate impacts have been present DP1, with most LIP concentrations being moderate to high, but less than the leachate monitors; this continued in 2020. Although some leachate impacts have been at this well, impacts were also attributed to the wetland environment and road salt activities. Regardless, as some leachate impacts were likely present, this supports the southwestern component of groundwater flow.

Monitor BH16-2 was installed in 2016 to assess groundwater quality at the southwestern property boundary. This monitor has exhibited nearly identical water quality to the background monitors (BH16-1S and BH16-1D), with the exception of elevated concentrations of COD, ammonia, and TKN compared to background, which continued in April 2020. Concentrations of these parameters were less than typical of this location in November 2020, more consistent with background water quality. The concentrations of COD, ammonia, and TKN have generally been greater at BH16-1S than in the leachate monitors (MW1) and have not been attributed to landfill.

4.2.4 Groundwater Volatile Organic Compound Monitoring

In 2020, a VOC analysis was completed during the spring sampling event at leachate monitors MW1-U and MW1-L. All VOC parameter concentrations were less than RDLs. Refer to Table 5 for a summary of VOC results.

4.2.5 Groundwater Compliance Assessment

The Ministry RUC (Guideline B-7) applies to operating waste disposal sites and sites closed post 1986 (MOEE, 1994a). As the Site closed in 2002, the RUC applies to the Site.

Based on the existing hydrogeological model of the Site, shallow leachate impacted groundwater discharges to the surface water systems down-gradient of the Site, particularly to the north. As dictated by the Ministry RUC (MOEE, 1994a), where groundwater provides baseflow to a surface water feature, this is the recognized reasonable use of the groundwater; therefore, management approaches should be focused on the receiving surface water feature. As such, compliance with Ministry policies for the protection of the environment should be focused to the surface water systems; refer to Section 4.3.

There is a potential for impacted groundwater to flow southwest from the waste mound and leave the Site prior to discharging to surface. As such, to ensure appropriate actions are in place to respond to any potential degradation in groundwater quality beyond an acceptable level, site-specific trigger levels have been developed for the Site. These are the RUC values developed in accordance with Ministry Guideline B-7 (MOEE, 1994a). The Ministry Guideline B-7 states that, in accordance with the appropriate criteria for particular uses, a change in quality of the groundwater on an adjacent property will be accepted only as follows (Ministry Procedure B-7-1):

The quality cannot be degraded by an amount in excess of 50% of the difference between background and the ODWQS for non-health related parameters and in excess of 25% of the difference between background and the ODWQS for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination.

The maximum concentration of a particular contaminant that is considered acceptable in the groundwater beneath an adjacent property is calculated in accordance with the following relationship:

$C_m = C_b + x (C_r - C_b)$

Where:
- C_m = maximum concentration accepted
- C_b = background concentration
- C_r = maximum concentration permitted in accordance with the ODWQS
- x = a constant that reduces the contamination to a level that is considered by the Ministry to have a negligible effect on water use.
  i.e. 0.5 for non-health related parameters
  0.25 for health-related parameters.

The RUC values were calculated using the median value of the background concentration (C_b) from a minimum of the previous five sampling events as required by Ministry Eastern Region Technical Support Section. Where background concentrations were less than the laboratory RDL, the RDL was used as the background concentration. Where the background concentrations exceeded ODWQS, the C_b value was set as the RUC value. The calculated C_m values for the Site were set as the RUC values.

The RUC values were calculated for all of the LIPs identified for the Site (Embedded Table 5). The RUC assessment included the following down-gradient monitors: DP1, DP2, and BH16-2. The analytical results of the water quality data in 2020 indicated that the RUC concentrations were met in these monitoring wells with the exception of the parameters in Embedded Table 6. It is noted that monitors BH16-1S/D were included in this table for reference purposes.

Embedded Table 6 Summary of RUC Exceedances

Monitor	RUC Criteria Exceedance
BH16-1D (Background)	TDS, DOC, sodium, iron, manganese
BH16-1S (Background)	none
DP1	alkalinity, TDS, hardness, chloride, iron, manganese
DP2	alkalinity, TDS, DOC, iron, manganese
BH16-2	manganese, iron

As discussed in Section 4.2.3, some leachate impacts were evident at monitor DP1; therefore, the RUC exceedances at this monitor were not unexpected. Regardless, the impacts at this location were not expected to extend much beyond the southern property boundary, if at all, due to the following:

- the Site has been closed to landfilling since 2002
- there have been no increasing trends for any LIPs at this location with the exception of iron (which was determined to be attributed to non-waste related sources)
- groundwater flow is expected to travel west and northwest from this location
- the farthest down-gradient monitor (to the west) is unimpacted (BH16-2)

Impacts at monitor DP2 have been the result of influences from the surrounding wetland environment and/or road salting activities; this was evidenced by elevated alkalinity, TDS, DOC, iron, and manganese and low concentrations of all other LIPs.

The concentration of manganese at BH16-2 was within the range at background monitor BH16-1S. The elevated iron concentration at BH16-2 in April was consistent with that reported at BH16-1D during the same monitoring event. As such, the water quality at this location indicated that impacts from the Site do not extend beyond the western property boundary at this time.

Based on the above, the Site was interpreted to comply with the RUC (MOEE, 1994a) following the groundwater assessment in 2020.

4.3 Surface Water Quality

The 2005 to 2011 surface water quality data are included digitally as part of the report package (WSP, 2017). Water quality results from 2012 to 2020 are presented in Table 6. The surface water data have been compared to historic results and background water quality, and compliance was assessed using the PWQO (MOEE, 1994b). Refer to Figure 8 through Figure 23 for time concentration graphs for select parameters.

4.3.1 Background Surface Water Quality

SW4 is 320 m north, up-gradient, and upstream of the waste mound and is representative of background surface water quality for the Site. SW4 has had low to moderate concentrations of most parameters with slightly elevated conductivity and elevated concentrations of alkalinity, TDS, hardness, and barium. No PWQO exceedances were reported in 2020 at station SW4. In 2020, this location continued to represent background surface water quality.

4.3.2 Downstream Surface Water Quality

SW6 monitors surface water quality at the edge of the northern wetland area between monitors DP3 and DP4. Historically, SW6 has had water quality similar to background conditions with the exception of elevated conductivity, alkalinity, TDS, turbidity, hardness, boron, and iron. In 2020 sampling only occurred during the spring sampling event due to insufficient volumes in July and November. All parameters at surface water station SW6 displayed seasonal variance within historical ranges and leachate impacts were not occurring at this location. All parameter concentrations met the PWQO criteria in 2020.

Surface water stations SW2 and SW3 are south of the waste mound and on the north side of Crystal Lake Road.

SW2 has historically had water quality similar to background conditions with the exception of slightly elevated DOC and sporadically elevated iron and total phosphorus which have been in-part attributed to the low-lying wetland environment. Conductivity, TDS, and chloride have also been elevated at this location; however, these parameter concentrations have been associated with road de-icing activities on Crystal Lake Road and the site entrance road.

Salt influences the chemistry of the soil in which it infiltrates and can release metals (e.g., aluminum, zinc, copper, cobalt, mercury, cadmium) and base cations (calcium, magnesium, potassium) (Health Canada, 2001). In 2020, total phosphorus, iron, zinc, and DO (low) did not meet the PWOQ at SW2 during one or more sampling events. Given the proximity of this location to the waste mound, but also to the site entrance road, Crystal Lake Road, and the ponded, wetland environmental, it is difficult to determine the source of the elevated concentrations.

Historically, SW3 has exhibited elevated concentrations of all LIPs assessed in surface water in comparison to background surface water quality (i.e., alkalinity, conductivity, TDS, DOC, hardness, iron, and chloride). Several other parameters have consistently exceeded the PWQO (total phenolics, cobalt, copper, iron, and total phosphorus). Similar to SW2, many elevated concentrations could be attributed to the stagnant, ponded conditions, often observed to be dry, road salt influences, and/or the waste site. In 2020, iron and total phosphorus did not meet the PWQO criteria.

SW5 monitors surface water southwest of the property boundary on the north side of Crystal Lake Road. Historically, station SW5 had similar water quality to the background location (SW4), with no elevated LIPs or persistent PWQO exceedances. The only parameters that have exceeded the PWQO at station SW5 have been total phenolics, iron, total phosphorus, zinc, and DO (low), which have been sporadic. In 2020, all LIPs were within historical ranges. Iron, total phosphorus, and DO (low) did not meet the PWQO criteria in July. Landfill impacts were not present at station SW5.

Given the similarity in water quality between stations SW5 and SW6 to background water quality at SW4, these two locations were not impacted by the Site. This was expected as monitors DP3 and DP4 were not impacted. Impacts were identified at station SW2 and were primarily attributed to road salt activities and/or naturally occurring parameter associated with the low-lying wetland environment. This was also the case with station SW3. No increasing trends have been identified at these locations. Given this, and the fact that station SW5 remains unimpacted, no adverse impacts are expected to the tributary of Union Creek or the

Burnt River. Refer to Figure 8 through Figure 23 for time concentration graphs for select parameters.

4.4 Landfill Gas Monitoring

Landfill gas monitoring was conducted at the Site in 2020 to assess the potential gas hazard at the Site. The purpose of this monitoring was to ensure that, in accordance with Section 4.10 of the *Landfill Standards, A Guideline on the Regulatory and Approval Requirements for New and Expanding Landfilling Sites* (MOE, 2012), the concentration of methane gas in the subsurface does not exceed 2.5% by volume at the property boundary.

Landfill gas (LFG), specifically methane and carbon dioxide, is derived from the decomposition of organic wastes. Production of LFG from landfilled wastes normally reaches a maximum rate approximately two years after placement and may continue at this rate for many years. The biological decomposition process results in the generation of LFG until some period, likely decades, after the landfilling of that waste ceases. Hazardous concentrations for methane are 5 to 15 % methane by volume or between 50,000 and 150,000 ppm.

The results of the landfill gas monitoring program are documented in the field data sheets (Appendix B). LFG was not detected at concentrations greater than 75 ppm; therefore, methane did not pose a threat to the Site or adjacent properties in 2020.

4.5 Adequacy of Monitoring Program

In an effort to have a refined and concise monitoring program at the Site, the existing monitoring program is reviewed annually to determine if it sufficiently monitors impacts at the Site. Following the 2020 assessment, the monitoring program continues to effectively characterize Site conditions, groundwater and any groundwater discharges from the Site, and includes data that relates to background water conditions. At the Site, in whole or in part:

- All monitoring wells were confirmed to be in good condition and secure.
- All fieldwork for groundwater and surface water investigations were done in accordance with the established SOPs (including internal/external QA/QC).

- All groundwater and surface water sampling for the monitoring period were successfully completed in accordance with the ECA (with the exception of the noted parameter reduction due to limited sample volumes).
- The Site generally met compliance and assessment criteria.

5.0 Site Operations

This section presents a summary of Site operations in 2020 and addresses the requirements detailed in ECA Condition 5.3.

- A monthly balance of waste received and transferred from the Transfer Station (Table 7).
- A summary of any rejected wastes (Section 5.6).
- A summary of any incidents (Section 5.5).
- A summary of complaints received (Section 5.5).
- Any changes to the Site Operations and Maintenance Manual and/or the Transfer Station Safety and Emergency Response Procedures since the last annual report (Section 5.9).
- A statement as to compliance with all conditions of the ECA, a description of any operational changes, and/or Transfer Station improvements undertaken and all other operational issues (Section 5.9 and Section 5.10).
- Any recommendations to minimize environmental impacts from the operation of the Site and to improve operations and monitoring programs in this regard (Section 5.4).

5.1 Site Access and Security

Site access is controlled from Crystal Lake Road by a chain linked fence which was in good repair in 2020. An access card is provided to all tax paying residents of the Municipality, where access is only permitted during operational hours and with the presence of a site attendant.

Signage is posted at the gate which lists the hours of operation, that the site uses video surveillance, and a reminder of the Municipality’s clear bag policy. Additional signage is on-site which lists acceptable waste types.

No changes were made to the operational hours in 2020 and were as followed:

Winter (October 1 to April 30)

Wednesday……. 8:00 AM to 2:00 PM
Saturday……... 8:00 AM to 4:00 PM
Sunday…… 12:00 PM to 5:00 PM

Summer (May 1 to September 30)

Monday……. 8:00 AM to 1:00 PM
Wednesday……. 8:00 AM to 2:00 PM
Saturday…… 8:00 AM to 4:00 PM
Sunday……. 12:00 PM to 8:00 PM

5.2 Site Operation

All waste disposal and transfer operations were conducted under the supervision and direction of the site attendant in 2020, employed by the Municipality. The site attendant was responsible for ensuring that the safe and orderly operation and maintenance of the site complied with the requirements of the ECA and the *Environmental Protection Act* and its Regulations as administered by the Ministry. In addition, the site attendant's responsibilities included:

- Controlling admission of authorized vehicles with acceptable wastes
- Ensuring proper daily litter control
- Controlling collection and haulage of materials by a licensed hauler
- Maintaining a daily record of all operations which are available for inspection by the Ministry

As part of the daily operation of the Site and outlined in the Standard Operating Procedures (MTL, 2020a), the site attendant used the following forms on each operating day, as applicable:

- TS-1 Daily Inspection Form
- TS-2 Issues and Deficiencies Forms
- TS-3 Daily Incoming Waste Form
- TS-4 Tipping Fee Form
- TS-5 Tire Form

- TS-6 Reuse Centre Form
- TS-7 Unaccepted Refused Waste & Entry Form
- TS-8 Complaint Form
- TS-9 Daily Record of Material Removed Form

5.3 Training

Training was limited due to the COVID-19 pandemic in 2020. A site attendant meeting was held on October 1, 2020 to complete a WHMIS refresher, discuss policies on wearing face masks in the workplace, how to sanitize tools and equipment, the ECA, and the *Transfer Station, Safety, Emergency, and Spills Procedures* (MTL, 2020b). Employees signed an "Acknowledgement and Understanding" form to acknowledge the training.

In 2019, semi-annual meetings are held with site attendants and municipal staff that operate and/or are responsible for transfer station operations. The following items are covered by these meetings and all operating personnel are trained in the following:

- site operating responsibilities
- receiving and recording procedures
- storage, handling, sorting and shipping procedures
- equipment inspection, operation and maintenance procedures
- housekeeping and nuisance control procedures
- site inspection procedures
- occupational health and safety concerns (related to waste)
- complaint response procedures
- procedures to be followed in the event of a spill, fire medical or other emergency
- a review and discussion of the ECA conditions for the Site

In addition to the semi-annual training/meeting, the following training was provided to site attendants in 2019:

- Paintball Gun Training
- Fire Extinguisher Awareness Training
- Lifting Loads Safely
- Workplace Hazardous Materials Information Systems (WHMIS)

A record is kept of all staff who attend the meetings and/or training.

5.4 Site Inspection

The following section discusses observations during site inspections conducted by Cambium and discusses information provided by the Township in 2020.

In 2020, daily site inspections of the on-site equipment and facilities were completed by the site attendant, as per ECA Conditions 2.6, 3.19 and 4.1. Records of these inspections are kept on-site.

There were no environmental and/or operational problems that were negatively impacting the environment observed by Cambium or the Municipality during site inspections in 2020. As such, no recommendations are suggested to minimize environmental impacts or improve site operations.

5.4.1 Litter Control

As noted by Cambium staff, the Site was in good condition. Minimal evidence of blown litter was observed during any of the site visits in 2020.

The intent of good housekeeping practices is to protect on-site worker health and safety, and the surrounding environment from nuisance effects. Nuisance effects are minimized by adopting good housekeeping measures as part of the Site operations. Regular housekeeping is essential to control such nuisances as:

- Blowing and loose litter
- Odour
- Rodents and insects
- Scavenging birds

5.4.2 Roads

The access road has sufficient width at the entrance and within the Site to allow unimpeded winter travel and access for emergency and snow removal equipment. The Site access roads were observed to be well maintained and graded and were reported to be regularly cleared of snow with a sand mixture applied as needed by the Municipality during the winter months.

5.4.3 Final Cover Integrity

The waste mound was adequately covered and there was minimal evidence of erosion from areas visited by Cambium staff in 2020. Furthermore, the waste mound was well vegetated, which is an effective erosion control measure. Riprap is installed on a portion of the northern slope as an additional erosion control measure.

5.5 Complaints and Incidents

In 2020, the Municipality reported a complaint from a resident regarding a miscommunication about materials accepted at the Site. Three incidents were reported which involved a vehicle collision with a pole, a resident verbally abusing a site attendant and not obeying the recycling policies, and a trespassing occurrence where seven bags of alcohol containers were stolen. The Municipality notified the Ontario Provincial Police about the incident involving theft.

5.6 Waste Refusal

The Municipality has a Clear Bag Policy. Any garbage bag that has any visible blue box materials, municipal hazardous and special wastes (MHSW), or more than 20% divertible items (i.e., clothing, organics, WEEE), is not accepted at the Site. The site attendant is required to fill out the “TS-7 Unaccepted Refused Waste and Entry” form as detailed in the Municipal document *Transfer Station Standard Operating Procedures* (MTL, 2020a). This Municipality keeps these forms on file.

5.7 Monitoring Well Security

As part of the 2020 groundwater monitoring program, every monitoring well listed in Table 1 was inspected and complied with R.R.O. 1990 Regulation 903: Wells. Refer to Appendix D for photographs of the monitoring wells.

5.8 Materials Summary

The following approved waste types were accepted at the Site; refer to Figure 4 for the collection locations of each material.

- Household Waste
- Blue Box Materials
- Bulky Items
- Construction and Demolition (C&D) Materials
- Scrap Metal
- White Goods
- Limited MHSW
- Tires
- Leaf and Yard Waste
- WEEE

The Municipality reported that only household waste and blue box recyclables were accepted at the Site from March to June. This was a precaution caused by the COVID-19 pandemic. Restrictions were slowly lifted and additional waste types were once again accepted at the Site.

In 2020, Waste By-Law B2020-031 was established to maintain and regulate the disposal of waste and divertible materials at all transfer stations owned by the Municipality. Minor housekeeping issues were addressed and fees were removed. Fees are now detailed in the Fees and Charges By-Law.

ECA Condition 3.6 defines the quantities and types of MHSW that can be accepted at the Site as followed:

- A maximum of 50 vehicular batteries
- A maximum of one 250 L drum of lithium, dry cell, and/or rechargeable batteries

- A maximum of one 250 L capacity container for the bulk collection of empty motor oil containers
- A maximum of 50 units of fluorescent light bulbs

It is noted, as per ECA Condition 3.5 (h), a maximum volume of 50 m³ of MHSW can be stored at the Site at one time.

As per ECA Condition 3.5, the infrastructure on-site ensures compliance with the ECA as it relates to volumes of materials permitted on-site at any given time.

5.8.1 Site Usage

Site usage, as documented by the Municipality, is summarized in Embedded Table 7. Waste collected is transferred to the Peterborough Waste Management Facility with the exception of C&D Materials. C&D is hauled to Waste Connections. Refer to appended Table 7 for a monthly summary of materials accepted and transferred at the Site.

Embedded Table 7 Summary of Site Usage

	2020	2019	2018	2017
Vehicles – Private	11,116	8,905	10,150	10,327
Bags of Garbage	14,220	10,360	10,941	11,317
Waste – Tonnes[1]	136.97	114.81	147.31	158.56
C&D Materials – Tonnes[2]	44.87	44.00	41.64	-

Notes:

1. 30 bins transferred to the Peterborough Waste Management Facility.

2. C&D materials tonnages unreported in 2017.

5.8.2 Site Diversion

Embedded Table 8 provides a summary of the materials diverted from landfilling in 2020, as reported by the Municipality and the County of Peterborough.

Embedded Table 8 Summary of Diverted Materials

Material	tonnes
Blue Box	
Plastic Containers	32.95
Fibres	35.53
Empty Oil/Anti-freeze Containers	0.15
Scrap Metal and White Goods	26.92
Textiles	0.19
WEEE	7.67
TOTAL	**103.41**
Material	**Unit**
Alcohol Containers	28,125
Tires	257

Additionally, 22 tonnes of brush and lumber were accepted at the Site in 2020 which was chipped and used as cover for rehabilitation on municipal properties.

5.8.3 Municipal Wide Diversion

The Site is approved to accept limited MHSW, as are various other transfer stations in the Municipality including the Bobcaygeon, Cavendish, and Buckhorn sites. Embedded Table 9 provides a summary of the limited MHSW accepted at these sites 2020.

Embedded Table 9 Summary of Limited MHSW Collected – Municipality

MHSW	Municipal Wide tonnes
Batteries	0.81
Florescent Tubes	0.16
Car Batteries	1.20
TOTAL	**2.17**

In 2020, the annual Environmental Day hosted by the County was cancelled due to the COVID-19 pandemic. Typically, this annual event would allow residents to dispose of the following items: polystyrene, media and car seats, hard cover books, and mattresses.

5.9 Site and Documentation Reviews and Updates

The following documents are maintained by the Municipality, reviewed annually, and updated as required.

- Current Design and Operation Plan consisting of:
    - "Crystal Lake Landfill Site - Closure Plan" prepared for the Township of Galway-Cavendish and Harvey by TSH dated September 2002 and subsequent correspondence between the Ministry and TSH including the letter dated June 28, 2006 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Colleen Carter, TSH providing updated drawings for the closure of the landfill.
    - Letter dated June 9, 2008 requesting an amendment to an existing Certificate of Approval, signed by Catrina Switzer, Environmental Services, County of Peterborough, including all supporting information.
    - Environmental Compliance Approval application, signed by Lois O-Neill-Jackson, CAO/Economic Development Officer, Municipality of Trent Lakes, dated May 10, 2016 and subsequent correspondence from Cambium to the Ministry, dated May 10, 2016, re: description of proposed changes sought under the application to amend ECA No. A341202 including Figure 2, Proposed Site Layout, dated May 2016.
- *Municipality of Trent Lakes – Transfer Station Standard Operating Procedures* (MTL, 2020a)
- Municipality of Trent Lakes – Transfer Station Safety, Emergency and Spills Procedures (MTL, 2020b)

Copies of the operations procedures and emergency and spills procedures are included with this report digitally.

Specifically,

- No changes were made to the Design and Operations Plan in 2020.

- The Standard Operating Procedures were reviewed and updated on October 1, 2020. Minor changes were made to identify the staging area for ashes, changes to the haulers for textiles and blue box recyclables, and the handling of loose waste.
- The Emergency and Spills Procedure was reviewed on November 26, 2020. The following changes were made: clarification stating that all fires must be reported to the Ministry, contact information for the Spills Action Centre, and an “Acknowledgement and Understanding” sign off page was added. Furthermore, Municipal contact information was updated.

5.10 Compliance with Environmental Compliance Approval

The Crystal Lake waste disposal site was operated in compliance with all conditions of the ECA in 2020.

6.0 Conclusions and Recommendations

Based on the 2020 monitoring program, Cambium provides the following conclusions regarding the Crystal Lake transfer station:

- Results of the groundwater elevation monitoring indicated that groundwater flowed toward the northwest from the waste mound, with a minor component of flow to the southwest, immediately south of the waste mound.
- Given the presence of the low-lying wetland area to the northwest of the waste mound and the unimpacted nature of monitors DP3 and DP4, groundwater discharges to surface at the toe of the waste mound.
- Leachate was characterized by the nested monitor in the waste mound (MW1) in the deep and shallow bedrock units. Based on a review of the average LIP concentrations compared to background monitors BH16-1S and BH16-1D, the greatest impacts occurred in the shallow bedrock unit (MW1-U).
- Volatile organic compound analysis was completed at multi-level monitoring wells MW1 during the spring sampling event. All VOC concentrations were less than the RDLs.
- Site-related impacts have been present immediately down-gradient (to the south) of the waste mound at monitor DP1, which implies that leachate is present primarily toward the southwest of the waste mound (in groundwater). Some elevated parameter concentrations were naturally occurring or were attributed to road salt impacts. As the Site has been closed to landfilling since 2002 and no increasing trends have been identified (with the exception of iron which is naturally occurring), were being attenuated.
- A review of groundwater quality data indicated that the Site met the RUC (MOEE, 1994a) in 2020.
- The results of the surface water monitoring program indicated that site-related impacts may be occurring at stations SW3 and SW2; however, various other impacts were evident such as road salt impacts and elevated concentrations due to ponded, wetland environments. All

remaining surface water locations were not impacted by the Site. Based on this assessment and the unimpacted nature of station SW5, the Site was not adversely impacting the downstream tributary of Union Creek.

- According to Municipal and County records, 136.97 tonnes of waste, 44.87 tonnes of construction and demolition wastes, 68.48 tonnes of containers and fibres, and approximately 35 tonnes of various other materials were accepted and transferred off-site in 2020. Not included in these tonnages were 22 tonnes of brush, 257 tires, and 28,125 alcohol containers.
- The Site was operated in compliance with the ECA in 2020.

Based on the 2020 monitoring program, the following recommendations are provided:

- The groundwater and surface water program should be continued in 2021 in accordance with appended Table 1.

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Glossary of Terms

Active Face/Area
The portion of the landfill facility where waste is currently being deposited, spread and/or, compacted prior to the placement of cover material.

Adverse Environmental Impact
Any direct or indirect undesirable effect on the environment resulting from an emission or discharge that is caused or likely to be caused by human activity.

Annual Report
Report documenting the results of water quality, environmental quality, and operations monitoring for the year, or for a period as prescribed in the Certificate of Approval.

Approved Design and Operations Plan
The design of a landfill site and its facilities which have been submitted along with the application documents for which formal Ministry approval has been issued through the Certificate of Approval.

Approved Site or Facility
A landfill site/facility for which there is an existing and current Certificate of Approval.

Aquifer
A geologic unit (soil or rock) that contains sufficient saturated permeable material to yield measurable quantities of water to wells and springs.

Attenuation
Natural process through which the concentrations of landfill generated contaminants are reduced to safe levels.

Borehole
A hole drilled for soil sampling purposes.

Buffer Area
An area of land situated within the peripheral area surrounding an active filling area, but limited in extent to the property boundary, assigned to provide space for remedial measures, contaminant control measures, and for the reduction or elimination of adverse environmental impact caused by migrating contaminants.

Certificate of Approval
The license or permit issued by the Ministry for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.

Contaminant
A compound, element, or physical parameter, usually resulting from human activity, or found at elevated concentrations that have or may have a harmful effect on public health or the environment.

Contaminant Migration Path
Route by which a contaminant will move from the site into adjacent properties or the natural environment. Usually a route that offers the least resistance to movement.

Contamination Attenuation Zone
The zone beneath the surface, located beyond the landfill site boundary, where contaminants will be naturally attenuated to predetermined levels. Also, see Reasonable Use Policy.

Contingency Plan
A documented plan detailing a co-ordinated course of action to be followed to control and remediate occurrences such as a fire, explosion, or release of contaminants in an uncontrolled manner that could threaten the environment and public health.

Cover Material
Material approved by the Ministry that is used to cover compacted solid waste. Usually, a soil with suitable characteristics for specific end-use.

Site Development Plan and Operations Report
Development and Operations Plan or Report is a document detailing the planned sequence of activities through the landfill site's active life, the control systems, site facilities and monitoring systems that are necessary. This document is required for obtaining a Certificate of Approval.

Design Capacity
The maximum amount of waste that is planned to be disposed of at a landfill site.

Detection Limit
Concentration under which a parameter cannot be quantitatively measured.

EAA or EA Act
Environmental Assessment Act, Revised Statutes of Ontario, 1990. One of the primary acts of legislation intended to protect, conserve, and wisely manage Ontario's environment through regulating planning and development.

Environmental Compliance Approval
The license or permit issued by the Ministry for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.

EPA
Environmental Protection Act, Revised Status of Ontario, 1990. EPA is another of the primary pieces of Provincial legislation governing the protection of the natural environment of the Province.

Evapotranspiration
The evaporation of all water from soil, snow, ice, vegetation and other surfaces, including the water absorbed by plants, that is released to the atmosphere as vapour.

Fill Area
The area of a landfill site designed and designated for the disposal of waste.

Final Cover
Soil material or soil in combination with synthetic membranes, overlain by vegetation in a planned landscape, placed over a waste cell that has reached the end of its active life.

Groundwater
Subsurface water that occurs beneath the water table in soils and rocks that are fully saturated.

Hydraulic Conductivity
The rate of flow of water through a cross-section under a specific hydraulic gradient. It is a property of the geologic formation and the fluid, in hydrogeologic applications where the fluid is water (Units of m/day or cm/s).

Hydraulic Gradient
The head drop per unit distance in the direction of flow, the driving force for groundwater flow.

Hydrogeology
The study of subsurface waters and related geologic aspects of surface waters.

Impermeable Fill
Soil material that is placed as filling material that is sufficiently cohesive and fine grained to impede and restrict the flow of water through it.

In situ Testing
Testing done on-site, in the field, of material or naturally occurring substances in their original state.

Landfill Gas
Combustible gas (primarily methane and carbon dioxide) generated by the decomposition of organic waste materials.

Landfill Site
A parcel of land where solid waste is disposed of in or on land for the purposes of waste management.

Leachate
Water or other liquid that has been contaminated by dissolved or suspended particles due to contact with solid waste.

Leachate Breakout
Location where leachate comes to the ground surfaces; a seep or spring.

Limit of Filling
The outermost limit at which waste has been disposed of, or approved or proposed for disposal at a landfill.

Ministry
Ontario Ministry of the Environment, Conservation and Parks.

Monitoring
Regular or spontaneous procedures used to methodically inspect and collect data on the performance of a landfill site relating to environmental quality (i.e., air, leachate, gas, ground or surface water, unsaturated soils, etc.).

Monitoring Well
The constructed unit of casing (riser and screen) installed in a borehole.

Multi-Level Monitoring Well
More than one monitoring well installed at a given test well location.

Native Soil
Soil material occurring naturally in the ground at a location.

Natural Attenuation
Where contaminants are reduced to acceptable concentration levels by natural mechanisms (dilution, absorption onto the soil matrix, etc.), biological action, and chemical interaction.

Occupational Health and Safety Act
The primary act of legislation enacted by Ontario Ministry of Labour to regulate and control the safety in the workplace; also Occupational Health and Safety Act, Revised Statutes of Ontario, 1990.

Odour Control
Minimizing or eliminating the nuisance and undesirable impact of objectionable or unpleasant odours arising from waste disposal operations.

Open Burning
Burning any matter whereby the resultant combustion products are emitted directly to the atmosphere without passing through an adequate stack, duct, or chimney.

Operations Plan
A document detailing the waste disposal operations in a planned, and if necessary, a staged manner, that ensure compliance with regulatory provisions concerning the operations of a landfill site.

Operator (Site Operator)/Attendant
The individual or organization who, through ownership or under contract, manages and operates a landfill site for the purpose of waste disposal.

Owner
A person, persons, organization, or municipal authority who own a landfill facility or part of a landfill facility, and in whose name the Certificate of Approval for the site is issued.

Percolation
The movement of infiltrating water through soil.

Permeability
Often used interchangeable with hydraulic conductivity, but not strictly correct. Permeability is a property of the porous media only. Dependent upon media properties that affect flow, diameter, sphericity, roundness, and packing of the grains.

Piezometer
A well that intersects a confined aquifer.

Provisional Certificate of Approval (Provisional C of A)
Same as Certificate of Approval.

Reasonable Use Policy
A policy developed by the Ministry to stipulate limits to the level of groundwater quality impairment that may be permitted to occur at site property boundaries, to allow the reasonable use of adjacent properties or land without adversely affecting public health and the environment.

Recharge Zone
An area where precipitation or surface run-off infiltrates into the ground and then, through natural percolation enters an aquifer.

Recycling
Sorting, collecting or processing waste materials that can be used as a substitute for the raw materials in a process or activity for the production of (the same or other) goods. For example, the "Blue Box" system, in-plant scrap handling, or raw material recovery systems. Recycling is also the marketing of products made from recycled or recycled materials.

Reduction (of waste or component of 3Rs program)
Those actions, practices, or processes that result in the production or generation of less waste.

Remedial Action
Corrective action taken to clean-up or remedy a spill, an uncontrolled discharge of a contaminant, or a breach in a facility or its operations, in order to minimize the consequent threat to public health and the environment.

Representative Sample
A small portion of soil, water, etc. which can be subjected to testing and analysis, that is expected to yield results that will reliably represent the identical characteristics of the source of the material or of a larger body of material.

Reuse (component of 3Rs program)
The use of an item again in its original form, for a similar purpose as originally intended, or to fulfil a different function.

Run-off
The part of precipitation (rainwater, snowmelt) that flows overland and does not infiltrate the surface material (soil or rock).

Saturated Zone
The zone of a subsurface soil where all voids are filled with water.

Sedimentation
The deposition of fine grained soil in an undesirable location, caused by the scouring, erosion and transportation of earth materials by surface run-off.

Sensitive Land Use
A land use where humans or the natural environment may experience an adverse environmental impact.

Settlement
The subsidence of the top surface and underlying waste of a landfill or waste cell as a result of densification under its own weight.

Site Capacity
The maximum amount of waste that is planned to be disposed (design capacity) or that has been disposed of at a landfill site.

Site Closure
The planned and approved cessation or termination of landfilling activities at a landfill site upon reaching its site capacity.

Site Life
The period from its inception through active period of waste disposal, to the time when a landfill site reaches its' site capacity, when it ceases to receive any further waste, including and up to closure.

Solid Waste
Any waste matter that cannot be characterized by its physical properties as a liquid waste product.

Solid Waste Disposal Site or Facility
A site or facility such as a landfill site where solid waste is disposed of.

Source Separation
The separation of various wastes at their point of generation for the purposes of recycling or further processing.

Standpipe
A monitoring well that intersects the water table aquifer.

Storm water
Run-off that occurs as a direct result of a storm event or thaw.

Storm water Detention
Control of storm water by the construction of impoundments of structures for the purpose of regulating storm water flows during high intensity rainfall events that would otherwise transport excessive amounts of sediment, cause soil erosion or cause flooding.

Stratigraphy
The geologic sub-structuring, usually layered with different distribution, deposition and age.

Surface Run-off (Drainage)
See Run-off.

Surface Water
Water that occurs at the earth's surface (ponds, streams, rivers, lakes, oceans).

Sub-Soil
Soil horizons below the topsoil.

Test hole
A hole drilled for soil sampling purposes.

Topsoil
The uppermost layer of the soil containing appreciable organic materials in mineral soils. Adequate fertility to support plant growth.

Unsaturated Zone
The zone (also vadose zone) in a porous sub-soil, where the voids are not completely water-filled, but contain some air-filled voids. Limited above by the land surface and below by the water table.

Vector
A disease carrier and transmitter; usually an insect or rodent.

VOC
Volatile organic compounds are those compounds that will readily volatilize (convert from liquid to gas phase) at conditions normally found in the environment.

Waste
Ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and other used products as are designated or interpreted by the provisions of the Environmental Protection Act.

Waste Disposal Site (Facility)
Any land or land covered by water upon, into, in or through which, or building or structure in which, waste is deposited or processed and any machinery or equipment or operation required for the treatment or disposal of waste.

Waste Management System
All facilities, equipment and operations for the complete management of waste, including the collection, handling, transportation, storage, processing and disposal thereof, and may include one or more waste disposal sites.

Water Table
The water level attained in a monitoring well, which screens the surficial unconfined aquifer.

Water Balance
Amounts of water to various components in a system so that water entering the system equals the amount of water contained within and discharged out of a system.

Water Level
The level of water in a well.

Well Casing
The pipe that is used to construct a well.

Well Screen
A filtering device used to keep sediment from entering a well.

Wetlands
Areas where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrolytic vegetation, and which have soils indicative of wet conditions.

Abbreviations

RFP	Request For Proposal	**ha**	hectare
Ministry	Ontario Ministry of the Environment, Conservation and Parks	**tonne**	metric ton
MNRF	Ontario Ministry of Natural Resources and Forestry	**t**	metric tonne
ECA	Environmental Compliance Approval	**µS**	microSiemens
EPA	Environmental Protection Act	**ODWQS**	Ontario Drinking Water Quality Standards
EAA	Environmental Assessment Act	**PC of A**	Provisional Certificate of Approval
MW	monitoring well	**PWQO**	Provincial Water Quality Objectives
masl	metres above sea level	**TOC**	Total Organic Carbon
pg	picogram	**VOC**	Volatile Organic Compound
ng	nanogram	**BTU**	British Thermal Unit
µg	microgram	**°C**	temperature in degrees Celsius
g	gram	**N/A**	not available
kg	kilogram	**%**	percent
L	Litre	**cfm**	cubic feet per minute
mg/L	milligrams per litre	**ppmdv**	part per million by dry volume
mm	millimetre	**ppmv**	part per million by volume
m	metre	**ppm**	part per million
km	kilometre	**min**	minimum
m^3	cubic metre	**max**	maximum
m^2	square metre		

Standard Limitations

Limited Warranty

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

Reliance on Materials and Information

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

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Site Assessments

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

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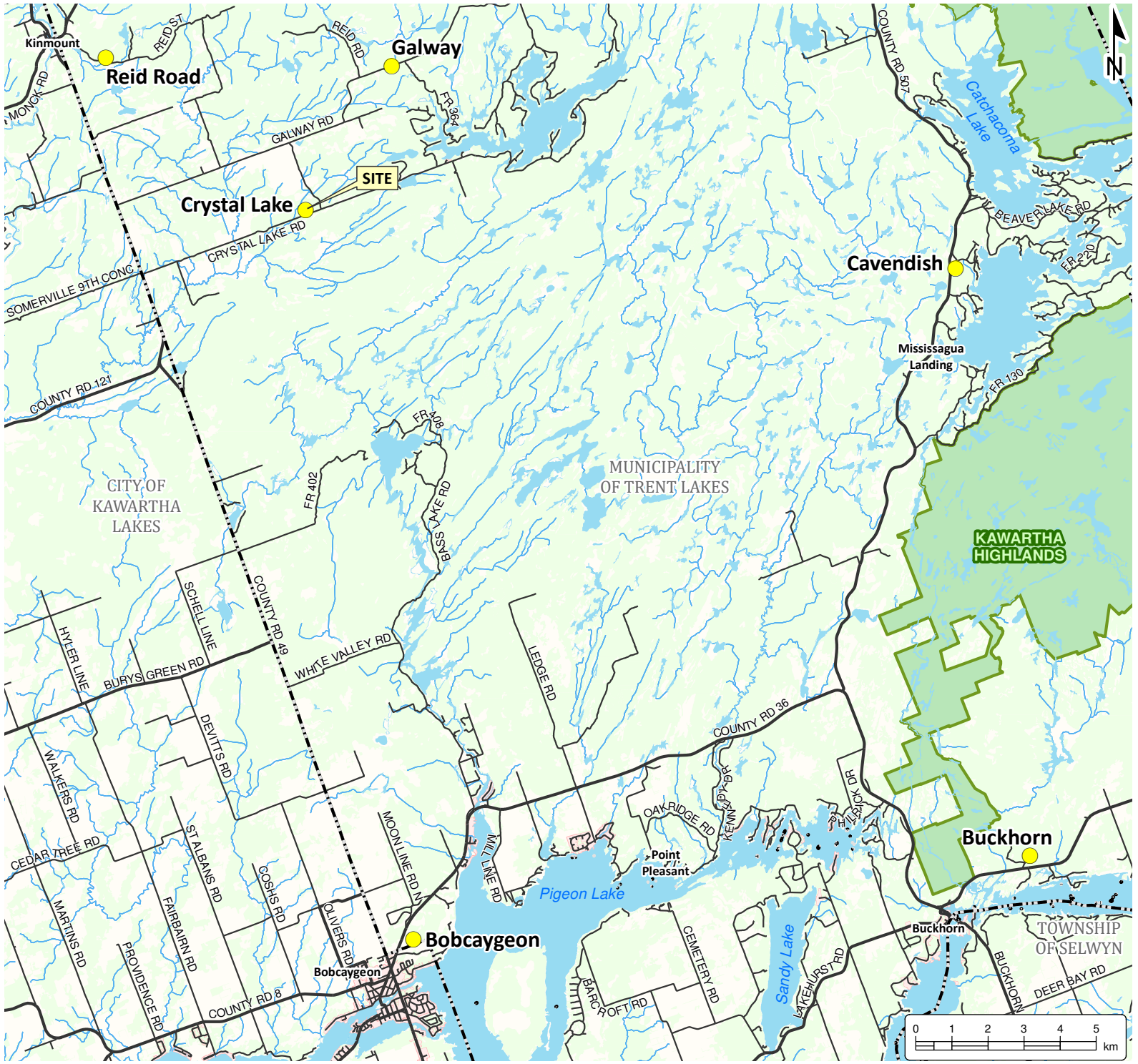
Appended Figures



CRYSTAL LAKE TRANSFER STATION

1018 Crystal Lake Road,
Trent Lakes, Ontario
Municipality of Trent Lakes

LEGEND

- Trent Lakes Waste Disposal Sites
- Major Road
- Minor Road
- Watercourse
- Water Area
- Provincial Park
- Wooded Area
- Built Up Area
- Lower Tier Municipality

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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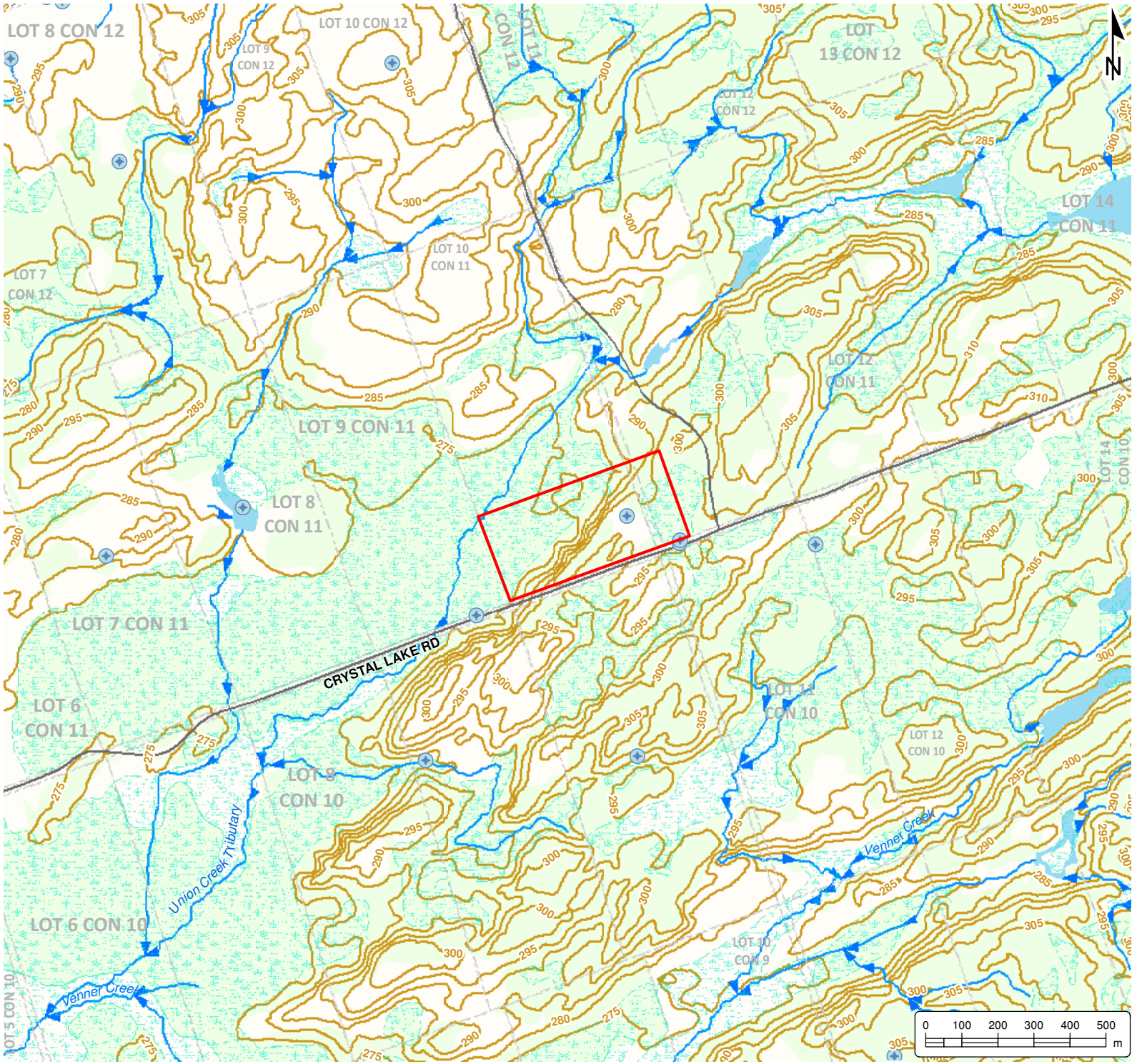
REGIONAL LOCATION PLAN

Project No.: 10520-003		Date: April 2021	Rev.:
Scale: 1:150,000		Projection: NAD 1983 UTM Zone 17N	
Created by: TLC	Checked by: SNR	Figure: 1	

O:\GIS\MXDs\10500-10999\10520-003 MTL - Crystal Lake Landfill\AMP 20220222\1-03-26 FIG 1 - Regional Location Plan.mxd



CRYSTAL LAKE TRANSFER STATION

1018 Crystal Lake Road,
Trent Lakes, Ontario
Municipality of Trent Lakes

LEGEND

- Select Water Wells
- Minor Road
- Watercourse, Permanent
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Lot / Concession
- Unevaluated Wetlands
- Water Area
- Wooded Area
- Property Boundary (12.73 ha.)

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2017 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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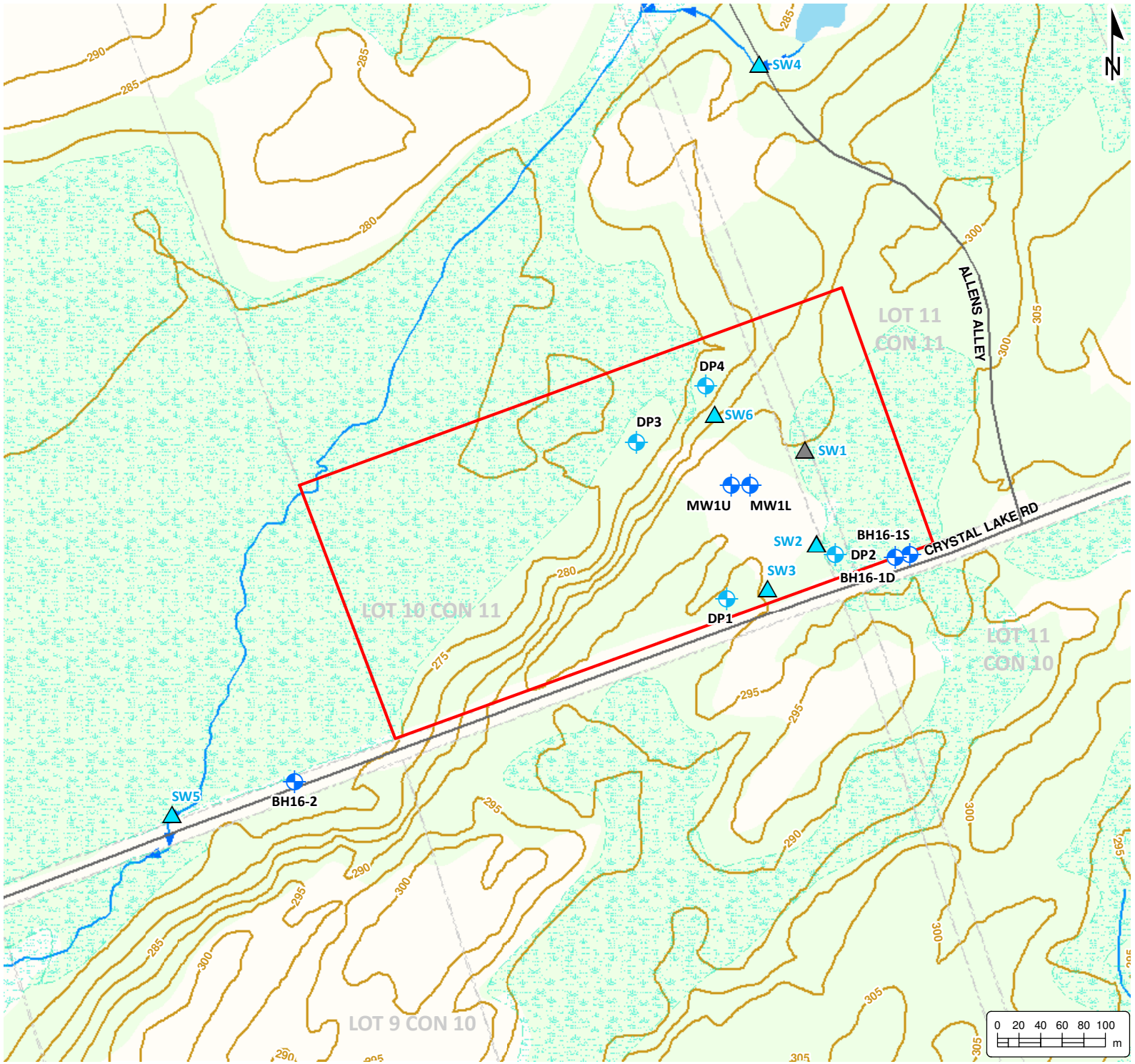
LOCAL TOPOGRAPHY PLAN

Project No.:	10520-003	Date:	April 2021
		Rev.:	
Scale:	1:15,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	TLC	Checked by:	SNR
Figure:	2		

O:\GIS\MXDs\10500-10999\10520-003 MTL - Crystal Lake Landfill\AMP 20220221-03-26 FIG 2 - Local Topography Plan.mxd



CRYSTAL LAKE TRANSFER STATION

1018 Crystal Lake Road,
Trent Lakes, Ontario
Municipality of Trent Lakes

LEGEND

- Monitoring Well Location
- Drive Point Location
- Surface Water Sample Location
- Historical Surface Water Sample Location
- Minor Road
- Watercourse, Permanent
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Lot / Concession
- Unevaluated Wetlands
- Water Area
- Wooded Area
- Property Boundary (12.73 ha.)

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2017 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
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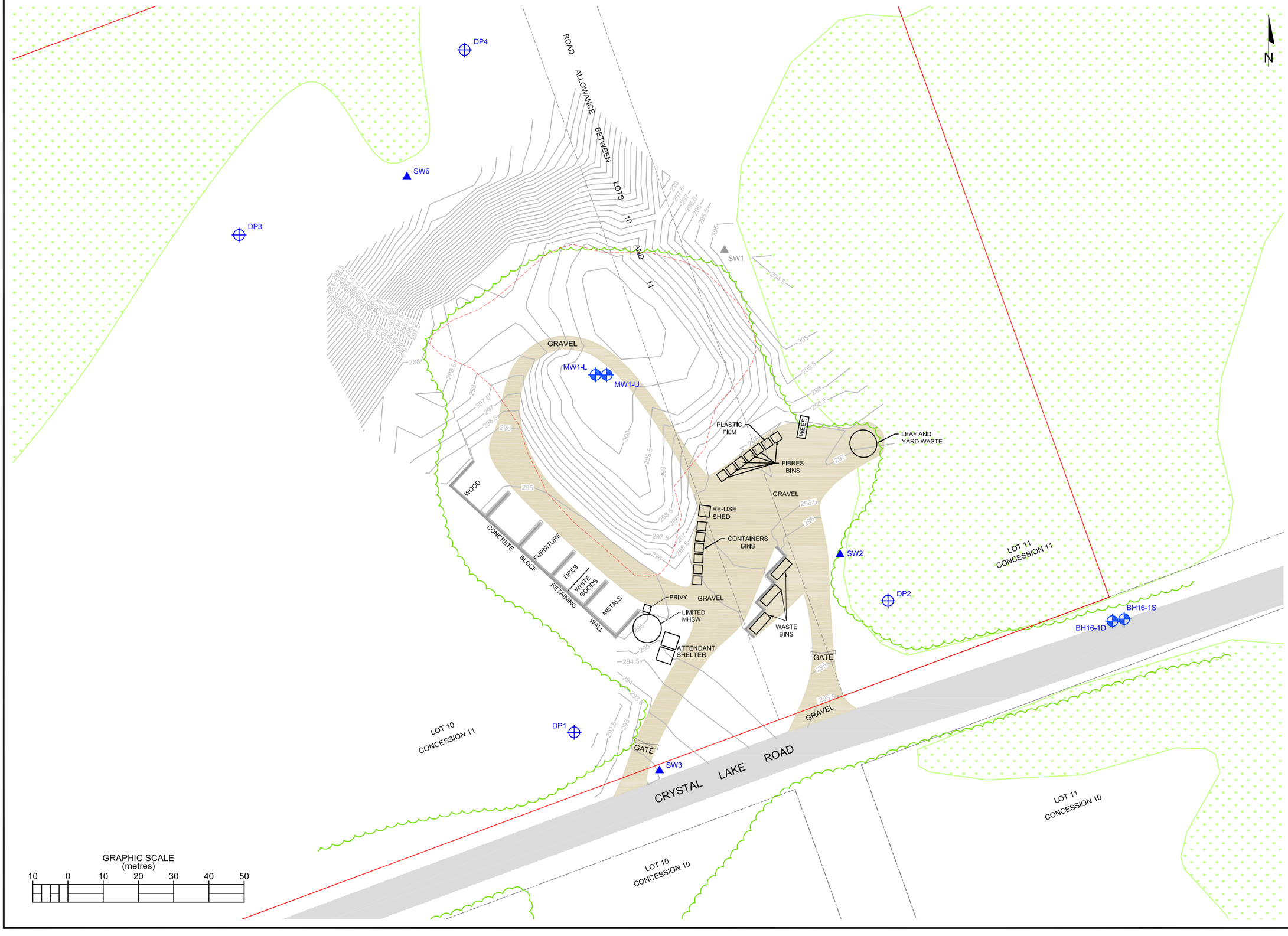
SAMPLE LOCATION PLAN

Project No.: 10520-003		Date: April 2021	Rev.:
Scale: 1:5,000		Projection: NAD 1983 UTM Zone 17N	
Created by: TLC	Checked by: SNR	Figure: 3	

O:\GIS\MXDs\10500-10999\10520-003 MTL - Crystal Lake Landfill AMP 20202021-03-26 FIG 3 - Sample Location Plan.mxd

CRYSTAL LAKE TRANSFER STATION

1018 CRYSTAL LAKE ROAD
Trent Lakes, Ontario
Municipality of Trent Lakes



GRAPHIC SCALE (metres)
10 0 10 20 30 40 50

LEGEND

- Surface Water Sample Location
- Historical Surface Water Sample Location
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Topographic Contour Line
- Property Boundary (12.73 ha)
- Existing Limit of Waste (0.49 ha)
- Gate
- Gravel Road
- Asphalt Road
- Tree Line (Approximate)
- Wetland

Notes:

1. Base mapping features adapted from a site plan prepared by Coe Fisher Cameron Land Surveyors dated January 21, 2015.
2. Waste disposal site features are approximate and are adapted from a site plan prepared by WSP dated June 2014.
2. Wetland features are © Queen's Printer of Ontario, 2015 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
3. Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
4. Projection: NAD 1983 UTM Zone 17T.

Benchmarks:

5. ORP A is an SIB located at the SW property corner (not shown on this plan).
   Northing: 4956462.4 Easting: 692696.7 Elevation: 273.90
6. ORP B is an SIB located at the SE property corner.
   Northing: 4956603.1 Easting: 693075.6 Elevation: 294.50
7. Elevations on site are derived from a temporary benchmark being a nail in a hydro pole having an elevation of 296.49 (cgvd28-1978).
8. Elevations shown hereon are geodetic and are referred to Geodetic Surveys Canada Benchmark #0011971u206, being a tablet in the top of a concrete dam on the Bobcaygeon River in the Village of Bobcaygeon, 0.34m from the south end of the dam, having an elevation of 249.20m (cgvd28-1978).

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EXISTING SITE CONDITIONS

Project No.:	Date:
10520-003	April 2021
	Rev.:
Horizontal Scale:	Projection:
1:1,000	UTM Zone 17N
Drawn By: TLC	Checked By: SNR
	Figure: 4

CRYSTAL LAKE TRANSFER STATION

1018 CRYSTAL LAKE ROAD
Trent Lakes, Ontario
Municipality of Trent Lakes

276.49
(276.49)
DP4

SW6

273.54
(273.45)
DP3

SW1

294.94
(294.67)
MW1-U

280.17
(280.23)
MW1-L

SW2

294.21
(294.29)
DP2

297.01
(296.69)
BH16-1S

289.79
(289.53)
BH16-1D

291.05
(291.06)
DP1

SW3

N

GRAPHIC SCALE
(metres)
10 0 10 20 30 40 50

LEGEND

- Surface Water Sample Location
- Surface Water Sample Location
- Overburden Monitoring Well
- Bedrock Monitoring Well
- 296.96 (296.14) Groundwater Elevation April 21, 2020 (November 12, 2020)
- Topographic Contour Line
- Property Boundary (12.73 ha)
- Existing Limit of Waste (0.49 ha)
- Groundwater Contour April 21, 2020
- Groundwater Contour November 12, 2020
- Gate
- Gravel Road
- Asphalt Road
- Tree Line (Approximate)
- Wetland
- Groundwater Flow Direction April 21, 2020
- Groundwater Flow Direction November 12, 2020

Notes:

1. Base mapping features adapted from a site plan prepared by Coe Fisher Cameron Land Surveyors dated January 21, 2015.
2. Waste disposal site features are approximate and are adapted from a site plan prepared by WSP dated June 2014.
2. Wetland features are © Queen's Printer of Ontario, 2015 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
3. Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
4. Projection: NAD 1983 UTM Zone 17T.

Benchmarks:

5. ORP A is an SIB located at the SW property corner (not shown on this plan).
Northing: 4956462.4 Easting: 692696.7 Elevation: 273.90
6. ORP B is an SIB located at the SE property corner.
Northing: 4956603.1 Easting: 693075.6 Elevation: 294.50
7. Elevations on site are derived from a temporary benchmark being a nail in a hydro pole having an elevation of 296.49 (cgvd28-1978).
8. Elevations shown hereon are geodetic and are referred to Geodetic Surveys Canada Benchmark #0011971u206, being a tablet in the top of a concrete dam on the Bobcaygeon River in the Village of Bobcaygeon, 0.34m from the south end of the dam, having an elevation of 249.20m (cgvd28-1978).

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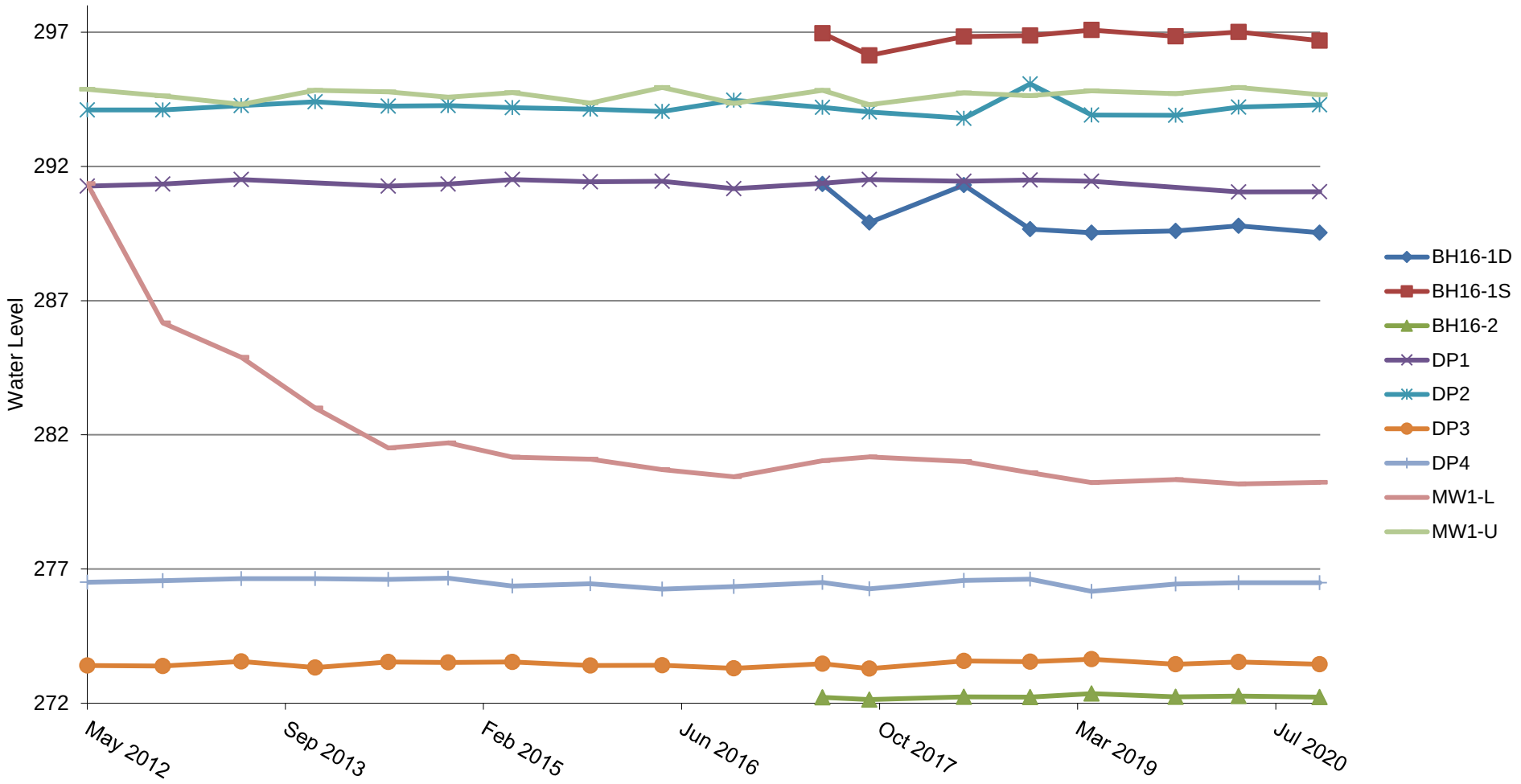
GROUNDWATER CONFIGURATION

Project No.: 10520-003	Date: April 2021	
	Rev.:	
Horizontal Scale: 1:1000	Vertical Scale: UTM Zone 17N	
Drawn By: TLC	Checked By: SNR	Figure: 5

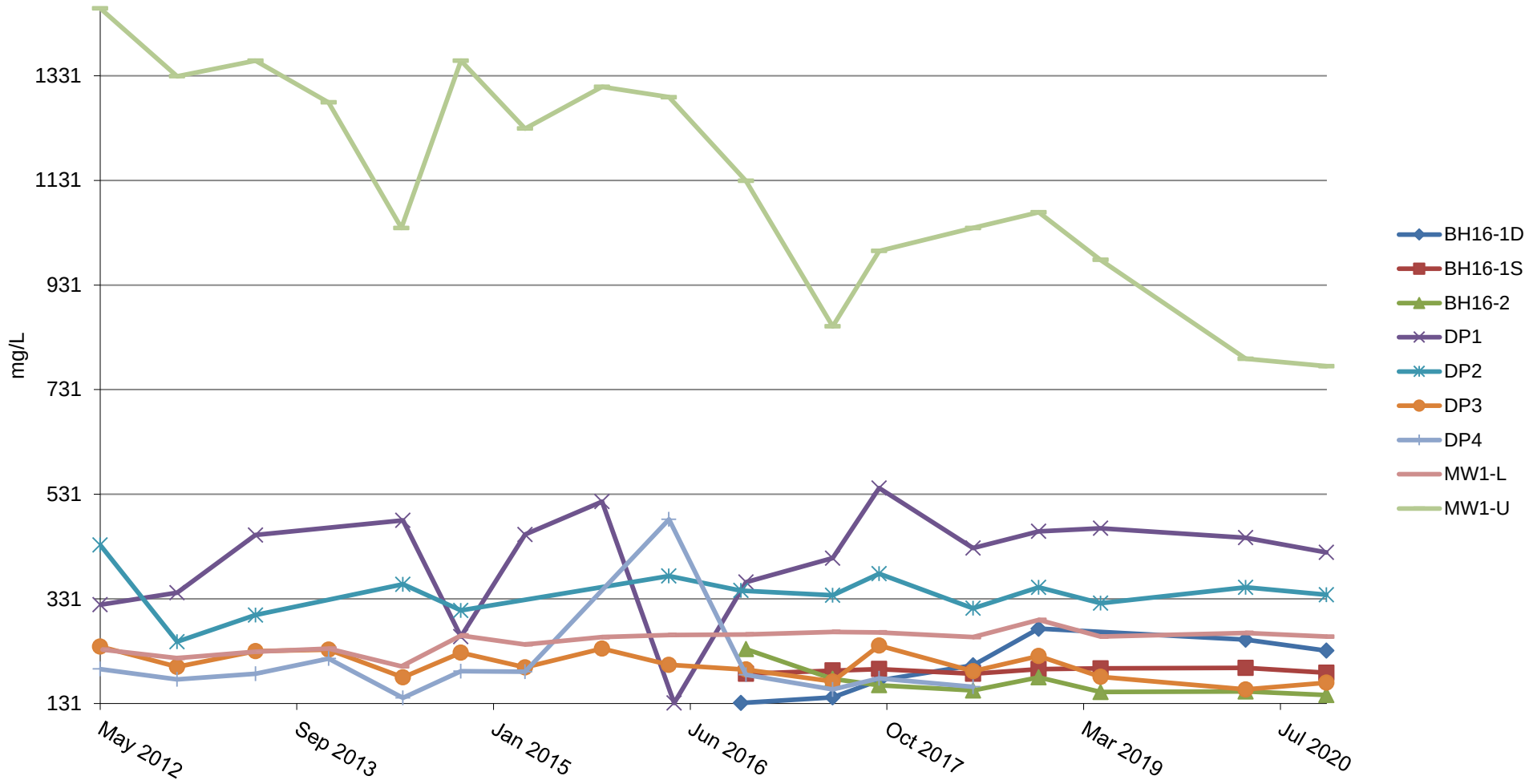


Groundwater Elevations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**6**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

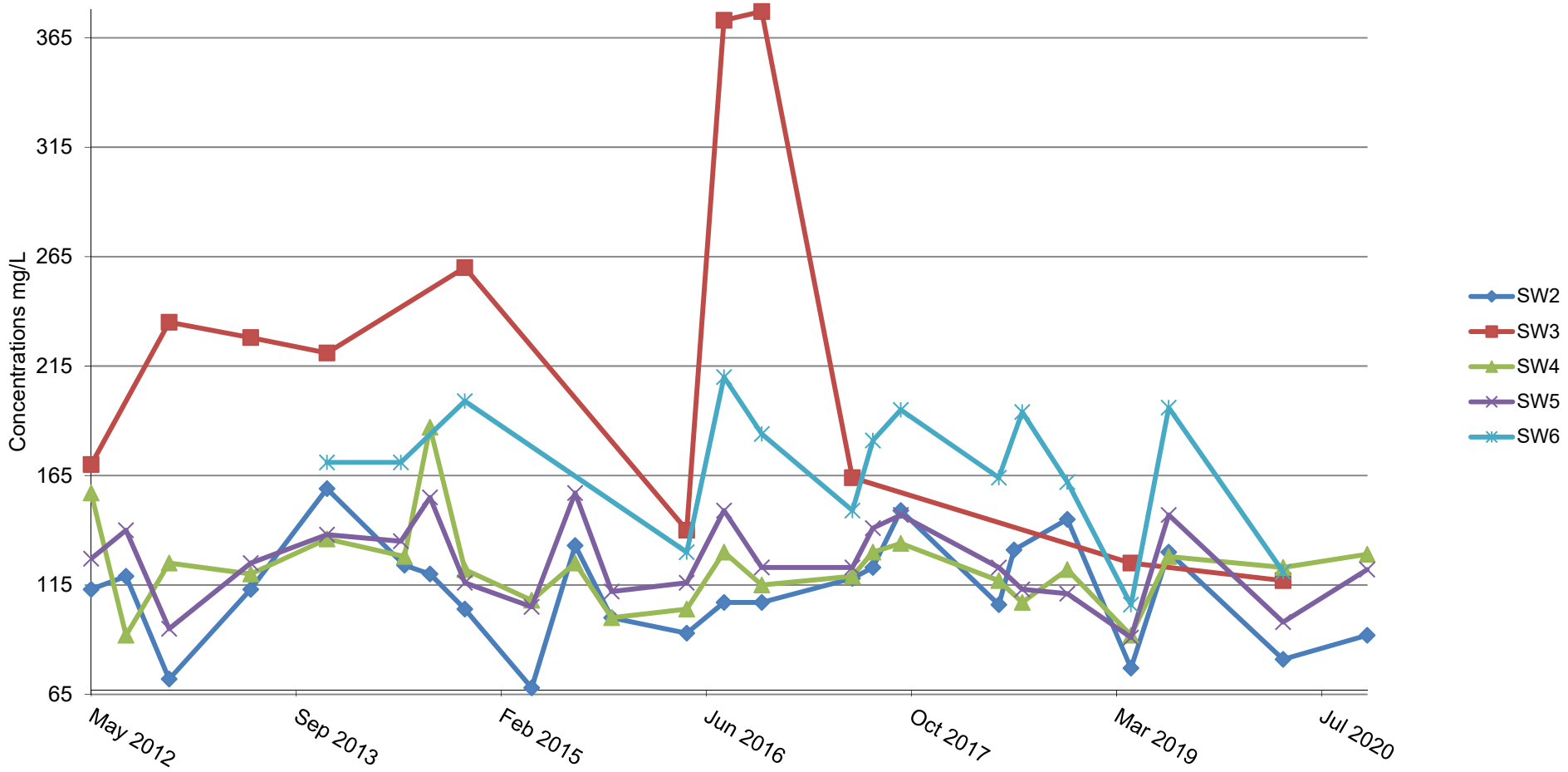


Alkalinity Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**7**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

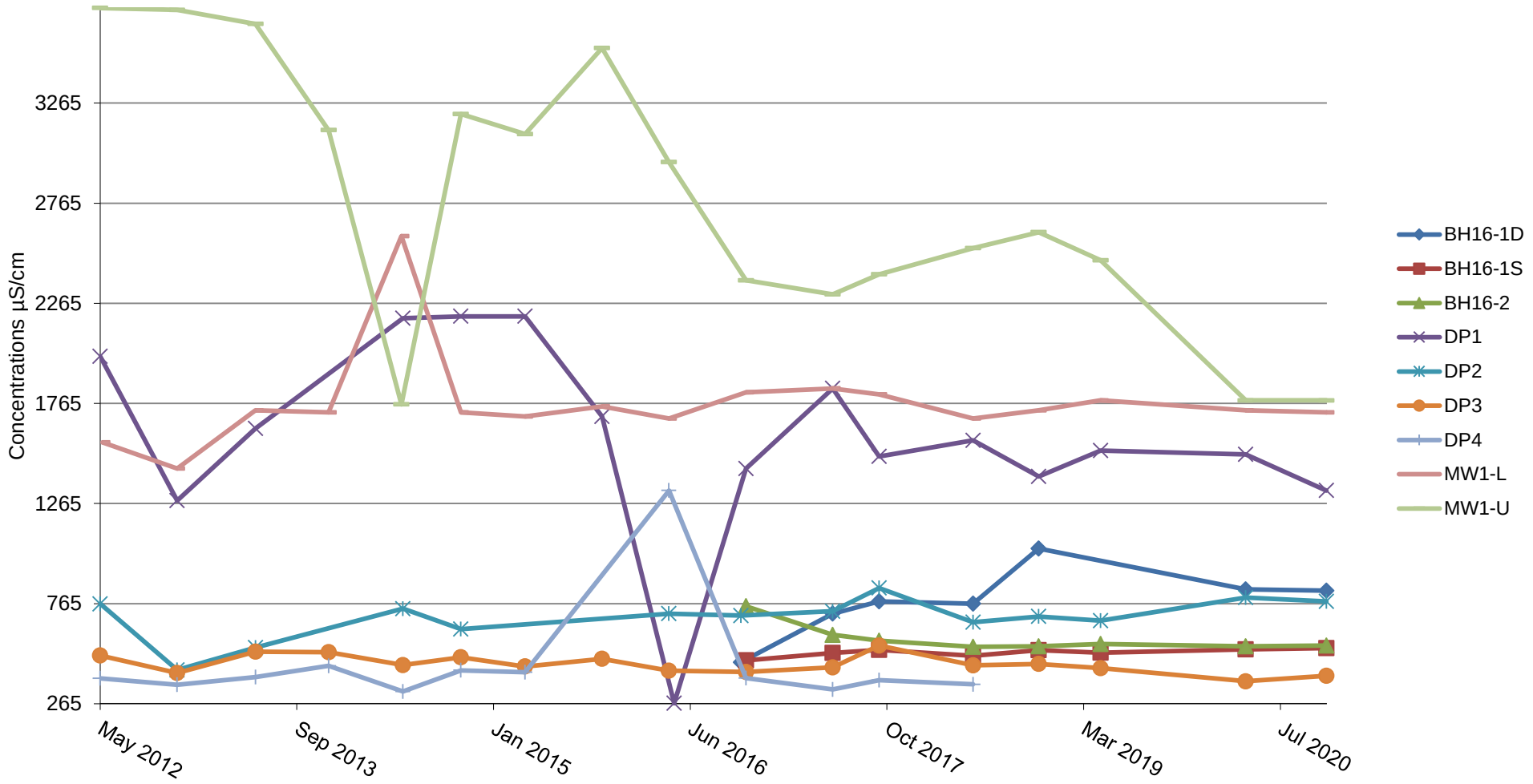


Alkalinity Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**8**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

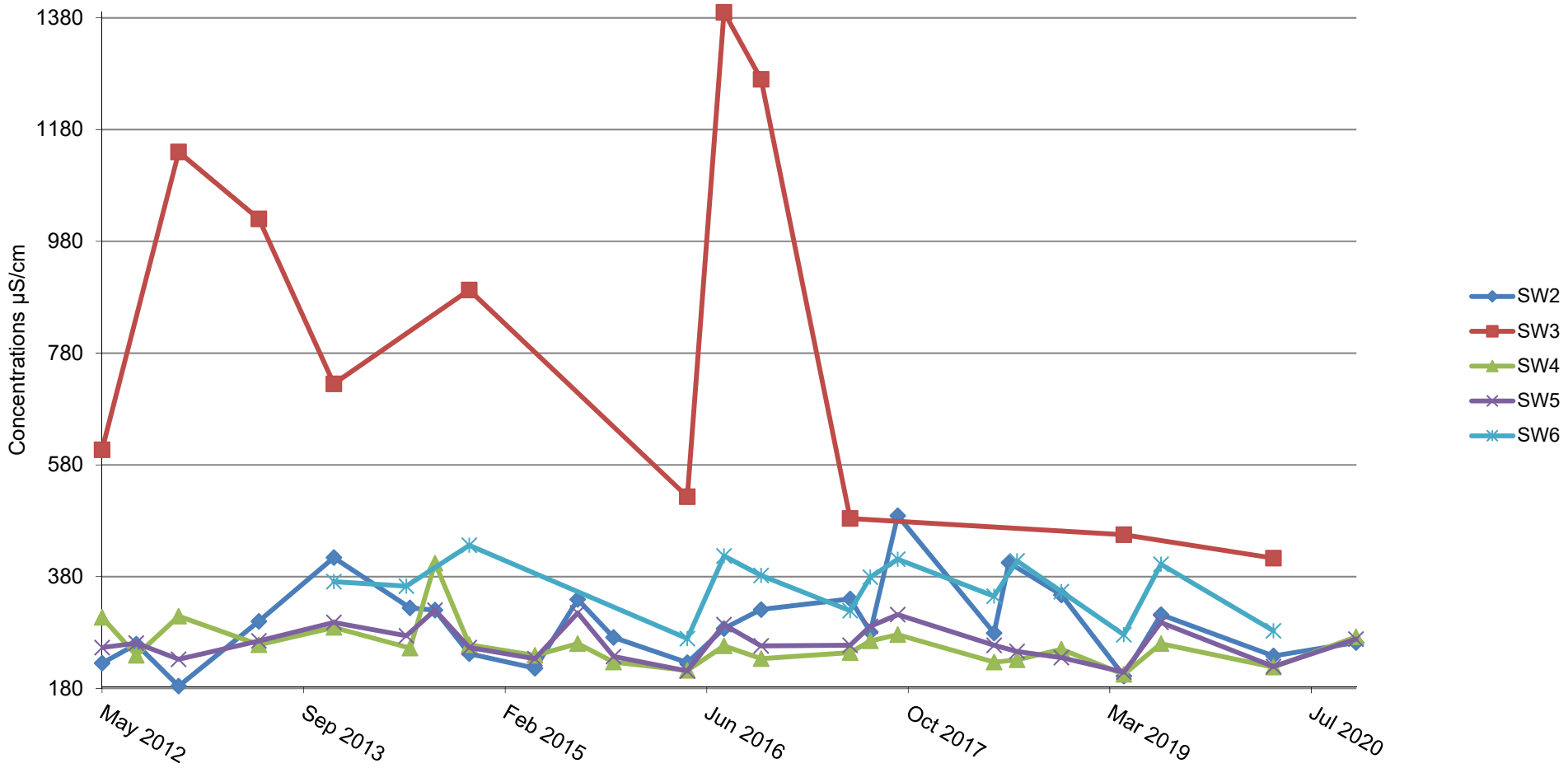


Conductivity Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**9**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

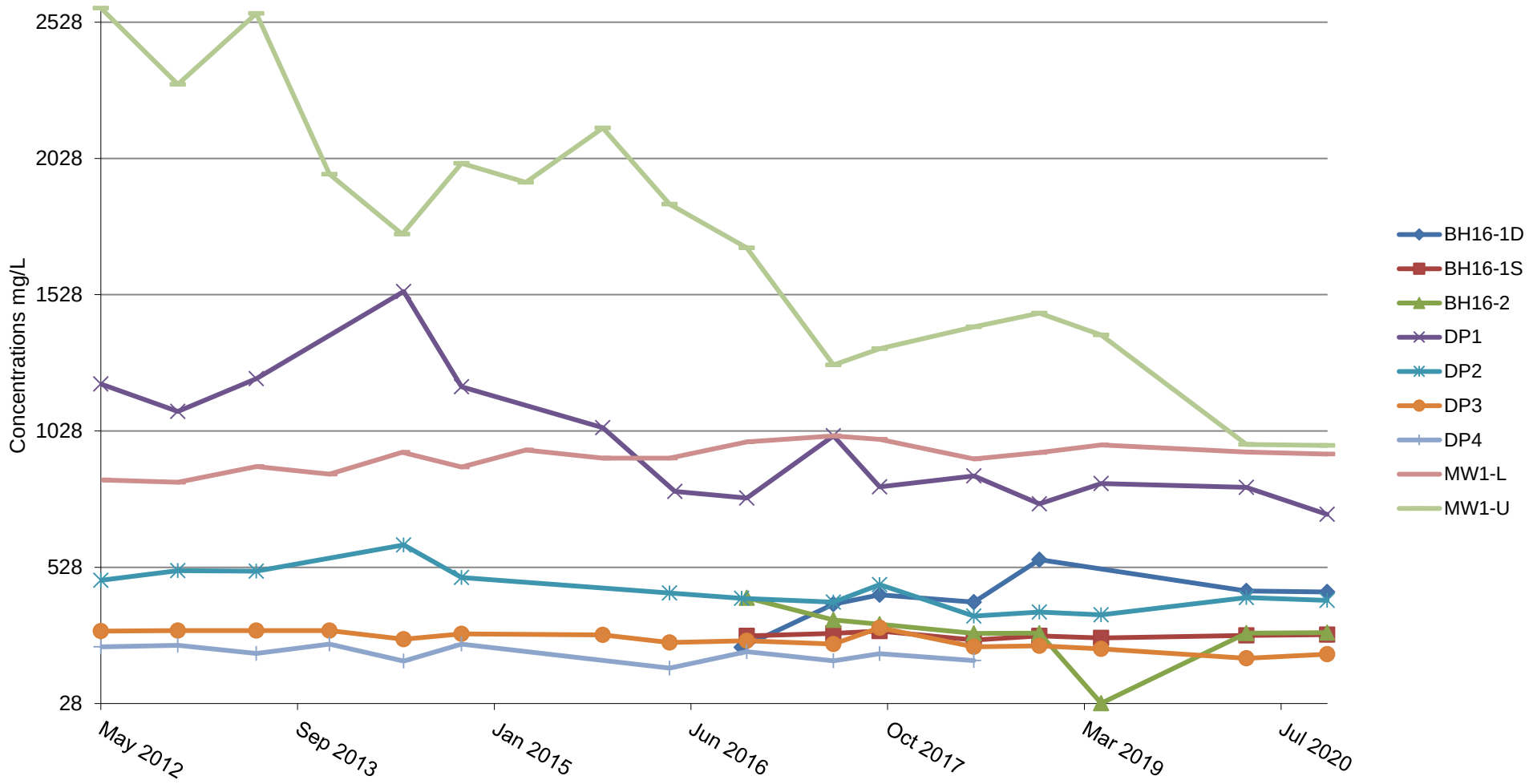


Conductivity Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**10**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

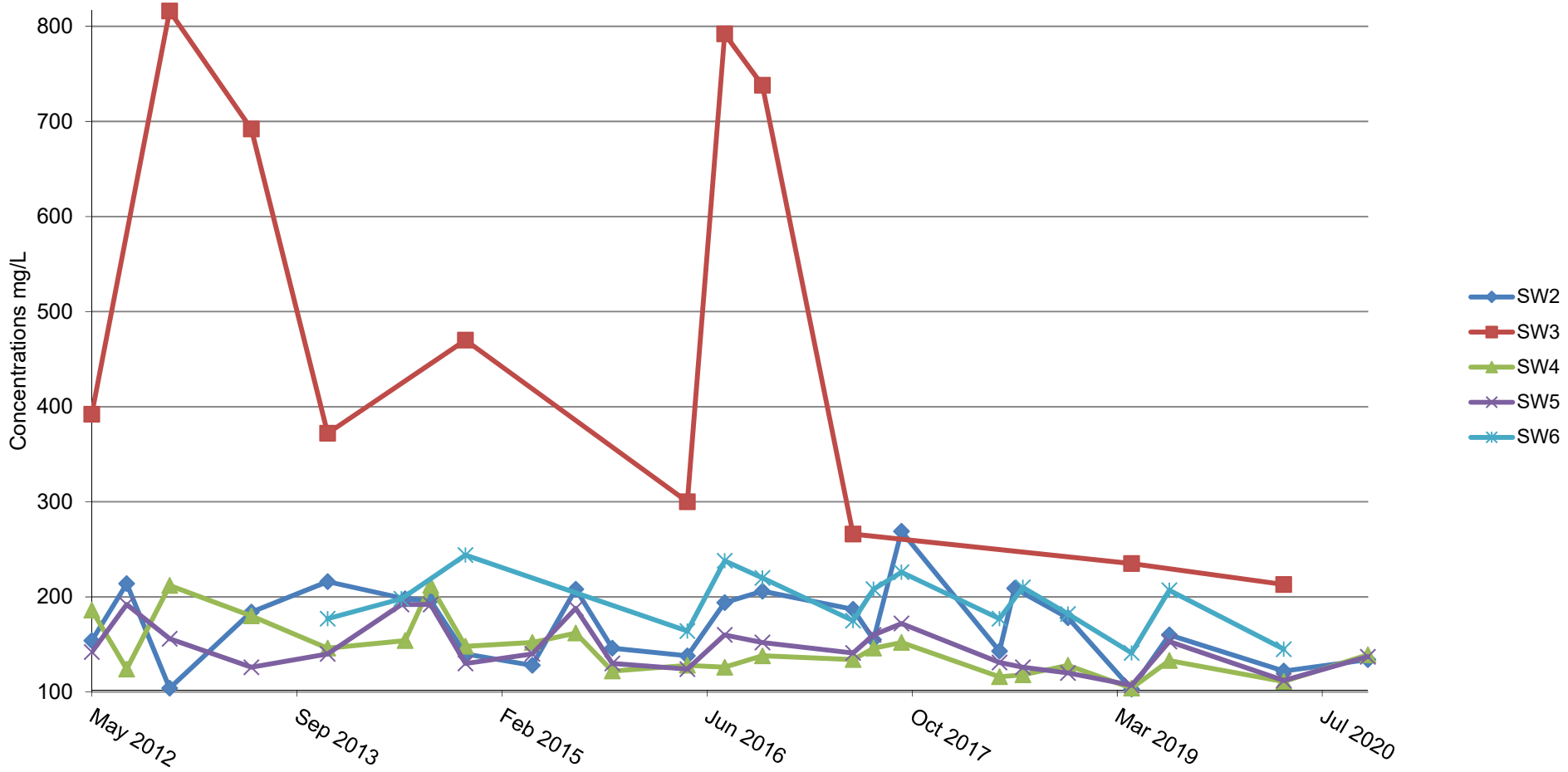


Total Dissolved Solids Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**11**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

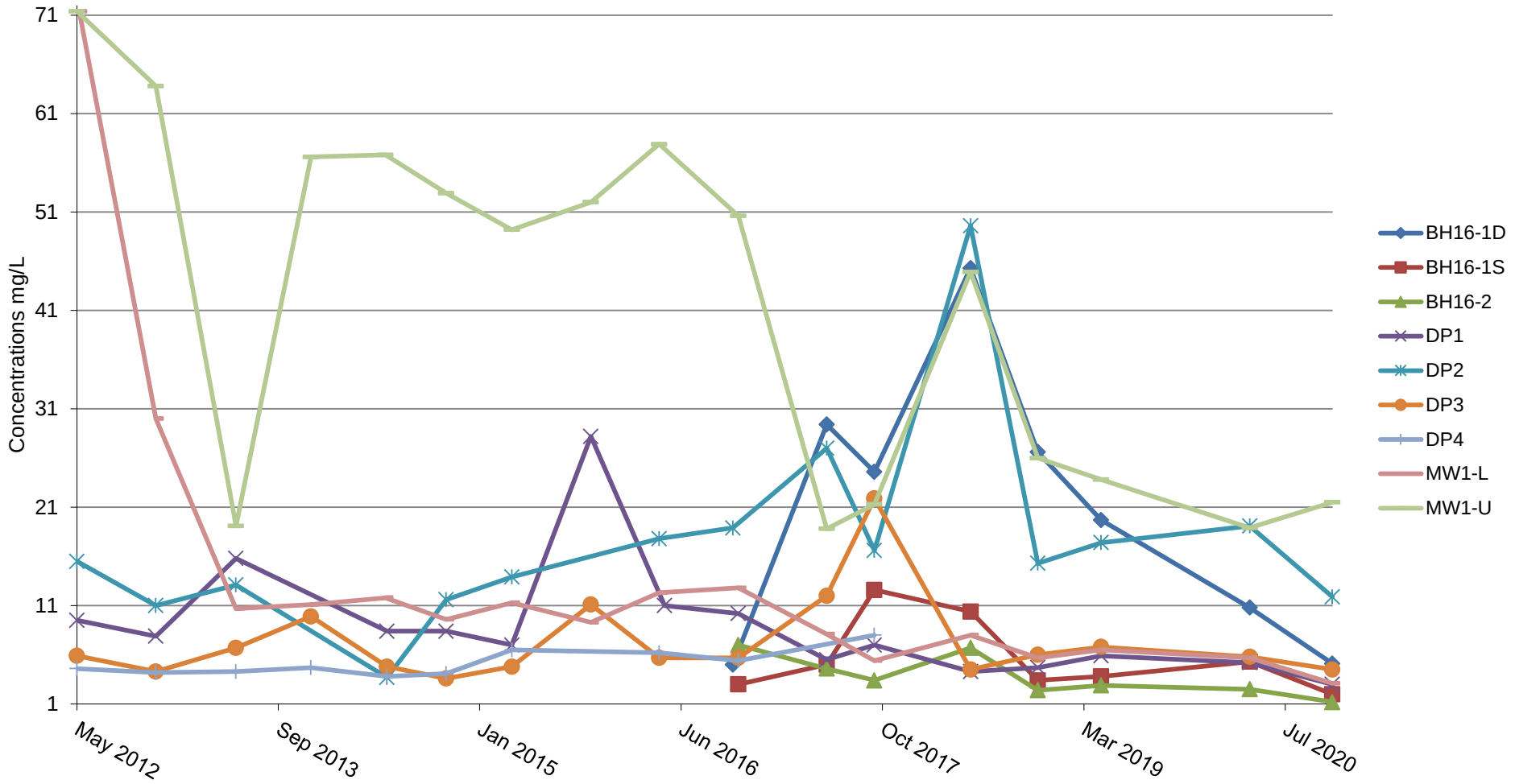


Total Dissolved Solids Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**12**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

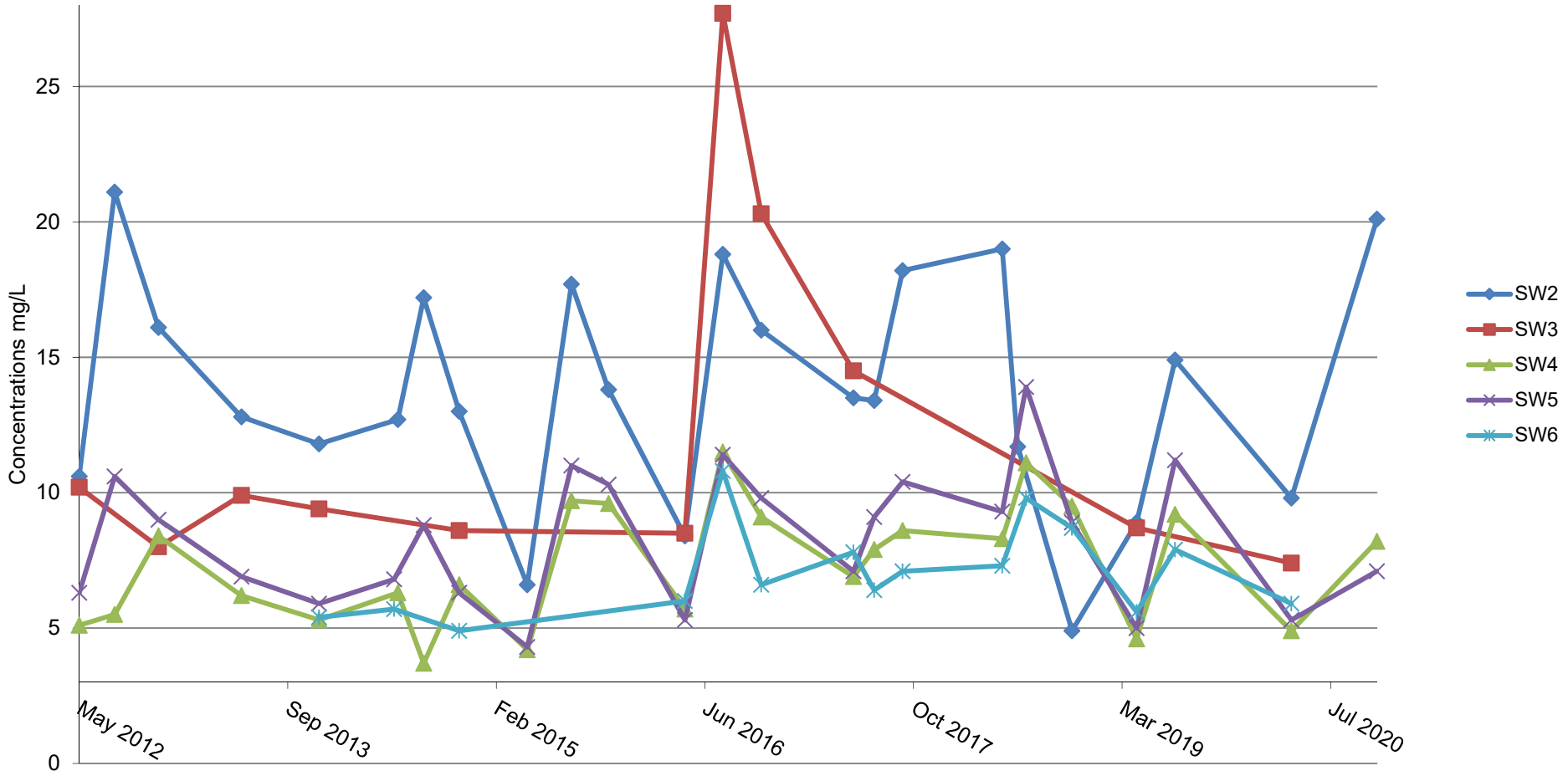


Dissolved Organic Carbon Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**13**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

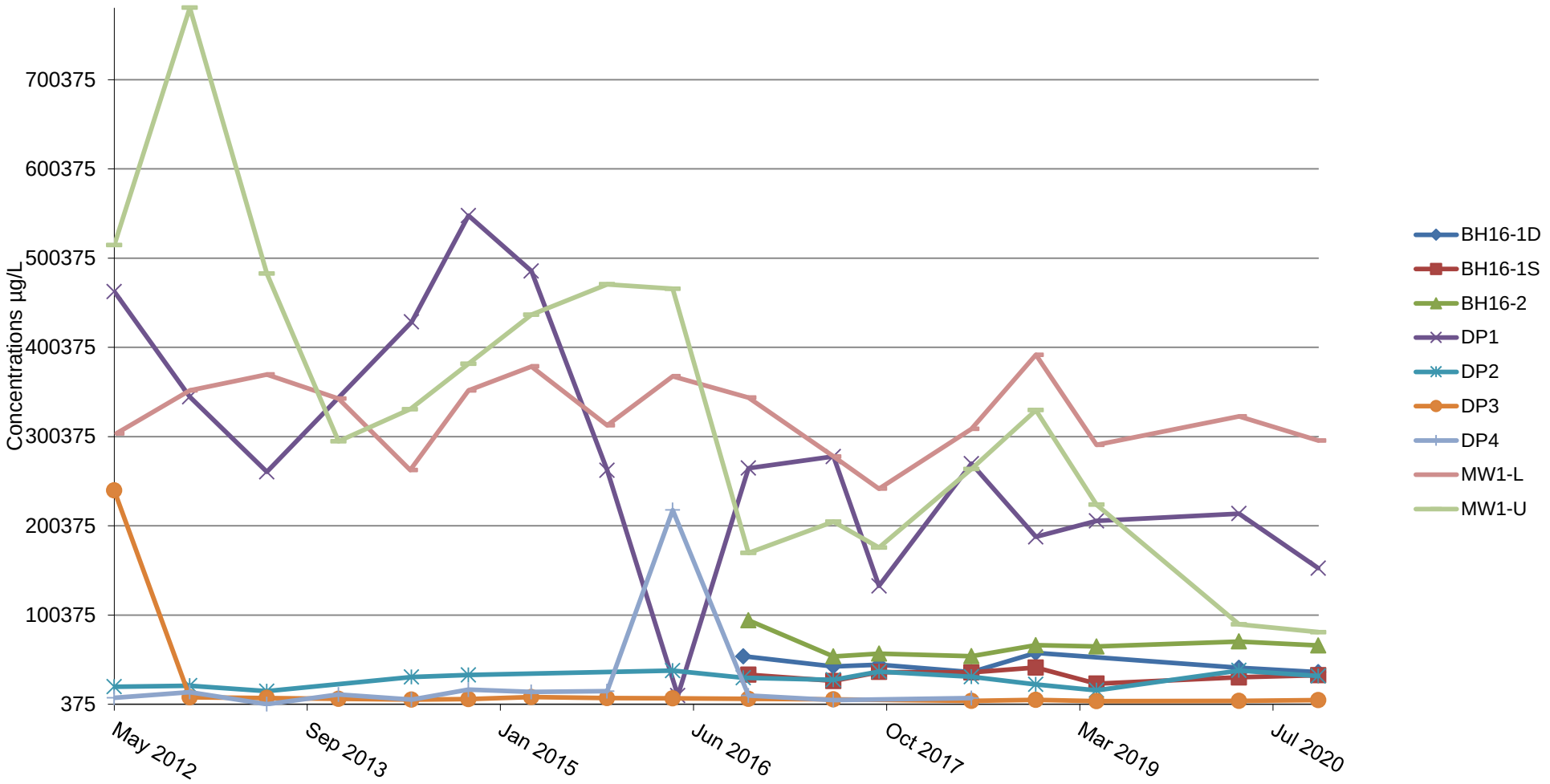


Dissolved Organic Carbon Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**14**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

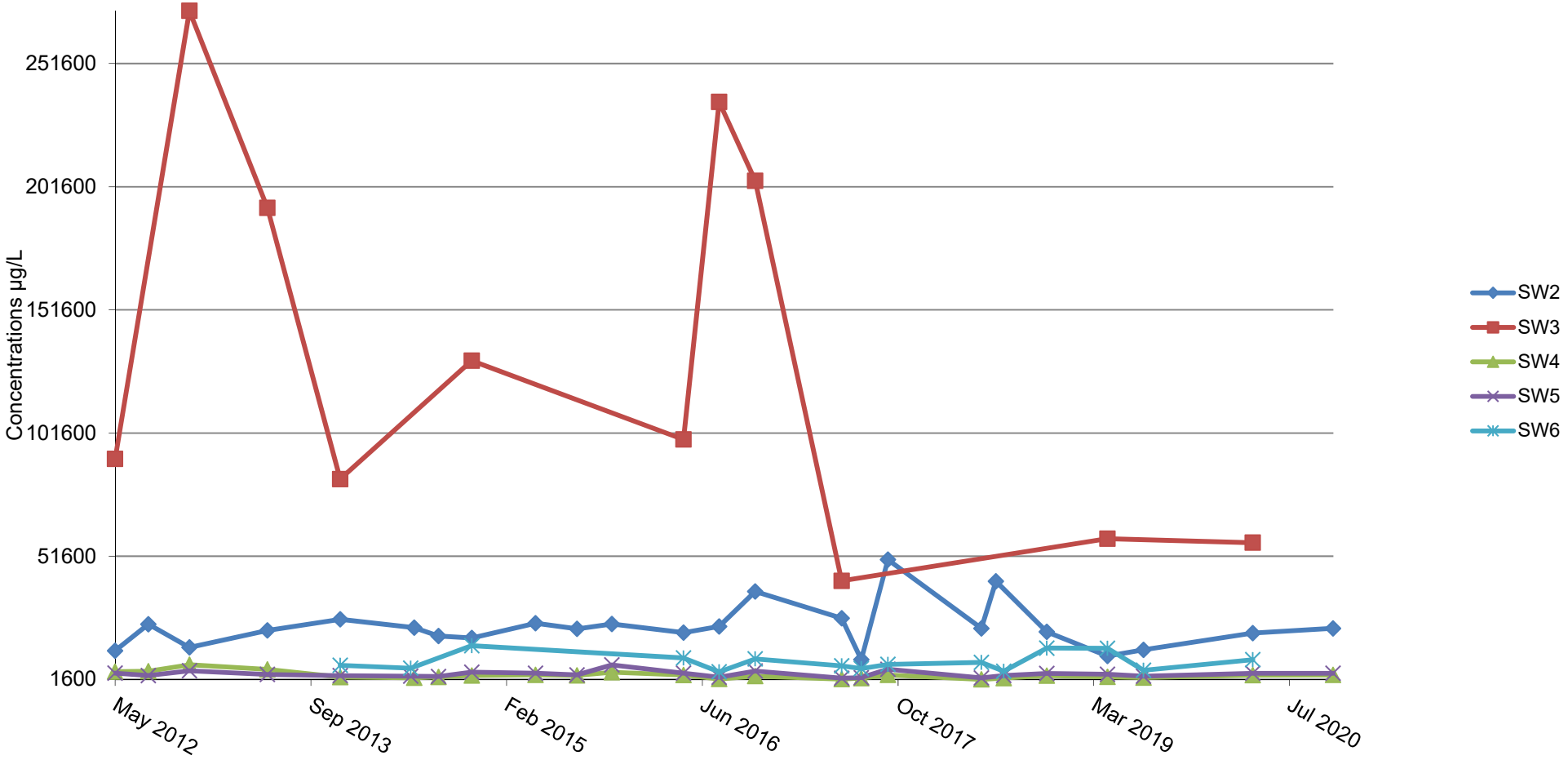


Chloride Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**15**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

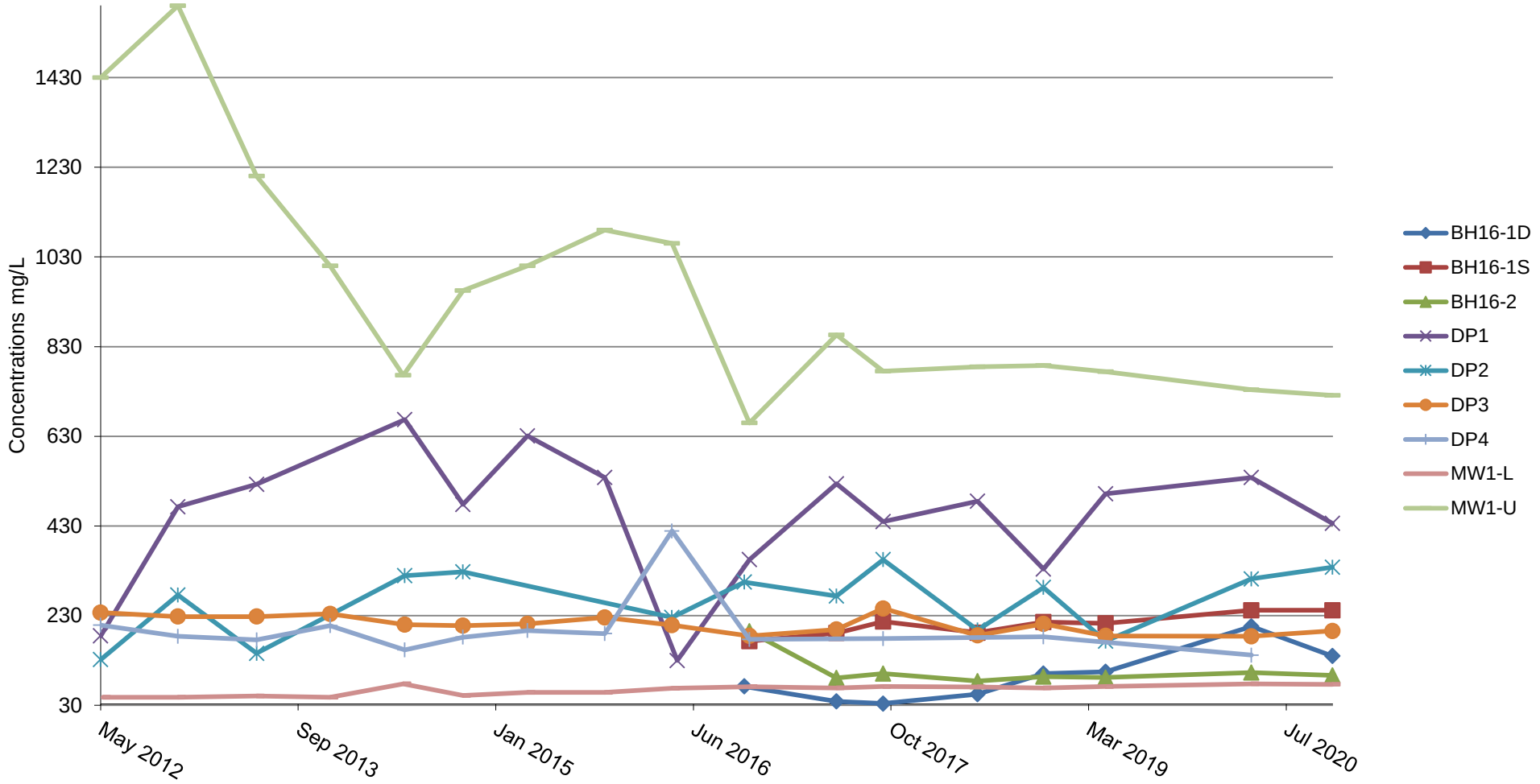


Chloride Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**16**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

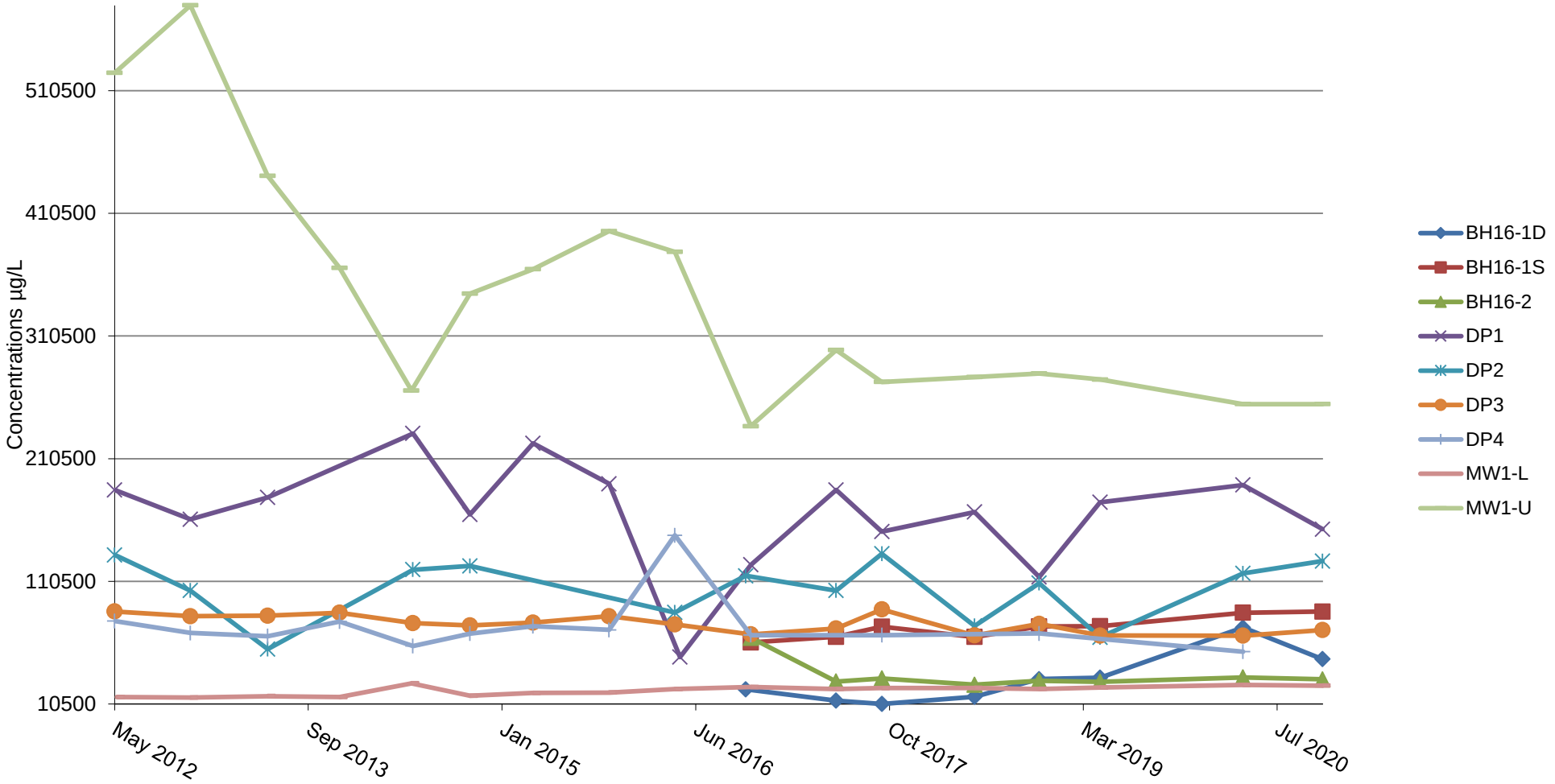


Hardness Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**17**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

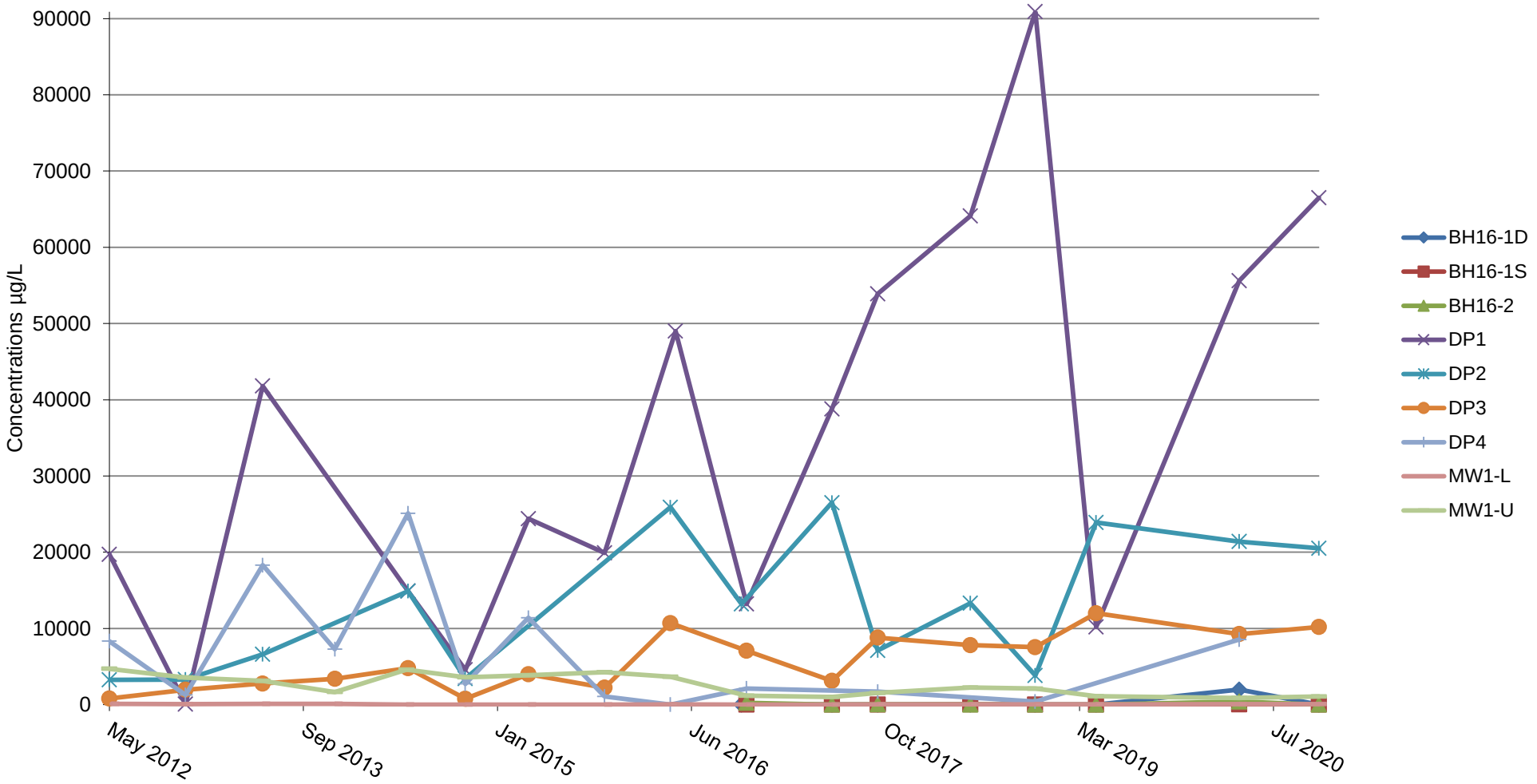


Calcium Concentrations

2020 Annual Report, Crystal Lake Trasnfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**18**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM

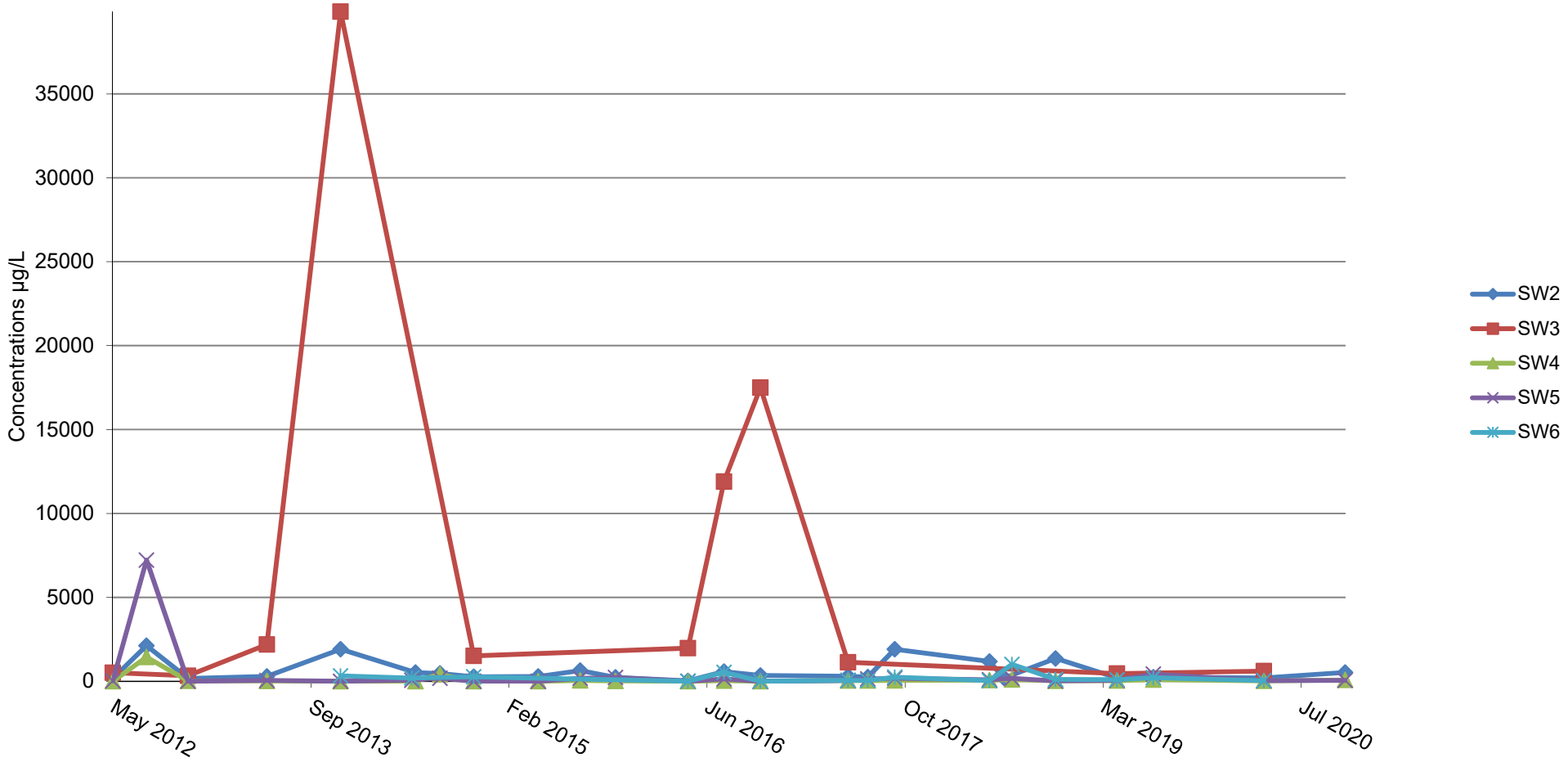


Iron Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**19**
Date:	Apr-21
Project Manager: Stephanie Reeder	
Project No.: 10520-003	

CAMBIUM

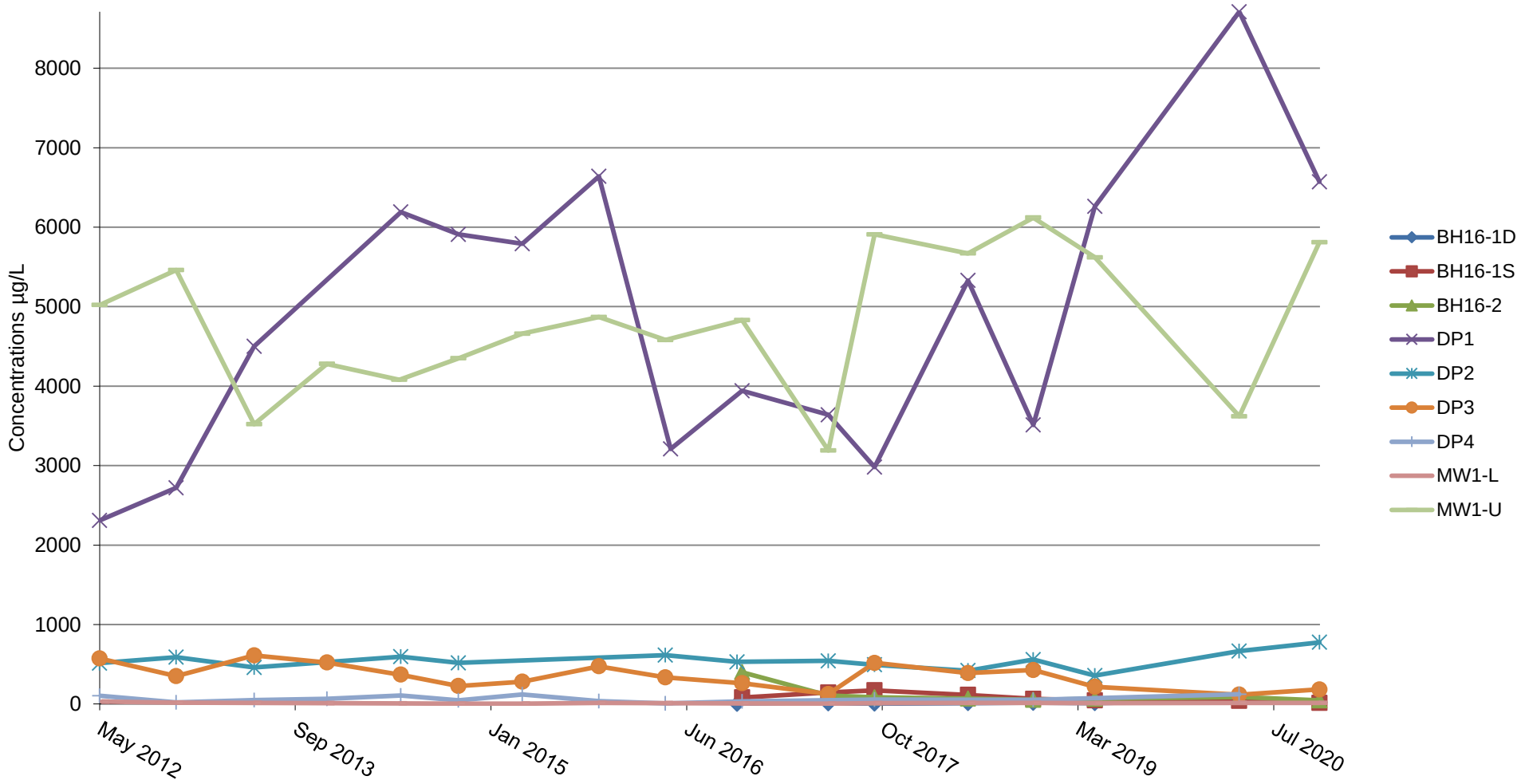


Iron Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**20**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM



Manganese Concentrations

2020 Annual Report, Crystal Lake Transfer Station
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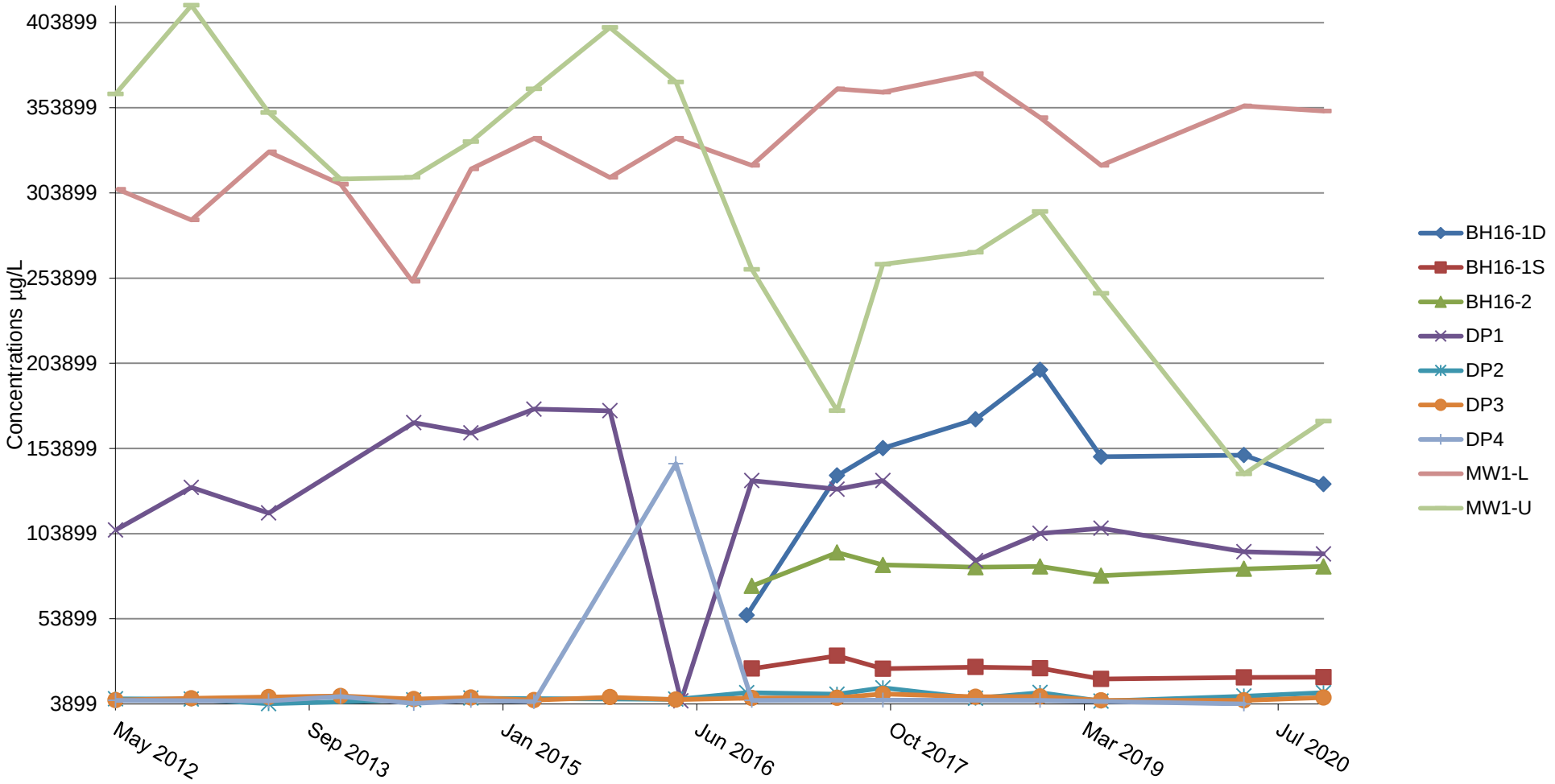
Figure:	**21**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM



Sodium Concentrations

2020 Annual Report, Crystal Lake Transfer Station
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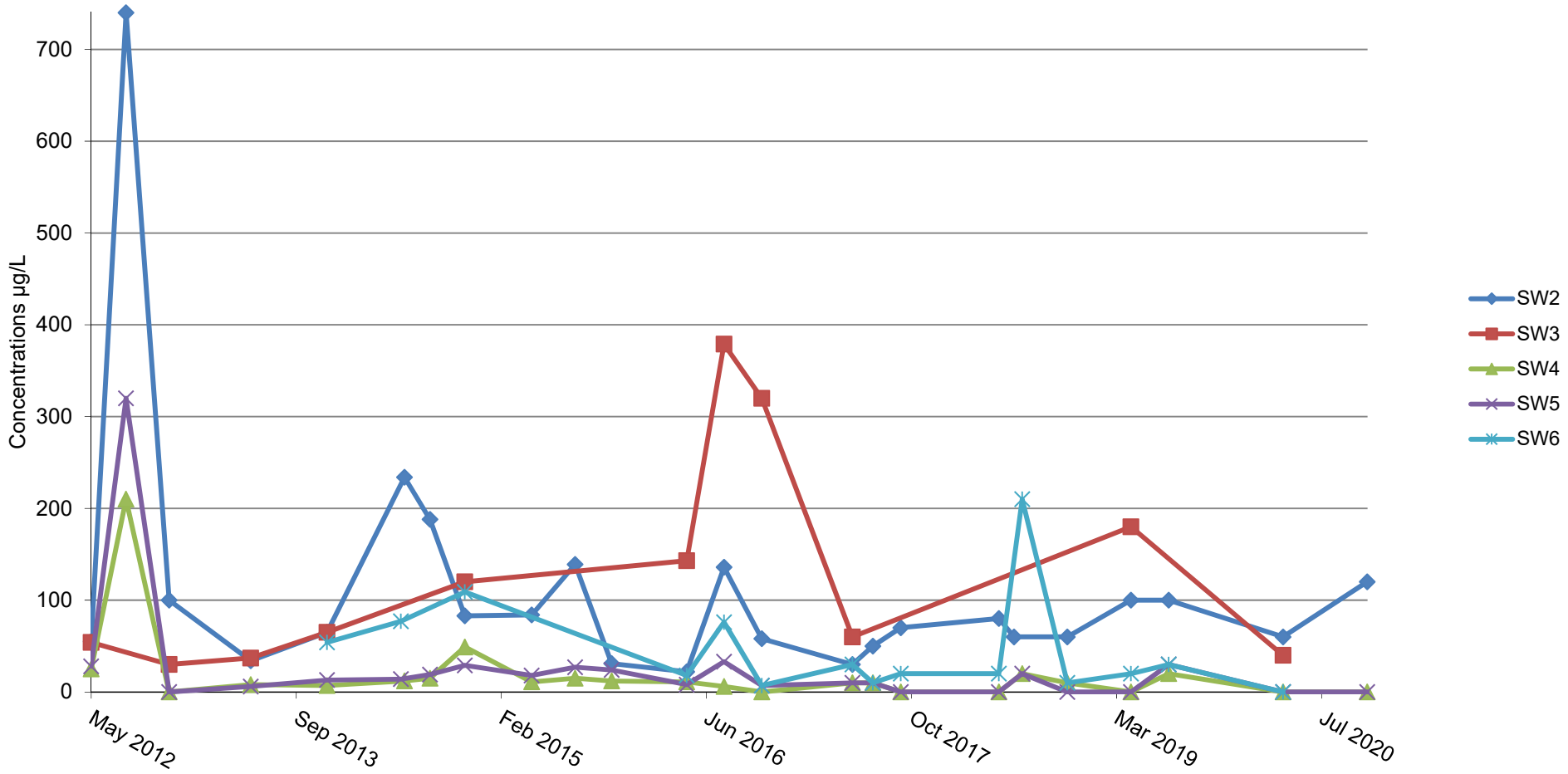
Figure:	**22**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

CAMBIUM



Total Phosphorus Concentrations

2020 Annual Report, Crystal Lake Transfer Station
1018 Crystal Lake Road, Trent Lakes
The Corporation of the Municipality of Trent Lakes

Figure:	**23**
Date:	Apr-21
Project Manager:	Stephanie Reeder
Project No.:	10520-003

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Appended Tables

Table Notes

RDL - reported detection limit for the current year

RUC - Reasonable Use Criteria

ODWQS - Ontario Drinking Water Quality Standards, O.Reg. 169/03

PWQO - Water Management, Policies, Guidelines, Provincial Water Quality Objectives (MOEE, 1994b)

PWQO for beryllium, cadmium, copper, and lead depend on hardness

PWQO for aluminum depends on pH and background concentration

NV - No Value

"-" Parameter not analyzed or measured

Unionized ammonia calculated using total ammonia and field data for pH and conductivity

Table 1 Environmental Monitoring Program

Location	Task	Frequency	Parameters
GROUNDWATER			
MW1-U, MW1-L, DP1, DP2, DP3, DP4, BH16-1S, BH16-1D, BH16-2 1 QA/QC Duplicate	• Measure groundwater levels • Groundwater sampling • Field Measurements (pH, temperature, conductivity, dissolved oxygen, ORP)	Twice (Spring and Autumn)	Alkalinity, Ammonia, Barium, Boron, Calcium, Chloride, Conductivity, Hardness, Iron, Magnesium, Manganese, Nitrate, TKN, pH, Potassium, Sodium, TDS, Sulphate, COD, DOC
MW1-U and MW1-L		Twice (Spring and Autumn)	BOD, TSS
MW1-U and MW1-L		Once (Spring)	EPA 624 VOCs
All monitors	• Measure combustible gas % by volume methane	Twice (Spring and Autumn)	Methane
SURFACE WATER			
SW2, SW3, SW4, SW5, SW6 1 QA/QC Duplicate	• Surface water sampling • Flow estimates • Field measurements (pH, temperature, conductivity, dissolved oxygen and ORP)	Three Times (Spring, Summer, and Autumn)	Alkalinity, dissolved aluminum, Ammonia, Un-ionized Ammonia, Arsenic, Barium, Boron, Cadmium, Chloride, Chromium, Cobalt, Conductivity, Copper, Iron, Lead, dissolved mercury, Nickel, Nitrate, Nitrite, TKN, pH, Total Phosphorus, Selenium, Silver, TSS, Turbidity, TDS, Sulphate, Zinc, BOD, COD, DOC, Phenols, Hardness, Colour

**Dissolved mercury to be lab filtered with a 0.45 micron filter for all surface water samples*
**Dissolved aluminum to be lab filtered with a 0.2 micron filter (clay free) for all surface water samples*

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Table 2 - Groundwater Elevation Data

Monitor	MW1-L	MW1-U	DP1	DP2	DP3	DP4	BH16-1S	BH16-1D	BH16-2
Northing Easting[1]	693024 4956700	693024 4956700	693017 4956600	693107 4956636	692929 4956741	692985 4956795	693171 4956632	693171 4956631	692609 4956431
Original Ground Elevation (masl)	300.41	300.41	291.49	294.23	273.68	276.58	297.10	297.10	273.14
Stick Up (m)	0.95	0.96	0.99	1.12	0.72	1.42	0.73	0.58	0.93
Depth (m)	22.47	10.34	2.62	2.57	1.70	2.63	6.34	10.46	8.12
Measuring Point (masl)	301.36	301.37	292.48	295.36	274.40	278.00	297.83	297.68	274.07
07-May-12	291.36	294.87	291.27	294.10	273.41	276.51	-	-	-
14-Nov-12	286.17	294.63	291.34	294.10	273.39	276.57	-	-	-
31-May-13	284.89	294.31	291.51	294.27	273.56	276.64	-	-	-
03-Dec-13	283.00	294.83	-	294.41	273.33	276.64	-	-	-
06-Jun-14	281.51	294.78	291.49	294.25	273.54	276.61	-	-	-
04-Nov-14	281.70	294.58	291.51	294.27	273.52	276.66	-	-	-
15-Apr-15	281.17	294.75	291.48	294.19	273.54	276.37	-	-	-
29-Oct-15	281.09	294.36	291.43	294.13	273.41	276.45	-	-	-
27-Apr-16	280.70	294-94	291.45	294.05	273.42	276.25	-	-	-
25-Oct-16	280.44	294.35	291.17	294.46	273.30	276.35	-	-	-
6-Jun-17	281.04	294.83	291.37	294.20	273.47	276.50	296.96	291.34	272.22
2-Oct-17	281.18	294.30	291.51	294.03	273.29	276.26	296.14	289.91	272.14
29-May-18	281.00	294.74	291.45	293.80	273.58	276.58	296.84	291.31	272.24
12-Nov-18	280.59	294.64	291.49	295.08	273.55	276.62	296.88	289.66	272.23
16-Apr-19	280.22	294.82	291.45	293.91	273.64	276.17	297.08	289.53	272.36
14-Nov-19	280.33	294.71	-	293.90	273.45	276.44	296.85	289.60	272.24
21-Apr-20	280.17	294.94	291.05	294.21	273.54	276.49	297.01	289.79	272.27
12-Nov-20	280.23	294.67	291.06	294.29	273.45	276.49	296.69	289.53	272.23

1. Zone 17, accurate to +/- 5.0 metres

Shaded cells indicated wells constructed in bedrock.

Wells DP1, DP2, DP3, and DP4 were assumed to be constructed in overburden; no borehole logs are available.

Table 3 - Vertical Hydraulic Gradients

Monitor	Difference in Elevation of Bottom of Screen	Vertical Gradients Deep-Shallow: +downwards, -upwards												Stratigraphy
		15-Apr-15	29-Oct-15	27-Apr-16	25-Oct-16	6-Jun-17	2-Oct-17	29-May-18	12-Nov-18	16-Apr-19	14-Nov-19	21-Apr-20	12-Nov-20	
BH16-1D	-4.27	-	-	-	-	1.32	1.46	1.30	1.69	0.03	1.70	1.69	1.68	Granite
BH16-1S														Granite
MW1-L	-12.14	1.12	1.09	1.17	1.15	1.14	1.08	1.13	1.16	1.20	1.18	1.22	1.19	Granite
MW1-U														Granite

Positive values indicate a downward vertical gradient.

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-1D 2016-10-16	BH16-1D 2017-06-06	BH16-1D 2017-10-02	BH16-1D 2018-05-29	BH16-1D 2018-11-12	BH16-1D 2019-04-18	BH16-1D 2020-04-21	BH16-1D 2020-11-12
Metals												
Barium (Filtered)	µg/L	1		**1000**	4	4	3	5	6	5	8	7
Boron (Filtered)	µg/L	5		**5000**	117	1640	1800	2000	1840	1750	2050	2030
Calcium (Filtered)	µg/L	20			22,500	13,200	10,500	16,400	30,800	32,000	72,800	47,100
Chloride	µg/L	500	***143200***	**250000**	54,100	42,800	44,800	36,300	57,900	-	41,200	36,400
Iron (Filtered)	µg/L	5	***157***	**300**	<10	<5	11	17	<5	6	***1970***	11
Manganese (Filtered)	µg/L	1	***40***	**50**	2	9	4	11	16	11	***49***	21
Magnesium (Filtered)	µg/L	20			3930	1530	1970	3290	5730	6000	5890	5500
Potassium (Filtered)	µg/L	100			17,900	12,100	13,900	14,400	18,400	15,900	15,200	14,600
Sodium (Filtered)	µg/L	200	***122050***	**200000**	56,000	***138,000***	***154,000***	***171,000***	***200,000***	***149,000***	***150,000***	***133,000***
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	132	143	175	204	274	-	253	232
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	72.4	39	34	55	101	105	206	140
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	234	393	***427***	***400***	***556***	-	***441***	***437***
Oxygen Demand - Chemical (COD)	mg/L	5			10	433	98	257	232	475	990	274
Solids - Total Suspended (TSS)	mg/L	3			203,000	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	5	***29.4***	***24.6***	***45.3***	***26.6***	***19.7***	***10.8***	**5.1**
Oxygen Demand - Biological (BOD)	mg/L	3			<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	28.7	89	92	18	166	-	110	121
Ammonia	mg/L	0.01			<0.02	0.07	0.04	0.07	0.07	0.11	0.05	0.11
Nitrate (as N)	mg/L	0.05		**10**	<0.05	<0.05	<0.05	<0.05	<0.05	-	0.08	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.19	0.4	0.3	0.7	0.4	0.7	1.1	0.2
Conductivity (lab)	µS/cm	1			472	715	776	765	1040	-	836	830
pH (Lab)	-			**6.5-8.5**	8.11	**8.67**	8.5	8.4	8.03	-	8.09	8.04
Field												
DO (Field)	mg/L				8.1	11.57	8.53	10.25	8.61	4.94	10.91	10.42
Redox Potential (Field)	mV				-	50	114	57	170	190	112	190
Temp (Field)	°C				8.3	9.3	13.6	13	7.4	9	7.3	6.1
Conductivity (field)	µS/cm				400	690	720	690	1010	910	910	562
pH (Field)	-			**6.5-8.5**	**9.2**	**8.69**	**8.65**	8.27	8.09	8.01	8.04	7.6

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-1S 2016-10-29	BH16-1S 2017-06-06	BH16-1S 2017-10-02	BH16-1S 2018-05-29	BH16-1S 2018-11-12	BH16-1S 2019-04-18	BH16-1S 2020-04-21	BH16-1S 2020-11-12
Metals												
Barium (Filtered)	µg/L	1		**1000**	27	31	35	24	24	19	22	20
Boron (Filtered)	µg/L	5		**5000**	36	55	46	50	39	33	34	32
Calcium (Filtered)	µg/L	20			60,700	65,300	73,600	65,200	73,800	74,000	84,900	85,800
Chloride	µg/L	500	***143200***	**250000**	33,600	26,500	36,500	36,200	41,600	23,400	30,500	32,800
Iron (Filtered)	µg/L	5	***157***	**300**	<10	<5	9	40	6	<5	33	18
Manganese (Filtered)	µg/L	1	***40***	**50**	***83***	***145***	***173***	***115***	***65***	***45***	40	16
Magnesium (Filtered)	µg/L	20			5160	6840	7960	7130	7640	6740	7180	6770
Potassium (Filtered)	µg/L	100			7490	6200	6800	5900	6300	5800	6300	6000
Sodium (Filtered)	µg/L	200	***122050***	**200000**	24,700	32,200	24,600	25,600	24,900	18,600	19,500	19,600
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	188	194	197	188	197	198	199	190
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	173	191	217	192	216	213	242	242
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	276	285	294	261	276	269	278	281
Oxygen Demand - Chemical (COD)	mg/L	5			8	190	33	71	28	19	12	13
Solids - Total Suspended (TSS)	mg/L	3			1480	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	3	5	***12.6***	***10.4***	3.4	3.8	**5.3**	2
Oxygen Demand - Biological (BOD)	mg/L	3			<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	17.8	15	14	18	19	20	27	27
Ammonia	mg/L	0.01			<0.02	0.02	0.03	0.05	0.05	0.04	0.02	0.07
Nitrate (as N)	mg/L	0.05		**10**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.21	0.8	0.3	0.6	0.3	0.3	0.2	0.2
Conductivity (lab)	µS/cm	1			482	519	534	505	533	520	536	543
pH (Lab)	-			**6.5-8.5**	8.16	8.12	8.16	8.16	8.1	8.11	7.92	7.92
Field												
DO (Field)	mg/L				8.1	12.69	7.79	7.44	4.92	9.07	10.01	5.78
Redox Potential (Field)	mV				-	44	82	84	150	159	88	253
Temp (Field)	°C				8.3	9.4	11.8	11.9	8.7	7	4.8	9
Conductivity (field)	µS/cm				436	550	900	430	570	530	600	409
pH (Field)	-			**6.5-8.5**	**9.2**	7.91	7.86	7.64	7.67	7.8	7.58	7.68

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-2 2016-10-29	BH16-2 2017-06-06	BH16-2 2017-10-02	BH16-2 2018-05-29	BH16-2 2018-11-12	BH16-2 2019-04-18	BH16-2 2020-04-21	BH16-2 2020-11-12
Metals												
Barium (Filtered)	µg/L	1		**1000**	73	47	76	42	68	67	81	33
Boron (Filtered)	µg/L	5		**5000**	214	273	267	258	258	257	274	276
Calcium (Filtered)	µg/L	20			64,400	28,800	31,300	26,200	29,500	28,600	32,100	30,600
Chloride	µg/L	500	***143200***	**250000**	94,400	54,000	57,100	54,200	66,500	65,100	70,700	66,200
Iron (Filtered)	µg/L	5	***157***	**300**	***232***	6	25	21	7	<5	***422***	16
Manganese (Filtered)	µg/L	1	***40***	**50**	***401***	***107***	***85***	***70***	***53***	***65***	***87***	***46***
Magnesium (Filtered)	µg/L	20			8380	4520	5510	4540	5010	4980	5490	4900
Potassium (Filtered)	µg/L	100			3440	1700	2000	1700	2100	1900	2000	1600
Sodium (Filtered)	µg/L	200	***122050***	**200000**	73,200	92,800	85,500	84,200	84,600	79,200	83,200	84,600
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	235	178	166	156	181	153	154	147
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	195	91	101	84	94	92	103	97
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	***416***	335	319	285	286	29	286	288
Oxygen Demand - Chemical (COD)	mg/L	5			47	<5	760	1050	944	7400	1740	183
Solids - Total Suspended (TSS)	mg/L	3			171,000	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	**7**	4.6	3.4	**6.7**	2.4	2.9	2.5	1.2
Oxygen Demand - Biological (BOD)	mg/L	3			9	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	15.4	16	17	102	19	19	20	22
Ammonia	mg/L	0.01			1.44	1.4	1.13	1.59	1.08	2.75	0.81	0.22
Nitrate (as N)	mg/L	0.05		**10**	<0.25	0.28	0.09	<0.05	0.05	0.22	0.12	0.17
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			2.03	5.4	4.9	27.8	4.1	13.1	4.1	0.4
Conductivity (lab)	µS/cm	1			752	609	580	549	552	563	552	556
pH (Lab)	-			**6.5-8.5**	8.17	8.48	**8.64**	8.44	8.45	8.32	8.46	8.49
Field												
DO (Field)	mg/L				6.5	5.68	6.59	6.46	8.12	6.23	3.26	3.74
Redox Potential (Field)	mV				-	51	179	95	162	177	80	255
Temp (Field)	°C				8.2	10	9.4	10	7.9	8	6.1	7.8
Conductivity (field)	µS/cm				-	610	570	440	580	550	620	396
pH (Field)	-			**6.5-8.5**	**9.8**	8.08	**8.61**	8.47	7.93	8.34	**8.59**	8.34

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP1 2012-05-01	DP1 2012-11-13	DP1 2013-05-31	DP1 2014-06-10	DP1 2014-11-04	DP1 2015-04-16	DP1 2015-10-29	DP1 2016-04-29	DP1 2016-10-29	DP1 2017-06-06	DP1 2017-10-02	DP1 2018-05-29	DP1 2018-11-12	DP1 2019-04-18	DP1 2020-04-21	DP1 2020-11-12
Metals																				
Barium (Filtered)	µg/L	1		**1000**	62	39	48	57	54	71	53	49	32	46	34	43	26	25	42	32
Boron (Filtered)	µg/L	5		**5000**	328	286	334	287	247	193	311	293	334	308	434	427	404	305	405	494
Calcium (Filtered)	µg/L	20			185,000	161,000	179,000	231,000	165,000	223,000	190,000	48,700	124,000	185,000	151,000	167,000	114,000	175,000	189,000	153,000
Chloride	µg/L	500	***143200***	**250000**	***463,000***	***345,000***	***261,000***	***429,000***	***548,000***	***486,000***	***262,600***	10,200	***265,000***	***278,000***	133,000	***270,000***	***188,000***	***206,000***	***214,000***	***153,000***
Iron (Filtered)	µg/L	5	***157***	**300**	***19,700***	65	***41,800***	***14,900***	***4570***	***24,400***	***19,900***	***49,000***	***13,200***	***38,800***	***53,900***	***64,100***	***90,900***	***10,200***	***55,600***	***66,500***
Manganese (Filtered)	µg/L	1	***40***	**50**	***2310***	***2720***	***4500***	***6190***	***5910***	***5790***	***6640***	***3210***	***3940***	***3640***	***2980***	***5330***	***3510***	***6260***	***8710***	***6570***
Magnesium (Filtered)	µg/L	20			20,200	17,300	18,500	21,900	16,000	17,900	15,500	2010	11,100	15,300	15,100	16,400	12,000	15,800	15,900	12,900
Potassium (Filtered)	µg/L	100			5680	6920	6910	8760	6330	6840	8140	2730	5380	5900	6900	6300	5400	7100	6900	6200
Sodium (Filtered)	µg/L	200	***122050***	**200000**	106,000	***131,000***	116,000	***169,000***	***163,000***	***177,000***	***176,000***	5780	***135,000***	***130,000***	***135,000***	88,100	104,000	107,000	93,300	92,000
Inorganics																				
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	320	343	***453***	***481***	259	***454***	***517***	132	***363***	***409***	***543***	***428***	***460***	***466***	***448***	***420***
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	185	***473***	***523***	***667***	***478***	***631***	***538***	130	***355***	***524***	***440***	***485***	334	***502***	***538***	***436***
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	***1200***	***1100***	***1220***	***1540***	***1190***	-	***1040***	***806***	***782***	***1010***	***823***	***863***	***761***	***835***	***821***	***722***
Oxygen Demand - Chemical (COD)	mg/L	5			39	50	54	52	46	32	115	37	32	75	111	76	42	67	103	33
Solids - Total Suspended (TSS)	mg/L	3			236	282	144	192	326	-	-	288	142	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	***9.5***	**7.9**	***15.8***	***8.4***	***8.4***	**7**	***28.2***	***11***	***10.2***	**5.5**	**7**	4.3	4.7	**5.9**	**5.2**	3
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	<5	<5	-	-	<5	<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	17.9	14.4	19	33.6	22.3	27.6	25.5	5.57	14.3	15	35	24	14	17	25	22
Ammonia	mg/L	0.01			0.19	0.03	0.07	0.16	0.07	0.04	0.1	0.02	0.05	0.16	0.16	0.11	0.08	0.14	0.12	0.15
Nitrate (as N)	mg/L	0.05		**10**	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.25	<0.05	<0.25	<0.05	<0.05	0.06	<0.05	0.07	0.12	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.79	0.53	1.7	0.75	0.48	0.45	1.14	0.57	0.57	0.9	0.8	0.6	0.5	0.8	0.6	0.7
Conductivity (lab)	µS/cm	1			2000	1280	1640	2190	2200	2200	1700	267	1440	1840	1500	1580	1400	1530	1510	1330
pH (Lab)	-			**6.5-8.5**	7.38	7.96	7.25	7.6	7.45	7.72	7.89	8.06	7.83	7.52	8.17	7.72	7.43	7.75	7.36	6.97
Field																				
DO (Field)	mg/L				-	-	-	-	-	-	-	7.2	-	7.07	8.87	8.33	6.84	6.44	6.2	5.96
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	58	78	66	154	173	110	251
Temp (Field)	°C				-	-	-	-	-	-	-	7.6	-	10.9	12.5	13.8	7.2	7	5.6	7.5
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	1891	-	1580	1490	1230	1320	1480	1510	1112
pH (Field)	-			**6.5-8.5**	-	-	-	-	-	-	-	**10.1**	-	7.06	7.22	7.06	6.74	6.96	6.76	6.55

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP2 2012-05-01	DP2 2012-11-13	DP2 2013-05-31	DP2 2014-06-10	DP2 2014-11-04	DP2 2015-04-16	DP2 2016-04-16	DP2 2016-10-16	DP2 2017-06-07	DP2 2017-10-02	DP2 2018-05-29	DP2 2018-11-12	DP2 2019-04-18	DP2 2020-04-21	DP2 2020-11-12
Metals																			
Barium (Filtered)	µg/L	1		**1000**	77	59	58	82	70	-	73	86	65	90	55	64	36	68	67
Boron (Filtered)	µg/L	5		**5000**	<10	18	12	12	<10	-	23	<10	19	19	35	9	42	30	43
Calcium (Filtered)	µg/L	20			132,000	103,000	55,200	120,000	123,000	-	85,100	115,000	103,000	133,000	74,200	109,000	64,900	117,000	127,000
Chloride	µg/L	500	***143200***	**250000**	20,100	21,200	15,000	31,000	33,200	-	38,100	30,000	27,800	37,100	31,100	22,600	16,000	38,200	32,200
Iron (Filtered)	µg/L	5	***157***	**300**	***3250***	***3290***	***6610***	***14,900***	***3420***	-	***25,900***	***13,200***	***26,500***	***7110***	***13,300***	***3830***	***23,900***	***21,400***	***20,500***
Manganese (Filtered)	µg/L	1	***40***	**50**	***514***	***590***	***461***	***596***	***517***	-	***616***	***531***	***543***	***493***	***420***	***559***	***359***	***665***	***776***
Magnesium (Filtered)	µg/L	20			5720	4470	2080	4660	5000	-	3340	4300	3810	5430	2980	4970	2620	4740	5060
Potassium (Filtered)	µg/L	100			1820	1420	1940	1480	1440	-	1620	1480	1300	1600	1400	1600	1300	1600	1600
Sodium (Filtered)	µg/L	200	***122050***	**200000**	6980	6820	4100	6290	7310	-	6710	10,500	9600	13,400	7200	10,600	5600	8500	10,500
Inorganics																			
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	***434***	249	300	***359***	309	-	***375***	347	338	***379***	313	***353***	323	***353***	339
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	132	276	146	319	328	-	226	305	274	***355***	198	293	173	312	338
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	***480***	***516***	***514***	***610***	***490***	-	***434***	***414***	***400***	***464***	349	364	353	***417***	***407***
Oxygen Demand - Chemical (COD)	mg/L	5			51	56	39	116	54	-	39	36	311	81	163	209	198	93	116
Solids - Total Suspended (TSS)	mg/L	3			450	69	512	567	656	-	1630	348	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	***15.5***	***11***	***13.1***	3.7	***11.6***	***13.9***	***17.8***	***18.9***	***27***	***16.6***	***49.6***	***15.3***	***17.4***	***19.1***	***11.9***
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	<5	<5	-	<5	<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	1.37	<0.1	3.28	<0.5	<0.5	-	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1
Ammonia	mg/L	0.01			0.42	0.25	0.36	0.48	0.19	-	0.58	0.32	0.64	0.59	0.76	0.73	1	1.1	0.71
Nitrate (as N)	mg/L	0.05		**10**	0.05	<0.05	0.12	<0.25	<0.25	-	<0.1	<0.25	<0.05	<0.05	0.29	0.07	3.1	0.06	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			2.62	1	2.66	1.47	0.8	-	2.04	1.07	2.6	1.4	8.2	3.5	3.1	2.3	2.2
Conductivity (lab)	µS/cm	1			764	434	545	740	638	-	715	705	727	843	672	701	680	795	776
pH (Lab)	-			**6.5-8.5**	7.59	8.08	7.08	7.57	7.95	-	7.47	7.66	7.79	7.37	7.7	7.65	7.6	7.19	7.31
Field																			
DO (Field)	mg/L				-	-	-	-	-	-	7.2	-	8.04	9.27	8.18	9.42	7.83	9.04	5.14
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	48	59	56	123	122	64	199
Temp (Field)	°C				-	-	-	-	-	-	7.5	-	10.2	11.5	18.1	6.4	3	3.3	8.1
Conductivity (field)	µS/cm				-	-	-	-	-	-	951	-	830	760	610	770	500	650	663
pH (Field)	-			**6.5-8.5**	-	-	-	-	-	-	**6.2**	-	7.13	7.21	7.24	6.8	7.12	6.84	6.88

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP3 2012-05-01	DP3 2012-11-13	DP3 2013-05-31	DP3 2013-12-03	DP3 2014-06-10	DP3 2014-11-04	DP3 2015-04-16	DP3 2015-10-29	DP3 2016-04-16	DP3 2016-10-29	DP3 2017-06-06	DP3 2017-10-02	DP3 2018-05-29	DP3 2018-11-12	DP3 2019-04-18	DP3 2020-04-21	DP3 2020-11-12
Metals																					
Barium (Filtered)	µg/L	1		**1000**	42	40	43	34	38	33	31	31	34	25	31	34	32	25	25	24	24
Boron (Filtered)	µg/L	5		**5000**	246	222	229	192	177	176	156	181	159	173	153	230	219	183	167	146	194
Calcium (Filtered)	µg/L	20			85,900	82,100	82,500	84,900	76,400	74,600	76,800	82,100	75,500	67,300	72,000	87,600	66,400	75,900	66,300	66,200	70,800
Chloride	µg/L	500	***143200***	**250000**	***240,000***	8270	7460	6520	5660	6190	8430	7230	7110	6520	5800	-	4100	5400	3800	4200	4900
Iron (Filtered)	µg/L	5	***157***	**300**	***800***	***1950***	***2770***	***3400***	***4800***	***785***	***4000***	***2230***	***10,700***	***7090***	***3130***	***8800***	***7810***	***7540***	***12,000***	***9270***	***10,200***
Manganese (Filtered)	µg/L	1	***40***	**50**	***574***	***353***	***613***	***522***	***369***	***227***	***281***	***474***	***336***	***261***	***126***	***517***	***389***	***429***	***217***	***118***	***183***
Magnesium (Filtered)	µg/L	20			85,900	5510	5240	5310	4710	5210	4870	5120	4890	4120	4700	6570	4820	5420	4590	4400	4630
Potassium (Filtered)	µg/L	100			8370	7890	9330	8330	7650	7860	6750	8620	7100	7530	7800	9700	7800	7600	6000	6700	7500
Sodium (Filtered)	µg/L	200	***122050***	**200000**	6240	7200	7990	8610	6800	7710	6130	7920	6460	7400	7600	9800	8100	8300	6000	6000	7700
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	240	201	231	234	181	228	200	236	205	196	173	242	193	222	182	158	171
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	237	228	228	234	210	208	212	226	209	185	199	246	186	212	185	184	196
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	294	296	296	296	264	284	-	280	252	258	246	306	236	240	229	194	209
Oxygen Demand - Chemical (COD)	mg/L	5			41	33	80	50	127	27	-	39	19	16	62	101	63	34	51	28	78
Solids - Total Suspended (TSS)	mg/L	3			110	260	2190	258	424	63	-	236	144	33	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	**5.9**	4.3	**6.7**	***9.9***	4.8	3.6	4.8	***11.1***	**5.7**	**5.7**	***12***	***21.9***	4.5	**6**	**6.8**	**5.8**	4.5
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	-	<5	<5	-	-	<5	<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	38.1	42	38.3	30.2	32.7	27.6	33.7	15.1	34.1	20.2	36	-	40	22	32	24	19
Ammonia	mg/L	0.01			0.06	0.03	0.23	0.15	0.19	0.08	-	0.14	0.06	0.08	0.27	0.22	0.17	0.12	0.16	0.08	0.08
Nitrate (as N)	mg/L	0.05		**10**	0.39	0.09	0.41	<0.1	0.12	<0.05	<0.25	<0.1	0.13	<0.05	0.94	-	0.64	0.14	0.26	0.31	0.08
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1.29	0.34	7.56	1.64	0.8	1.04	-	1.86	0.36	0.57	0.9	0.6	0.7	0.6	0.8	0.4	0.4
Conductivity (lab)	µS/cm	1			506	418	525	522	458	497	451	489	430	424	447	556	457	464	443	377	405
pH (Lab)	-			**6.5-8.5**	7.72	8.1	7.4	7.9	8.03	7.99	8.01	7.89	7.93	7.82	8.07	8.16	8.12	7.84	7.97	7.57	7.79
Field																					
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	-	9.93	9.89	7.05	6.25	5.56	3.63	3.47
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	9	118	21	123	121	46	190
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	-	14.4	11.9	12	6	3	3.2	7.2
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	-	500	540	390	530	490	410	312
pH (Field)	-			**6.5-8.5**	-	-	-	-	-	-	-	-	-	-	7.89	7.81	7.35	7.3	**4**	7.21	7.01

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP4 2012-05-01	DP4 2012-11-13	DP4 2013-05-31	DP4 2013-12-03	DP4 2014-06-10	DP4 2014-11-04	DP4 2015-04-16	DP4 2015-10-29	DP4 2016-04-16	DP4 2016-10-29	DP4 2017-06-06	DP4 2017-10-02	DP4 2018-05-29	DP4 2018-11-12	DP4 2019-04-18	DP4 2020-04-21	DP4 2020-11-12
Metals																					
Barium (Filtered)	µg/L	1		**1000**	22	17	24	16	23	17	17	16	11	16	-	16	-	12	-	14	-
Boron (Filtered)	µg/L	5		**5000**	23	20	15	22	15	18	20	24	14	21	-	19	-	14	-	20	-
Calcium (Filtered)	µg/L	20			78,100	68,400	65,800	77,700	57,700	67,900	73,900	70,900	148,000	66,600	-	66,600	-	68,000	-	53,200	-
Chloride	µg/L	500	***143200***	**250000**	7520	14,000	380	11,300	5590	16,800	14,200	15,000	***218,000***	10,100	5000	-	7300	-	-	-	-
Iron (Filtered)	µg/L	5	***157***	**300**	***8320***	***1270***	***18,300***	***7280***	***25,100***	***2730***	***11,400***	***1070***	<10	***2120***	-	***1700***	-	***406***	-	***8550***	-
Manganese (Filtered)	µg/L	1	***40***	**50**	***103***	20	***48***	***65***	***106***	***45***	***121***	37	8	32	-	***55***	-	***54***	-	***123***	-
Magnesium (Filtered)	µg/L	20			3280	3110	2860	3290	2370	3120	3090	3050	12,100	2670	-	3140	-	3090	-	2280	-
Potassium (Filtered)	µg/L	100			6660	6210	5840	6860	4620	6110	5740	8120	5490	6200	-	7000	-	6200	-	4100	-
Sodium (Filtered)	µg/L	200	***122050***	**200000**	6000	-	5720	8370	4200	6000	5330	-	***145,000***	5970	-	6200	-	6100	-	3900	-
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5	***349***	**500**	197	177	188	217	142	193	192	-	***483***	186	158	179	163	-	-	-	-
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	**500**	209	184	176	208	154	182	197	190	***419***	177	-	179	-	183	-	142	-
Solids - Total Dissolved (TDS)	mg/L	3	***393***	**500**	236	242	212	246	184	246	-	-	158	218	185	211	186	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			185	43	58	113	50	28	-	489	6	23	-	-	690	-	134	-	105
Solids - Total Suspended (TSS)	mg/L	3			218	592	516	956	892	564	-	-	<10	632	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	**5**	4.6	4.2	4.3	4.7	3.8	4.1	**6.5**	-	**6.2**	**5.4**	-	***8***	-	-	-	-	-
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	-	<5	<5	-	-	<5	<5	-	-	-	-	-	-	-
Sulphate (Filtered)	mg/L	1		**500**	8.41	9.75	1.3	7.82	5.2	6.5	9.5	7.62	14.4	8.9	7	-	10	-	-	-	-
Ammonia	mg/L	0.01			3.78	0.2	<0.02	0.71	0.15	0.18	-	1.75	<0.02	0.04	-	-	0.08	-	0.1	0.06	0.07
Nitrate (as N)	mg/L	0.05		**10**	0.24	0.2	<0.05	0.06	<0.05	<0.05	<0.25	0.17	<0.25	<0.05	<0.05	-	0.45	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1.93	0.62	1.55	2.47	1.09	0.74	-	4.91	0.19	0.54	-	-	1.5	-	1.1	1.4	0.5
Conductivity (lab)	µS/cm	1			392	360	398	454	326	432	422	-	1330	393	336	383	362	-	-	-	-
pH (Lab)	-			**6.5-8.5**	7.89	8.11	7.26	7.75	8.01	8.07	8.02	-	7.94	7.99	8.01	8.1	8.21	-	-	-	-
Field																					
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	-	-	-	9.37	4.92	8.59	4.11	9.06
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-	-	7	124	111	44	200
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	-	-	-	16.3	6	7	4.7	7.1
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	-	-	-	320	470	390	460	297
pH (Field)	-			**6.5-8.5**	-	-	-	-	-	-	-	-	-	-	-	-	7.37	7.74	7.29	7.36	7.46

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	MW1-L 2012-05-07	MW1-L 2012-11-13	MW1-L 2013-05-31	MW1-L 2013-12-03	MW1-L 2014-06-06	MW1-L 2014-11-04	MW1-L 2015-04-16	MW1-L 2015-10-29	MW1-L 2016-04-16	MW1-L 2016-10-29	MW1-L 2017-06-02	MW1-L 2017-10-02	MW1-L 2018-05-29	MW1-L 2018-11-12	MW1-L 2019-04-18	MW1-L 2020-04-21	MW1-L 2020-11-12
Metals																					
Barium (Filtered)	µg/L	1		1000	10	9	14	16	15	12	20	24	36	40	31	30	33	34	38	42	41
Boron (Filtered)	µg/L	5		5000	949	1100	1100	1020	1100	977	1190	1040	1220	1190	1200	1240	1310	1300	1250	1460	1490
Calcium (Filtered)	µg/L	20			16,100	15,800	16,900	16,100	27,400	17,200	19,500	19,800	22,600	24,300	22,800	23,500	23,600	22,800	23,900	26,000	25,500
Chloride	µg/L	500	***143200***	250000	***304,000***	***352,000***	***370,000***	***343,000***	***263,000***	***352,000***	***379,000***	***313,000***	***368,000***	***344,000***	***278,000***	***242,000***	***309,000***	***392,000***	***291,000***	***323,000***	***296,000***
Iron (Filtered)	µg/L	5	***157***	300	119	65	107	100	<10	<10	<10	<10	29	<10	<5	32	37	49	40	69	62
Manganese (Filtered)	µg/L	1	***40***	50	30	19	13	12	9	5	5	14	12	7	6	12	14	14	12	13	14
Magnesium (Filtered)	µg/L	20			1970	1980	2100	2000	2310	2150	2440	2330	2790	2670	2810	3130	2880	2880	2920	3190	3250
Potassium (Filtered)	µg/L	100			3410	3620	4440	4420	10,500	5170	5290	5150	5830	6470	5800	6300	6100	5900	5800	6500	6100
Sodium (Filtered)	µg/L	200	***122050***	200000	***306,000***	***288,000***	***328,000***	***309,000***	***252,000***	***318,000***	***336,000***	***313,000***	***336,000***	***320,000***	***365,000***	***363,000***	***374,000***	***348,000***	***320,000***	***355,000***	***352,000***
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5	***349***	500	234	218	230	236	202	261	244	258	262	263	268	267	258	291	259	266	259
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	500	48	48	51	48	78	51.8	58.7	59	67.9	71.7	69	72	71	69	72	78	77
Solids - Total Dissolved (TDS)	mg/L	3	***393***	500	***848***	***840***	***898***	***870***	***950***	***896***	***958***	***928***	***928***	***988***	***1010***	***997***	***926***	***949***	***977***	***951***	***943***
Oxygen Demand - Chemical (COD)	mg/L	5			28	30	31	28	26	28	25	25	22	24	30	67	34	39	42	37	13
Solids - Total Suspended (TSS)	mg/L	3			51	64	69	102	77	150	75	102	71	68	108	63	142	38	210	146	51
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	5	***71.4***	***30***	***10.7***	***11.1***	***11.8***	***9.6***	***11.3***	***9.3***	***12.3***	***12.8***	***8.1***	**5.4**	***8***	**5.7**	**6.5**	**5.7**	3.1
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	4	<3	<3	<3
Sulphate (Filtered)	mg/L	1		500	66	61.4	68.5	69.5	51.4	84.3	97.2	87.2	121	126	100	100	124	121	130	136	140
Ammonia	mg/L	0.01			0.07	0.04	<0.02	0.12	0.05	0.04	<0.02	0.05	<0.02	<0.02	<0.01	0.03	0.03	0.05	0.04	0.02	0.05
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.5	<0.5	<0.25	<0.5	<0.5	<0.25	<0.25	<0.5	0.36	0.22	0.27	0.24	0.21	0.27	0.17
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.82	1.65	0.92	0.44	0.92	0.4	0.27	0.65	0.59	0.52	0.6	0.6	0.6	0.6	0.7	0.6	0.6
Conductivity (lab)	µS/cm	1			1570	1440	1730	1720	2600	1720	1700	1750	1690	1820	1840	1810	1690	1730	1780	1730	1720
pH (Lab)	-			6.5-8.5	8.14	8.22	8.2	8.26	7.95	8.47	8.21	7.81	8.33	7.82	8.12	8.32	8.23	7.81	8.19	8.08	8.03
Field																					
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	-	10.92	6.44	5.84	5.28	5.66	7.56	6.77
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	38	116	42	173	173	94	183
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	-	13.1	13.4	14.5	6.1	10	7.9	8.7
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	-	1720	1700	1450	1630	1520	1110	1308
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	-	7.81	8.1	7.84	7.63	7.56	7.02	7.92

Table 4 - Groundwater Quality

	Unit	RDL	RUC	ODWQS	MW1-U 2012-05-01	MW1-U 2012-11-13	MW1-U 2013-05-31	MW1-U 2013-12-03	MW1-U 2014-06-06	MW1-U 2014-11-04	MW1-U 2015-04-16	MW1-U 2015-10-29	MW1-U 2016-04-16	MW1-U 2016-10-29	MW1-U 2017-06-06	MW1-U 2017-10-02	MW1-U 2018-05-29	MW1-U 2018-11-12	MW1-U 2019-04-18	MW1-U 2020-04-21	MW1-U 2020-11-12
Metals																					
Barium (Filtered)	µg/L	1		1000	58	41	41	35	46	44	46	48	57	26	29	31	35	41	39	29	28
Boron (Filtered)	µg/L	5		5000	302	286	339	349	365	370	423	443	432	394	280	411	388	432	389	297	358
Calcium (Filtered)	µg/L	20			525,000	580,000	441,000	366,000	266,000	345,000	365,000	396,000	379,000	237,000	299,000	273,000	277,000	280,000	275,000	255,000	255,000
Chloride	µg/L	500	***143200***	250000	***515,000***	***781,000***	***483,000***	***295,000***	***331,000***	***382,000***	***437,000***	***471,000***	***466,000***	***170,000***	***205,000***	***176,000***	***264,000***	***330,000***	***224,000***	90,000	81,200
Iron (Filtered)	µg/L	5	***157***	300	***4710***	***3560***	***3130***	***1660***	***4590***	***3580***	***3850***	***4260***	***3660***	***1160***	***995***	***1540***	***2240***	***2110***	***1100***	***868***	***1080***
Manganese (Filtered)	µg/L	1	***40***	50	***5020***	***5460***	***3520***	***4280***	***4080***	***4350***	***4660***	***4870***	***4580***	***4830***	***3190***	***5910***	***5670***	***6120***	***5620***	***3620***	***5810***
Magnesium (Filtered)	µg/L	20			30,000	34,500	27,400	22,400	24,600	22,600	23,200	25,100	26,500	16,500	26,600	22,400	22,600	21,400	21,000	23,600	20,400
Potassium (Filtered)	µg/L	100			11,100	11,700	10,700	10,200	5100	8790	10,200	11,000	11,000	8610	11,100	10,800	10,900	10,600	10,000	11,500	9900
Sodium (Filtered)	µg/L	200	***122050***	200000	***362,000***	***414,000***	***351,000***	***312,000***	***313,000***	***334,000***	***365,000***	***401,000***	***369,000***	***259,000***	***176,000***	***262,000***	***269,000***	***293,000***	***245,000***	***139,000***	***170,000***
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5	***349***	500	***1460***	***1330***	***1360***	***1280***	***1040***	***1360***	***1230***	***1310***	***1290***	***1130***	***852***	***996***	***1040***	***1070***	***979***	***790***	***776***
Hardness (as CaCO3) (Filtered)	mg/L	1	***341***	500	***1430***	***1590***	***1210***	***1010***	***766***	***955***	***1010***	***1090***	***1060***	***660***	***856***	***775***	***785***	***788***	***774***	***734***	***721***
Solids - Total Dissolved (TDS)	mg/L	3	***393***	500	***2580***	***2300***	***2560***	***1970***	***1750***	***2010***	***1940***	***2140***	***1860***	***1700***	***1270***	***1330***	***1410***	***1460***	***1380***	***979***	***975***
Oxygen Demand - Chemical (COD)	mg/L	5			164	158	159	114	87	133	106	139	110	97	63	127	80	140	129	58	100
Solids - Total Suspended (TSS)	mg/L	3			186	140	1080	204	138	214	97	94	596	76	140	116	146	101	240	98	82
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***7.9***	5	***71.4***	***63.8***	***19.1***	***56.6***	***56.8***	***52.9***	***49.2***	***52***	***57.9***	***50.6***	***18.8***	***21.3***	***44.9***	***26***	***23.8***	***18.9***	***21.5***
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	5	<3	<3	<3
Sulphate (Filtered)	mg/L	1		500	76	85.8	83.1	51.9	148	43.2	50.7	34.6	50.4	59.9	56	53	67	39	33	62	57
Ammonia	mg/L	0.01			0.41	0.46	0.24	0.43	0.47	0.41	0.26	0.36	0.38	0.22	0.33	0.52	0.35	0.54	0.54	0.25	0.73
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<1	<0.25	<1	<1	<1	<1	<0.5	<0.05	<0.05	0.06	0.05	<0.05	0.06	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			3.77	3.14	4.94	2.28	3.34	2.62	2.09	2.93	2.44	2.47	1.4	2.2	1.4	2.3	2.2	1.2	2.5
Conductivity (lab)	µS/cm	1			3740	3730	3660	3130	1760	3210	3110	3540	2970	2380	2310	2410	2540	2620	2480	1780	1780
pH (Lab)	-			6.5-8.5	8.14	7.56	7.68	7.79	7.82	8.01	7.71	7.9	7.92	8.03	7.21	7.45	7.49	7.45	7.64	7.35	7.2
Field																					
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	-	3.33	3.28	6.15	2.35	5.76	6.58	5.57
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	12	129	60	167	169	89	191
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	-	11.4	10.7	12.8	8.1	10	7.8	9.3
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	-	2200	2300	1850	2200	1840	990	1406
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	-	6.63	6.78	6.86	6.72	6.95	6.55	7.06

Table 5 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	MW1-L 2009-05-12	MW1-L 2009-10-14	MW1-L 2010-06-14	MW1-L 2010-10-27	MW1-L 2012-05-07	MW1-L 2013-05-31	MW1-L 2014-11-04	MW1-L 2015-04-16	MW1-L 2016-04-16	MW1-L 2017-06-06	MW1-L 2018-05-29	MW1-L 2019-04-18	MW1-L 2020-04-21
BTEX																
Benzene	µg/L	0.5	**1**	0.3	0.6	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4	<0.2	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	**140**	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	µg/L	1		<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.4	<0.4	<1	<1
Xylene (o)	µg/L	0.5		<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.5	<0.5
Xylene Total	µg/L	1.1	**90**	<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	-	<0.4	<1.1	<1.1
VOCs																
Acetone	µg/L	30		<10	<10	<10	<10	<2	<2	<1	<2	<1	36	<2	<30	<30
Bromodichloromethane	µg/L	2		<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<2	<2
Bromoform	µg/L	5		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<5	<5
Bromomethane	µg/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.4	<0.4	<0.2	<0.4	<0.2	<0.3	<0.3	<0.05	<0.5
Carbon tetrachloride	µg/L	0.2	**2**	<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L		**80**	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-
Chloroform	µg/L	1		<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.3	<0.3	<1	<1
Chloroethane	µg/L			-	-	-	-	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<3	-
Chloromethane	µg/L			-	-	-	-	<0.8	<0.8	<0.4	<0.8	<0.4	<0.3	<0.3	<2	-
Dibromochloromethane	µg/L	2		<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<2	<2
Dibromochloropropane (DBCP)	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Dibromomethane	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Dichlorobenzene, 1,2-	µg/L	0.5	**200**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.5	<0.5
Dichlorobenzene, 1,3-	µg/L	0.5		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3	<0.2	<0.1	<0.1	<0.1	<0.5	<0.5
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.2	<0.2	<0.5	<0.5
Dichlorodifluoromethane	µg/L	2		-	-	-	<0.5	<0.6	<0.6	<1	<0.6	<0.3	<1	<1	<2	<2
Dichloropropane, 1,3-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	<0.1	<0.1	-
Dichloroethane, 1,1-	µg/L			0.2	0.2	<0.1	<0.1	<0.6	<0.6	<0.3	<0.6	<0.3	<0.1	<0.1	<0.5	-
Dichloroethane, 1,2-	µg/L	0.5	**5**	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<0.5	<0.5
Dichloroethylene, 1,1-	µg/L	0.5	**14**	<0.1	<0.1	<0.1	<0.1	<0.6	<0.6	<0.3	<0.6	<0.3	<0.1	<0.1	<0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5		<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<5	<0.5
Dichloroethylene, 1,2-cis-	µg/L	0.5		0.9	1.3	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<0.5	<0.5
Dichloropropane, 1,2-	µg/L	0.5		<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.1	<0.4	<0.2	<0.1	<0.1	<0.5	<0.5
Dichloropropane, 2,2-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Dichloropropene, 1,1-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-
Dichloropropene, 1,3-cis-	µg/L	0.5		<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<0.2	<0.5
Dichloropropene, 1,3-trans-	µg/L	0.5		<0.2	<0.2	<0.2	<0.2	<0.6	<0.6	<0.3	<0.6	<0.3	<0.1	<0.1	<0.5	<0.5
Dichloropropene, 1,3-(cis+trans)	µg/L			<0.4	<0.4	<0.4	<0.4	<1	<1	<0.5	<1	<0.5	<0.2	<0.2	<0.7	<1
Ethylene dibromide	µg/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	<0.2
Hexachlorobutadiene	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Hexane	µg/L	5		-	-	-	-	-	-	-	<0.4	<0.2	<1	<1	<5	<5
Methyl butyl ketone (2-hexanone)	µg/L			-	-	-	-	<0.6	<0.6	<0.3	<0.6	<1	<10	-	-	-
Methyl Ethyl Ketone	µg/L	20		<5	<5	<5	<5	<2	<2	<0.1	<2	<1	<1	<1	<20	<20
Methyl Isobutyl Ketone	µg/L	20		<5	<5	<5	<5	<2	<2	<1	<2	<1	<1	<1	<20	<20
Methylene chloride	µg/L		**50**	<0.5	<0.5	<0.5	<0.2	<0.6	<0.6	<0.3	<0.4	<0.2	0.4	<0.3	<0.5	-
Methyl tert-Butyl Ether	µg/L	2		<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4	<0.2	<1	<1	<2	<2
Styrene	µg/L	0.5		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane, 1,1,2,2-	µg/L			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	<0.4	<0.4	<0.5	-
Tetrachloroethane, 1,1,1,2-	µg/L	0.5		<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.5	<0.5
Tetrachloroethylene	µg/L	0.5	**10**	<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.2	<0.2	<0.5	<0.5
Trichlorobenzene, 1,2,4-	µg/L			-	-	-	-	-	-	-	<0.6	<0.3	<0.2	-	<0.5	-
Trichloroethane, 1,1,1-	µg/L	0.5		<0.1	<0.1	<0.1	<0.1	<0.6	<0.6	<0.3	<0.6	<0.3	<0.1	<0.1	<0.5	<0.5
Trichloroethane, 1,1,2-	µg/L	0.5		<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<0.5	<0.5
Trichloroethylene	µg/L	0.5	**5**	-	-	<0.1	<0.1	<0.4	<0.4	<0.2	<0.4	<0.2	<0.1	<0.1	<0.5	<0.5
Trichloropropane, 1,2,3-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Trichlorofluoromethane	µg/L	5		<0.1	<0.1	-	-	<0.8	<0.8	<0.4	<0.8	<0.4	<0.1	<0.1	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.2	<0.2	<0.2	<0.2	<0.34	<0.34	<0.17	<0.34	<0.17	<0.2	<0.2	<0.2	<0.2
PAHs																
Naphthalene	µg/L			-	-	-	-	-	-	-	-	-	<0.7	-	-	-
Halogenated Benzenes																
Bromobenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.1	-	-	-
Chlorotoluene, 2-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Chlorotoluene, 4-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Trichlorobenzene, 1,2,3	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
MAH																
Trimethylbenzene, 1,2,4-	µg/L			-	-	-	-	-	-	-	-	-	<2	-	-	-
Trimethylbenzene, 1,3,5-	µg/L			-	-	-	-	-	-	-	-	-	<0.6	<0.6	<0.6	-
Isopropylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
n-butylbenzene	µg/L			<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.2	<0.1	<0.7	-	<0.5	-
n-propylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.4	-	-	-
p-isopropyltoluene	µg/L			-	-	-	-	-	-	-	-	-	<0.4	-	-	-
sec-butylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.5	-	-	-
tert-butylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.1	-	-	-

Table 5 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	MW1-U 2009-05-12	MW1-U 2009-10-14	MW1-U 2010-06-14	MW1-U 2010-10-27	MW1-U 2012-05-07	MW1-U 2013-05-31	MW1-U 2014-11-04	MW1-U 2015-04-16	MW1-U 2016-04-16	MW1-U 2017-06-06	MW1-U 2018-05-29	MW1-U 2019-04-18	MW1-U 2020-04-21
BTEX																
Benzene	µg/L	0.5	**1**	<0.1	<0.1	0.7	0.5	0.35	<0.8	**1.2**	0.61	<0.4	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.4	<0.5	<0.2	<0.8	<0.8	<0.4	<0.4	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	**140**	<0.1	<0.1	<0.2	<0.3	<0.1	<0.4	<0.8	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	µg/L	1		<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.4	<0.4	<1	<1
Xylene (o)	µg/L	0.5		<0.1	<0.1	<0.2	<0.3	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<0.5	<0.5
Xylene Total	µg/L	1.1	**90**	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	-	<0.4	<1.1	<1.1
VOCs																
Acetone	µg/L	30		<10	<10	<20	<30	<1	<4	<4	<2	<2	<2	<2	<30	<30
Bromodichloromethane	µg/L	2		<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<2	<2
Bromoform	µg/L	5		<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<5	<5
Bromomethane	µg/L	0.5		<0.5	<0.5	<1	<1	<0.2	<0.8	<0.8	<0.4	<0.4	<0.3	<0.3	<0.05	<0.5
Carbon tetrachloride	µg/L	0.2	**2**	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L		**80**	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-
Chloroform	µg/L	1		<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.3	<0.3	<1	<1
Chloroethane	µg/L			-	-	-	-	2.8	<0.8	<0.8	2.1	<0.4	<0.1	<0.1	<3	-
Chloromethane	µg/L			-	-	-	-	<0.4	<1.6	<1.6	<0.8	<0.8	<0.3	<0.3	<2	-
Dibromochloromethane	µg/L	2		<0.2	<0.2	<0.4	-	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<2	<2
Dibromochloropropane (DBCP)	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Dibromomethane	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Dichlorobenzene, 1,2-	µg/L	0.5	**200**	<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<0.5	<0.5
Dichlorobenzene, 1,3-	µg/L	0.5		<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<0.5	<0.5
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5
Dichlorodifluoromethane	µg/L	2		-	-	-	<1	<0.3	<1.2	<4	<0.6	<0.6	<1	<1	<2	<2
Dichloropropane, 1,3-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	<0.1	<0.1	-
Dichloroethane, 1,1-	µg/L			<0.1	<0.1	0.2	<0.3	<0.3	<1.2	<1.2	<0.6	<0.6	0.1	0.1	<0.5	-
Dichloroethane, 1,2-	µg/L	0.5	**5**	<0.2	<0.2	<0.4	<0.5	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<0.5	<0.5
Dichloroethylene, 1,1-	µg/L	0.5	**14**	<0.1	<0.1	<0.2	<0.3	<0.3	<1.2	<1.2	<0.6	<0.6	<0.1	<0.1	<0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5		<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<5	<0.5
Dichloroethylene, 1,2-cis-	µg/L	0.5		<0.1	<0.1	1.3	1.3	1	1.4	1.7	0.61	<0.4	0.1	0.1	<0.5	<0.5
Dichloropropane, 1,2-	µg/L	0.5		<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<0.5	<0.5
Dichloropropane, 2,2-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Dichloropropene, 1,1-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-
Dichloropropene, 1,3-cis-	µg/L	0.5		<0.2	<0.2	<0.4	<0.5	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<0.2	<0.5
Dichloropropene, 1,3-trans-	µg/L	0.5		<0.2	<0.2	<0.4	<0.5	<0.3	<1.2	<1.2	<0.6	<0.6	<0.1	<0.1	<0.5	<0.5
Dichloropropene, 1,3-(cis+trans)	µg/L			<0.4	<0.4	<0.8	<1	<0.5	<2	<2	<1	<1	<0.2	<0.2	<0.7	<1
Ethylene dibromide	µg/L	0.2		<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<0.2	<0.2
Hexachlorobutadiene	µg/L			-	-	-	-	-	-	-	-	-	<1	-	-	-
Hexane	µg/L	5		-	-	-	-	-	-	-	<0.4	<0.4	<1	<1	<5	<5
Methyl butyl ketone (2-hexanone)	µg/L			-	-	-	-	<0.3	<1.2	<1.2	<0.6	<2	<10	-	-	-
Methyl Ethyl Ketone	µg/L	20		<5	<5	<10	<10	<1	<4	<0.4	<2	<2	<1	<1	<20	<20
Methyl Isobutyl Ketone	µg/L	20		<5	<5	<10	<10	<1	<4	<4	<2	<2	<1	<1	<20	<20
Methylene chloride	µg/L		**50**	<0.5	<0.5	<1	<0.5	<0.3	<1.2	<1.2	<0.4	<0.4	<0.3	<0.3	<0.5	-
Methyl tert-Butyl Ether	µg/L	2		<0.2	<0.2	<0.4	<0.5	<0.2	<0.8	<0.8	<0.4	<0.4	<1	<1	<2	<2
Styrene	µg/L	0.5		<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane, 1,1,2,2-	µg/L			<0.2	<0.2	<0.4	<0.5	<0.1	<0.4	<0.4	<0.2	<0.2	<0.4	<0.4	<0.5	-
Tetrachloroethane, 1,1,1,2-	µg/L	0.5		<0.1	<0.1	<0.2	<0.3	<0.1	<0.4	<0.4	<0.2	<0.2	<0.1	<0.1	<0.5	<0.5
Tetrachloroethylene	µg/L	0.5	**10**	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.2	<0.2	<0.5	<0.5
Trichlorobenzene, 1,2,4-	µg/L			-	-	-	-	-	-	-	<0.6	<0.6	<0.2	-	<0.5	-
Trichloroethane, 1,1,1-	µg/L	0.5		<0.1	<0.1	<0.2	<0.3	<0.3	<0.12	<1.2	<0.6	<0.6	<0.1	<0.1	<0.5	<0.5
Trichloroethane, 1,1,2-	µg/L	0.5		<0.2	<0.2	<0.4	<0.5	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<0.5	<0.5
Trichloroethylene	µg/L	0.5	**5**	-	-	<0.2	<0.3	<0.2	<0.8	<0.8	<0.4	<0.4	<0.1	<0.1	<0.5	<0.5
Trichloropropane, 1,2,3-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Trichlorofluoromethane	µg/L	5		<0.1	<0.1	-	-	<0.4	<1.6	<1.6	<0.8	<0.8	<0.1	<0.1	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.2	<0.2	<0.4	<0.5	<0.17	<0.68	<0.68	<0.34	<0.34	<0.2	<0.2	<0.2	<0.2
PAHs																
Naphthalene	µg/L			-	-	-	-	-	-	-	-	-	<0.7	-	-	-
Halogenated Benzenes																
Bromobenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.1	-	-	-
Chlorotoluene, 2-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Chlorotoluene, 4-	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Trichlorobenzene, 1,2,3	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
MAH																
Trimethylbenzene, 1,2,4-	µg/L			-	-	-	-	-	-	-	-	-	<2	-	-	-
Trimethylbenzene, 1,3,5-	µg/L			-	-	-	-	-	-	-	-	-	<0.6	<0.6	<0.6	-
Isopropylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.2	-	-	-
n-butylbenzene	µg/L			<0.1	<0.1	<0.2	<0.3	<0.1	<0.4	<0.4	<0.2	<0.2	<0.7	-	<0.5	-
n-propylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.4	-	-	-
p-isopropyltoluene	µg/L			-	-	-	-	-	-	-	-	-	<0.4	-	-	-
sec-butylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.5	-	-	-
tert-butylbenzene	µg/L			-	-	-	-	-	-	-	-	-	<0.1	-	-	-

Table 6 - Surface Water Quality

	Unit	RDL	PWQO	SW1	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2
				2015-04-16	2012-05-07	2012-07-31	2012-11-13	2013-05-31	2013-12-03	2014-06-10	2014-08-11	2014-11-04	2015-04-16	2015-07-31	2015-10-28	2016-04-28	2016-07-28	2016-10-28	2017-06-06	2017-07-26	2017-10-02	2018-05-29	2018-07-05	2018-11-12	2019-04-16	2019-07-17	2020-04-21	2020-07-08	2020-11-12
Metals																													
Aluminium	µg/L	10		6	23	18	20	13	13	5	6	7	7	4	8	10	11	9	30	50	80	100	100	60	30	-	-	-	-
Aluminium (Filtered)	µg/L	10	**15|75**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	30	20	20
Arsenic	µg/L	0.1	**5**	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	0.4	0.3	0.6	0.7	0.3	0.2	<0.1	0.2	0.1	0.3	0.2
Barium	µg/L	1		20	12	17	10	10	19	19	16	9	9	15	11	8	17	12	19	29	41	41	52	15	8	20	10	19	12
Boron	µg/L	5	**200**	47	<10	10	<10	18	<10	<10	<10	<10	<10	<10	<10	12	<10	<10	<5	13	17	6	40	11	6	14	9	9	22
Cadmium	µg/L	0.02	**0.1|0.5**	<0.1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014	0.071	0.015	0.073	0.042	0.018	<0.015	<0.015	<0.015	<0.015
Chloride	µg/L	500		4750	13,200	24,000	14,600	21,500	26,000	22,600	19,200	18,400	24,400	22,100	24,100	20,600	23,100	37,300	26,400	9600	50,200	22,300	41,400	20,900	11,100	13,600	20,400	14,300	22,300
Chromium (III+VI)	µg/L	1	**8.9**	<3	<3	<3	<3	<3	<3	3	<3	<3	<3	<3	<3	<3	<3	<3	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	0.1	**0.9**	<0.5	<1	<1	<1	<0.5	**1**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	**10**	0.6	0.4	0.1	0.3	<0.1	0.2	0.2
Copper	µg/L	0.1	**1|5**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.7	0.2	**9.6**	0.6	3.7	**5.6**	0.9	0.6	0.3	0.7	0.2
Iron	µg/L	5	**300**	**1010**	172	**2120**	170	290	**1910**	**520**	**467**	270	289	**639**	234	28	**577**	**347**	298	253	**1910**	**1180**	195	**1360**	203	245	200	**312**	**524**
Lead	µg/L	0.02	**1|3|5**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.08	<0.02	0.79	0.16	0.47	0.33	0.19	0.05	0.07	0.09	0.05
Mercury	µg/L			-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel	µg/L	10	**25**	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus total (P2O5)	µg/L	10	**30**	**80**	**55**	**740**	**100**	**34**	**65**	**234**	**188**	**83**	**84**	**139**	**31**	22	**136**	**58**	30	**50**	**70**	**80**	**60**	**60**	**100**	**100**	**60**	**100**	**120**
Selenium	µg/L	1	**100**	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	µg/L	0.1	**0.1**	<0.1	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	µg/L	5	**20**	<5	<5	8	10	**25**	7	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	**52**	**33**	**31**	**24**	**43**	10	<5	**24**	9	9
Inorganics																													
Alkalinity (as CaCO3)	mg/L	5		123	113	119	72	113	159	124	120	104	68	133	100	93	107	107	118	123	149	106	131	145	77	130	81	125	92
Hardness (as CaCO3)	mg/L	1		125	112	140	83	127	174	144	143	92.4	77.2	161	107	96.4	134	123	139	150	156	150	175	126	85	169	106	163	116
Solids - Total Dissolved (TDS)	mg/L	1		166	154	214	104	184	216	198	196	140	128	208	146	138	194	206	187	155	269	143	209	178	103	160	122	152	134
Oxygen Demand - Chemical (COD)	mg/L	5		22	28	149	55	41	37	89	59	29	17	50	41	15	37	40	32	46	78	61	29	63	20	53	27	61	63
Solids - Total Suspended (TSS)	mg/L	3		12	<10	93	<10	<10	<10	15	30	<10	12	14	<10	<10	20	15	3	6	14	36	18	16	3	10	5	12	4
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2		8	10.6	21.1	16.1	12.8	11.8	12.7	17.2	13	6.6	17.7	13.8	8.4	18.8	16	13.5	13.4	18.2	19	11.7	4.9	8.9	14.9	9.8	22.7	20.1
Oxygen Demand - Biological (BOD)	mg/L	3		<5	<5	18	<5	<5	<5	5	18	<5	<5	6	<5	<5	<5	<5	<2	3	6	5	3	8	<3	<3	<3	<3	<3
Phenols (4AAP)	mg/L	0	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.003**	<0.001	<0.001	**0.002**	<0.001	<0.001	**0.003**	<0.001	<0.001	<0.001	**0.008**	<0.001	<0.001	<0.001	<0.001	**0.005**	<0.002	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		5.26	2.15	2.21	1.21	1.27	4.13	1.51	0.14	<0.1	2.36	1.79	0.82	2.94	1.29	0.46	<1	<1	<1	<1	2	<1	2	<1	3	<1	<1
Ammonia, Unionized (as N)	mg/L	0.01	**0.02**	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.0027	-	0.0012	<0.02	<0.02	<0.02	<0.02	0.00033	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.01	-
Ammonia	mg/L	0.01		-	<0.02	0.04	0.03	<0.02	0.17	0.05	-	0.05	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.01	0.03	0.04	0.04	0.01	0.05	0.04	0.04	0.03	0.04	0.03
Nitrate (as N)	mg/L	0.05		<0.25	<0.05	0.2	<0.05	<0.05	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.11	<0.05
Nitrite (as N)	mg/L	0.05		<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.73	0.72	7.7	0.63	0.96	0.73	1.39	2.09	0.62	0.68	1.95	0.94	0.34	1.57	1.17	0.5	0.9	1.2	1.1	0.5	0.8	0.7	1.1	0.7	1.5	1.3
Colour	TCU	2		37	49	101	128	79	82	60	71	98	35	65	57	35	65	82	53	46	105	63	52	160	43	60	38	94	150
Conductivity (lab)	µS/cm	1		262	225	259	184	300	414	324	320	242	216	339	271	226	287	321	340	281	489	279	405	347	202	312	238	296	262
pH (Lab)	-		**6.5-8.5**	7.79	8	7.58	7.28	7.32	7.42	7.93	7.8	7.65	7.49	7.96	7.57	7.9	7.5	8.12	7.86	7.65	7.85	7.85	7.94	7.54	7.01	7.64	7.59	7.63	7.59
Field																													
DO (Field)	mg/L		**5-50**	-	-	-	-	-	-	-	-	-	-	-	-	11.01	10.53	9.18	9.53	12.35	**1.5**	9.12	**4.3**	**2.41**	**3.18**	7.35	9.52	**4.68**	**3.64**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	145	62	7	118	136	113	118	70	160	188
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	-	-	-	7.3	19.5	4.9	15.5	17.5	8.6	24.4	23.6	1.6	3.6	25.1	5	21.9	4.9
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	-	-	-	250	234	319	380	-	470	260	470	350	190	350	310	320	188
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	-	-	-	8.45	7.56	**8.77**	7.27	7.07	7.43	7.47	7.73	7.19	7.51	6.92	7.3	7.01	7.25
Turbidity	NTU	0.1		3.8	0.9	-	2.6	-	-	4.5	13.9	7	3.2	8.4	10.3	0.9	3.8	7.7	1.4	3.3	2.6	15	6.9	18.5	1.4	1.9	0.8	4.1	1.5

Table 6 - Surface Water Quality

	Unit	RDL	PWQO	SW3 2012-05-07	SW3 2012-11-13	SW3 2013-05-31	SW3 2013-12-03	SW3 2014-11-04	SW3 2016-04-28	SW3 2016-07-28	SW3 2016-10-28	SW3 2017-06-06	SW3 2019-04-16	SW3 2020-04-21
Metals														
Aluminium	µg/L	10		10	9	10	7	9	5	13	<4	60	50	-
Aluminium (Filtered)	µg/L	10	**15|75**	-	-	-	-	-	-	-	-	-	-	30
Arsenic	µg/L	0.1	**5**	<3	<3	<3	<3	<3	<3	<3	<3	0.5	0.2	0.2
Barium	µg/L	1		21	31	40	912	24	24	105	84	27	21	12
Boron	µg/L	5	**200**	<10	22	17	21	12	12	16	13	18	8	9
Cadmium	µg/L	0.02	**0.1|0.5**	<1	<1	<0.1	**0.6**	<0.1	<0.1	<0.1	<0.1	<0.014	<0.015	<0.015
Chloride	µg/L	500		91,100	273,000	193,000	82,900	131,000	99,000	236,000	204,000	41,600	58,700	57,100
Chromium (III+VI)	µg/L	1	**8.9**	3	<3	<3	<3	<3	<3	7	<3	2	<1	<1
Cobalt	µg/L	0.1	**0.9**	<1	<1	**1.2**	**24.8**	0.6	<0.5	**2.7**	**1.9**	<5	0.5	0.2
Copper	µg/L	0.1	**1|5**	<2	<2	<2	**34**	<2	<2	**6**	<2	0.5	0.8	0.4
Iron	µg/L	5	**300**	**509**	**330**	**2190**	**39,900**	**1510**	**1970**	**11,900**	**17,500**	**1130**	**459**	**606**
Lead	µg/L	0.02	**1|3|5**	<2	<2	<2	<2	<2	<2	3	<2	0.02	0.03	0.03
Mercury	µg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	<0.02	<0.02
Nickel	µg/L	10	**25**	<3	<3	<3	<3	<3	<3	<3	<3	<10	<10	<10
Phosphorus total (P2O5)	µg/L	10	**30**	**54**	30	**37**	**65**	**120**	**143**	**379**	**320**	**60**	**180**	**40**
Selenium	µg/L	1	**100**	<4	<4	<4	<4	<4	<4	4	<4	<1	<1	<1
Silver	µg/L	0.1	**0.1**	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.1	<0.1
Zinc	µg/L	5	**20**	**52**	9	10	**229**	<5	7	**22**	6	**94**	15	5
Inorganics														
Alkalinity (as CaCO3)	mg/L	5		170	235	228	221	260	140	373	377	164	125	117
Hardness (as CaCO3)	mg/L	1		205	347	333	248	236	170	436	398	198	165	164
Solids - Total Dissolved (TDS)	mg/L	1		392	816	692	372	470	300	792	738	266	235	213
Oxygen Demand - Chemical (COD)	mg/L	5		18	24	27	2380	26	25	69	64	32	25	18
Solids - Total Suspended (TSS)	mg/L	3		<10	<10	31	5120	15	36	80	148	24	8	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2		10.2	8	9.9	9.4	8.6	8.5	27.7	20.3	14.5	8.7	7.4
Oxygen Demand - Biological (BOD)	mg/L	3		<5	<5	<5	59	<5	<5	<5	7	<2	<3	<3
Phenols (4AAP)	mg/L	0	**0.001**	<0.001	<0.001	0.001	**0.014**	<0.001	<0.001	<0.001	<0.001	**0.01**	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		2.71	20.1	3.34	7.07	1.49	3.58	0.72	1.14	<1	3	3
Ammonia, Unionized (as N)	mg/L	0.01	**0.02**	<0.02	<0.02	<0.02	**0.04**	0.0046	<0.02	0.0081	0.0012	<0.005	<0.01	-
Ammonia	mg/L	0.01		<0.02	<0.02	<0.02	1.05	0.06	<0.02	0.2	<0.02	0.02	0.06	0.02
Nitrate (as N)	mg/L	0.05		<0.05	0.12	<0.1	0.043	<0.25	<0.05	<0.25	<0.25	<0.05	<0.05	0.08
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.1	<0.25	<0.25	<0.05	<0.25	<0.25	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.44	0.51	0.64	29.5	0.38	0.63	1.7	0.93	0.5	1.1	0.4
Colour	TCU	2		37	26	39	35	34	33	45	23	48	30	27
Conductivity (lab)	µS/cm	1		607	1140	1020	725	893	523	1390	1270	484	455	413
pH (Lab)	-		**6.5-8.5**	8.24	7.97	7.84	7.76	8.18	8.01	7.86	8.07	7.99	7.48	7.71
Field														
DO (Field)	mg/L		**5-50**	-	-	-	-	-	12.07	**4.78**	5.89	9	**4.24**	10.57
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	98	152	54
Temp (Field)	°C			-	-	-	-	-	16.9	22.2	5	13.7	6.7	6.1
Conductivity (field)	µS/cm			-	-	-	-	-	895	1097	953	550	500	480
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	7.74	7.4	8.22	7.57	7.57	8.3
Turbidity	NTU	0.1		1	15	-	-	9.5	26.3	81.3	87.2	5.3	2.7	2.3

Table 6 - Surface Water Quality

	Unit	RDL	PWQO	SW4 2012-05-07	SW4 2012-07-31	SW4 2012-11-13	SW4 2013-05-31	SW4 2013-12-03	SW4 2014-06-10	SW4 2014-08-11	SW4 2014-11-04	SW4 2015-04-16	SW4 2015-07-31	SW4 2015-10-28	SW4 2016-04-28	SW4 2016-07-28	SW4 2016-10-28	SW4 2017-06-06	SW4 2017-07-26	SW4 2017-10-02	SW4 2018-05-29	SW4 2018-07-25	SW4 2018-11-12	SW4 2019-04-16	SW4 2019-07-17	SW4 2020-04-21	SW4 2020-07-08	SW4 2020-11-12
Metals																												
Aluminium	µg/L	10		9	20	8	11	<4	11	<4	<4	<4	<4	<4	<4	13	<4	40	20	30	50	30	40	20	-	-	-	-
Aluminium (Filtered)	µg/L	10	15|75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	30	30	40
Arsenic	µg/L	0.1	5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	0.3	0.3	0.3	0.7	0.3	0.2	0.2	0.4	0.2	0.6	0.3
Barium	µg/L	1		47	34	46	30	25	29	30	25	24	29	24	24	30	22	35	30	27	40	40	26	21	31	23	33	32
Boron	µg/L	5	200	<10	<10	<10	14	<10	<10	26	<10	<10	<10	<10	12	<10	<10	19	7	8	<5	19	5	<5	9	7	11	10
Cadmium	µg/L	0.02	0.1|0.5	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014	<0.014	<0.015	0.063	<0.015	0.016	<0.015	<0.015	<0.015	<0.015
Chloride	µg/L	500		4760	4910	7530	5650	2520	2220	2580	3170	3420	3220	4480	3370	1760	2930	1700	2100	3400	1600	2100	3100	2600	2300	3300	2100	3400
Chromium (III+VI)	µg/L	1	8.9	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	0.1	0.9	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	µg/L	0.1	1|5	<2	3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.3	0.3	<0.1	0.2	2.1	0.4	0.8	0.2	0.4	0.6	0.5
Iron	µg/L	5	300	0	1440	24	18	<10	<10	410	<10	<10	46	20	<10	34	<10	41	40	51	66	101	27	39	97	24	148	78
Lead	µg/L	0.02	1|3|5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.04	<0.02	<0.02	0.04	0.33	0.03	0.16	0.04	0.04	0.09	<0.02
Mercury	µg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	-	-	-	-	-
Mercury (Filtered)	µg/L	0.02	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel	µg/L	10	25	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus total (P2O5)	µg/L	10	30	25	210	<20	8	7	12	15	49	11	15	12	11	6	<6	10	10	<10	<10	20	10	<10	20	<10	20	<10
Selenium	µg/L	1	100	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	µg/L	0.1	0.1	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	µg/L	5	20	<5	9	<5	10	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	50	<5	<5	30	18	13	10	8	5	<5	10
Inorganics																												
Alkalinity (as CaCO3)	mg/L	5		157	92	125	120	136	128	187	122	108	125	100	104	130	115	119	130	134	117	107	122	92	128	123	139	129
Hardness (as CaCO3)	mg/L	1		163	73	165	130	146	136	191	122	114	138	122	106	135	112	131	125	132	136	127	129	95	146	120	159	149
Solids - Total Dissolved (TDS)	mg/L	1		186	124	212	180	146	154	212	148	152	162	122	128	126	138	134	146	152	116	118	128	104	133	111	145	139
Oxygen Demand - Chemical (COD)	mg/L	5		7	49	24	16	12	25	6	27	10	23	20	5	15	17	12	24	26	18	24	16	5	20	13	25	22
Solids - Total Suspended (TSS)	mg/L	3		<10	103	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	3	<3	4	<3	<3	5	3	<3	<3	<3	<3
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2		5.1	5.5	8.4	6.2	5.3	6.3	3.7	6.6	4.2	9.7	9.6	5.7	11.5	9.1	6.9	7.9	8.6	8.3	11.1	9.5	4.6	9.2	4.9	10.9	8.2
Oxygen Demand - Biological (BOD)	mg/L	3		<5	7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	2	<2	<2	<2	5	<3	<3	<3	<3	<3
Phenols (4AAP)	mg/L	0	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.007	<0.001	0.004	<0.001	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		6.82	17.1	38	10.8	7.26	3.19	4.99	5.74	6.96	2.72	11.1	7.28	1.46	3.79	3	2	2	2	3	6	5	<1	5	1	5
Ammonia, Unionized (as N)	mg/L	0.01	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0014	0.0018	-	<0.02	0.0014	<0.02	0.0002	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.01	-
Ammonia	mg/L	0.01		<0.02	0.22	<0.02	<0.02	0.04	0.04	-	0.04	-	<0.02	0.07	<0.02	<0.02	<0.02	<0.01	0.02	0.03	0.02	0.01	0.03	0.03	0.06	0.02	0.05	0.02
Nitrate (as N)	mg/L	0.05		<0.05	0.32	<0.05	<0.1	0.08	<0.05	<0.05	<0.05	0.15	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	0.08	0.12	<0.05
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.18	1.95	0.35	0.64	0.12	0.5	<0.1	0.2	0.16	0.44	0.46	0.22	0.53	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.2	0.5	0.4
Colour	TCU	2		26	37	37	44	22	40	18	42	21	61	47	28	74	49	33	42	38	38	56	30	17	49	18	48	35
Conductivity (lab)	µS/cm	1		307	239	309	258	289	252	404	258	239	260	227	212	256	233	244	265	276	227	231	250	205	260	218	283	272
pH (Lab)	-		6.5-8.5	8.09	7.81	8	7.67	7.92	8.09	8.02	7.93	7.92	8.06	7.53	7.53	7.64	7.99	8.07	7.92	8.2	8.08	7.9	7.86	7.79	7.97	7.69	7.91	7.94
Field																												
DO (Field)	mg/L		5-50	-	-	-	-	-	-	-	-	-	-	-	10.41	6.82	10.72	9.17	7.64	9.77	7.52	6.3	10.21	9.22	8.16	9.99	6.22	9.45
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	152	148	68	106	125	135	117	61	173	248
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	-	-	10.4	18.8	5.4	15.2	18.1	7.8	23.3	22.2	2.5	5.3	22.6	5.5	21.3	7.2
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	-	-	235	214	399	260	260	300	240	270	310	220	320	320	320	207
pH (Field)	-		6.5-8.5	-	-	-	-	-	-	-	-	-	-	-	8.33	8.01	8.52	7.64	7.27	8.08	7.86	7.62	8.08	7.93	7.25	7.77	7.25	7.75
Turbidity	NTU	0.1		<0.5	-	1.9	-	-	0.8	1.7	0.7	<0.5	1.6	0.7	0.6	<0.5	0.8	0.5	0.6	0.9	0.9	1.5	0.4	0.5	0.5	0.4	1.6	2.4

Table 6 - Surface Water Quality

	Unit	RDL	PWQO	SW5 2012-05-07	SW5 2012-07-31	SW5 2012-11-13	SW5 2013-05-31	SW5 2013-12-03	SW5 2014-06-01	SW5 2014-08-11	SW5 2014-11-04	SW5 2015-04-16	SW5 2015-07-31	SW5 2015-10-28	SW5 2016-04-28	SW5 2016-07-28	SW5 2016-10-28	SW5 2017-06-06	SW5 2017-07-26	SW5 2017-10-02	SW5 2018-05-29	SW5 2018-07-25	SW5 2018-11-12	SW5 2019-04-16	SW5 2019-07-17	SW5 2020-04-21	SW5 2020-07-08	SW5 2020-11-12
Metals																												
Aluminium	µg/L	10		6	18	7	10	<4	<40	<4	<4	<4	<4	<4	<4	10	<4	30	20	30	40	30	30	30	-	-	-	-
Aluminium (Filtered)	µg/L	10	**15|75**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	30	20	40
Arsenic	µg/L	0.1	**5**	<3	<3	<3	<3	<3	<30	<3	<3	<3	<3	<3	<3	<3	<3	0.3	0.4	0.4	0.5	0.4	0.1	0.2	0.7	0.1	0.9	0.2
Barium	µg/L	1		32	90	22	30	23	32	43	22	22	35	23	24	39	22	34	33	30	33	45	18	22	44	23	51	26
Boron	µg/L	5	**200**	<10	<10	<10	13	<10	28	<10	<10	<10	<10	<10	16	<10	<10	18	5	8	<5	22	<5	<5	8	6	10	7
Cadmium	µg/L	0.02	**0.1|0.5**	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014	<0.014	<0.015	0.077	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Chloride	µg/L	500		4150	3170	5090	3620	3140	2920	2780	4540	4110	3420	7470	4150	2480	5000	2100	2300	5700	2200	3200	4000	3700	2900	4100	2500	4100
Chromium (III+VI)	µg/L	1	**8.9**	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	0.1	**0.9**	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.1	<0.1	0.1	0.1	<0.1	0.2	<0.1
Copper	µg/L	0.1	**1|5**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.2	<0.1	<0.1	0.1	2.8	0.2	0.3	0.1	0.3	0.5	0.2
Iron	µg/L	5	**300**	28	**7220**	0	51	<10	64	183	<10	<10	177	227	<10	139	<10	42	141	179	91	173	18	53	**428**	33	**884**	54
Lead	µg/L	0.02	**1|3|5**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<0.02	<0.02	<0.02	0.02	1.12	<0.02	<0.02	0.05	<0.02	0.08	<0.02
Mercury	µg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	-	-	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel	µg/L	10	**25**	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus total (P2O5)	µg/L	10	**30**	28	**320**	<20	6	13	14	19	29	18	27	24	8	**33**	7	10	10	<10	<10	20	<10	<10	30	<10	**50**	<10
Selenium	µg/L	1	**100**	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	µg/L	0.1	**0.1**	<2	<2	<2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	µg/L	5	**20**	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	**54**	<5	10	<5	**33**	15	10	7	9	<5	11
Inorganics																												
Alkalinity (as CaCO3)	mg/L	5		127	140	95	125	138	135	155	116	105	157	112	116	149	123	123	141	147	123	113	111	91	147	98	159	122
Hardness (as CaCO3)	mg/L	1		130	145	118	137	148	140	166	118	110	166	115	108	151	120	132	138	140	127	138	108	100	170	115	169	148
Solids - Total Dissolved (TDS)	mg/L	1		142	192	156	126	140	192	192	130	140	188	130	124	160	152	141	160	172	131	126	120	107	153	112	164	137
Oxygen Demand - Chemical (COD)	mg/L	5		22	65	30	24	14	20	19	26	<5	27	31	9	18	18	19	23	29	23	29	19	13	23	11	30	5
Solids - Total Suspended (TSS)	mg/L	3		<10	143	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	22	<10	<3	<3	3	<3	<3	5	<3	<3	<3	12	<3
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2		6.3	10.6	9	6.9	5.9	6.8	8.8	6.3	4.3	11	10.3	5.3	11.4	9.8	7.1	9.1	10.4	9.3	13.9	8.9	5	11.2	5.3	13.3	7.1
Oxygen Demand - Biological (BOD)	mg/L	3		<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	5	<3	<3	<3	3	<3
Phenols (4AAP)	mg/L	0	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	**0.006**	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		5.07	2.05	23.3	4.14	7.57	1.15	0.66	5.28	6.47	0.52	4.47	6.72	1.22	3.15	2	1	1	<1	3	6	4	<1	6	1	5
Ammonia, Unionized (as N)	mg/L	0.01	**0.02**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0019	0.00095	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.01	-
Ammonia	mg/L	0.01		<0.02	0.06	<0.02	<0.02	0.03	-	-	0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.03	0.02	0.01	0.03	0.03	0.05	0.01	0.06	0.03
Nitrate (as N)	mg/L	0.05		<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	<0.05	<0.05	<0.05	0.06	0.1	<0.05
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.47	3.2	0.8	0.82	0.14	0.56	0.28	0.2	0.14	0.45	0.54	0.2	0.57	0.36	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.5	0.2	0.6	0.3
Colour	TCU	2		37	64	47	51	20	42	50	34	22	60	44	27	61	43	33	43	40	42	64	24	18	52	17	48	29
Conductivity (lab)	µS/cm	1		253	261	232	265	298	274	320	253	233	315	237	211	294	256	257	291	312	257	246	235	209	298	219	320	268
pH (Lab)	-		**6.5-8.5**	8.14	7.74	7.96	7.76	7.86	8.1	8.01	7.96	7.67	8.03	7.59	7.95	7.83	7.98	8.02	7.73	7.9	7.96	7.76	7.69	7.84	7.86	7.76	7.84	7.89
Field																												
DO (Field)	mg/L		**5-50**	-	-	-	-	-	-	-	-	-	-	-	10.28	5.69	8.49	7.5	**4.82**	**3.95**	**4.18**	**4.4**	9.99	10.21	**4.75**	11	**3.32**	6.8
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	-	-	-	-	-	84	148	154	73	97	270	150	121	69	192	266
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	-	-	4	15.6	5.2	14.3	17.2	8.5	21.7	20.9	1.2	3.4	21.1	4.8	21.3	6.4
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	-	-	235	253	239	280	-	330	240	280	130	240	370	260	390	189
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	-	-	8.3	7.71	8.42	7.44	7.45	7.27	7.48	7.65	7.34	7.5	6.95	8.17	6.95	7.33
Turbidity	NTU	0.1		<0.5	-	0.9	-	-	<0.5	<0.5	<0.5	0.8	1.2	<0.5	883	4.9	1.8	0.3	0.6	0.5	0.7	1	0.3	0.5	1	0.4	2.2	0.4

Table 6 - Surface Water Quality

	Unit	RDL	PWQO	SW6 2013-12-03	SW6 2014-06-01	SW6 2014-11-04	SW6 2016-04-28	SW6 2016-07-28	SW6 2016-10-28	SW6 2017-06-06	SW6 2017-07-26	SW6 2017-10-02	SW6 2018-05-29	SW6 2018-07-25	SW6 2018-11-12	SW6 2019-04-16	SW6 2019-07-17	SW6 2020-04-21
Metals																		
Aluminium	µg/L	10		7	6	5	5	13	<4	70	40	70	60	620	60	40	-	-
Aluminium (Filtered)	µg/L	10	**15|75**	-	-	-	-	-	-	-	-	-	-	-	-	-	70	30
Arsenic	µg/L	0.1	**5**	<3	<3	<3	<3	<3	<3	0.4	0.5	0.6	0.7	1.3	0.3	0.3	0.6	0.2
Barium	µg/L	1		20	16	17	11	25	13	18	15	26	15	36	14	11	19	12
Boron	µg/L	5	**200**	11	14	12	15	15	15	21	14	15	9	33	10	7	20	13
Cadmium	µg/L	0.02	**0.1|0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.014	<0.014	<0.014	0.017	0.103	<0.015	0.018	0.016	<0.015
Chloride	µg/L	500		7310	6150	15,300	10,300	4660	9930	7100	6000	7700	8500	4900	14,300	14,200	5300	9600
Chromium (III+VI)	µg/L	1	**8.9**	<3	<3	<3	<3	<3	<3	2	**11**	<1	<1	2	<1	<1	<1	<1
Cobalt	µg/L	0.1	**0.9**	0.8	<0.5	<0.5	<0.5	0.5	<0.5	<5	<5	<5	**14**	0.8	0.2	0.1	0.2	<0.1
Copper	µg/L	0.1	**1|5**	4	2	<2	<2	2	<2	1	0.8	0.5	1	**5.6**	1	1.4	1.5	0.9
Iron	µg/L	5	**300**	**322**	194	266	<10	**533**	<10	53	54	248	33	**1010**	111	95	216	37
Lead	µg/L	0.02	**1|3|5**	<2	<2	<2	<2	<2	<2	0.03	0.02	0.03	<0.02	1.1	0.04	0.13	0.13	0.03
Mercury	µg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02	0.14	<0.02	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02
Nickel	µg/L	10	**25**	<3	<3	<3	<3	<3	<3	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phosphorus total (P2O5)	µg/L	10	**30**	**54**	**77**	**109**	18	**76**	7	30	10	20	20	**210**	10	20	30	<10
Selenium	µg/L	1	**100**	<4	<4	<4	<4	<4	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	µg/L	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	µg/L	5	**20**	<5	<5	<5	<5	5	<5	**39**	<5	**25**	6	**25**	**23**	7	5	9
Inorganics																		
Alkalinity (as CaCO3)	mg/L	5		171	171	199	130	210	184	149	181	195	164	194	162	106	196	121
Hardness (as CaCO3)	mg/L	1		177	176	191	131	195	181	155	181	209	160	210	176	124	212	141
Solids - Total Dissolved (TDS)	mg/L	1		177	198	244	164	238	220	175	208	226	177	210	182	141	207	145
Oxygen Demand - Chemical (COD)	mg/L	5		27	37	23	13	73	13	16	14	16	25	23	19	11	29	11
Solids - Total Suspended (TSS)	mg/L	3		12	80	57	<10	320	<10	4	6	13	7	70	52	9	12	6
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2		5.4	5.7	4.9	6	10.8	6.6	7.8	6.4	7.1	7.3	9.8	8.7	5.6	7.9	5.9
Oxygen Demand - Biological (BOD)	mg/L	3		<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	4	<3	<3	<3
Phenols (4AAP)	mg/L	0	**0.001**	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	**0.004**	<0.001	<0.001	<0.001	0.001	**0.005**	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		7.07	4.48	5.94	5.57	1.06	5.02	2	3	2	3	1	5	4	1	6
Ammonia, Unionized (as N)	mg/L	0.01	**0.02**	**0.03**	0.004	0.0021	<0.02	<0.02	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
Ammonia	mg/L	0.01		0.36	0.05	0.03	<0.02	<0.02	<0.02	<0.01	0.08	0.03	0.02	0.02	0.03	0.03	0.03	0.01
Nitrate (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	0.07
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.84	0.85	0.5	0.19	0.87	0.23	0.4	0.3	0.3	0.3	1.3	0.3	0.4	0.3	0.2
Colour	TCU	2		18	18	18	23	26	19	25	17	18	18	27	20	18	20	12
Conductivity (lab)	µS/cm	1		371	363	436	269	417	382	319	379	411	345	408	353	276	402	283
pH (Lab)	-		**6.5-8.5**	8.11	8.13	8.14	8.16	7.99	8.28	8.22	8.1	8.13	8.2	7.99	7.95	7.99	8.05	7.94
Field																		
DO (Field)	mg/L		**5-50**	-	-	-	12.52	6.06	11.25	10.45	9.34	7.79	8.93	**4.7**	10.58	10.98	6.89	11.72
Redox Potential (Field)	mV			-	-	-	-	-	-	5	150	97	17	113	121	111	133	41
Temp (Field)	°C			-	-	-	4	15.6	5.2	12.5	15.7	9.4	15.9	18.8	3.5	3.8	19	2.7
Conductivity (field)	µS/cm			-	-	-	293	334	370	330	390	410	310	410	400	310	410	340
pH (Field)	-		**6.5-8.5**	-	-	-	**8.55**	7.22	**8.75**	8.07	6.57	7.82	7.88	7.6	7.77	7.78	7.18	7.87
Turbidity	NTU	0.1		-	3.7	21.3	2.1	53.9	<0.5	0.6	3.2	3.6	2.3	22.5	0.9	1.8	3	0.5

Table 7 - Monthly Accepted and Transferred

Quantity accepted at the Site, as recorded on daily incoming waste forms

Month	Vehicles	Total Garbage Bags	Bulky Waste (yd^3)	Shingles & Drywall (yd^3)	Major Appliances without Freon (quantity)	Major Appliances with Freon (quantity)	Reuse Centre Bins (40 yd - quantity)	Brush (tonnes)	Tires[1] (quantity)	Alcohol Containers[2] (quantity)
January	334	452	-	-	-	-	-	-	-	-
February	348	488	-	-	-	-	-	-	-	-
March	483	671	-	-	-	-	-	-	-	-
April	693	956	-	-	-	-	-	-	-	-
May	1,029	1,312	-	-	-	-	-	-	-	-
June	1,227	1,509	-	-	-	-	-	-	-	-
July	1,634	2,030	-	-	-	-	-	-	-	-
August	1,870	2,398	-	-	-	-	-	-	-	-
September	1,329	1,632	-	-	-	-	-	-	-	-
October	952	1,170	-	-	-	-	-	-	-	-
November	664	890	-	-	-	-	-	-	-	-
December	553	712	-	-	-	-	-	-	-	-
Annual Total	**11,116**	**14,220**	**-**	**-**	**-**	**-**	**-**	**22**	**257**	**28,125**

Quantity reported to be removed from the Site, transported/processed as noted

Month	Waste[3] (tonnes)	Loads[3]	C&D Materials[4] (tonnes)	Containers[5] (tonnes)	Fibres[5] (tonnes)	Furniture[6] (tonnes)	Scrap Metals & White Goods[7] (tonnes)	WEEE[8] (tonnes)	MHSW[9] (tonnes)	MHSW Event Day[10] (tonnes)	Empty Oil/Anti Freeze Containers[11] (tonnes)	Textiles[12] (tonnes)	Durable Plastics[13] (tonnes)
January	3.94	1	-	1.96	2.61	-	-	-	-	-	-	-	-
February	4.16	1	-	1.72	1.74	-	-	-	-	-	-	-	-
March	8.78	2	-	1.16	1.93	-	-	-	-	-	-	-	-
April	8.06	2	-	2.26	1.47	-	-	-	-	-	-	-	-
May	7.98	2	9.66	2.22	3.14	-	-	-	-	-	-	-	-
June	8.91	2	-	3.67	2.81	-	-	-	-	-	-	-	-
July	22.45	5	-	4.85	4.37	-	-	-	-	-	-	-	-
August	23.88	4	-	4.87	4.01	-	-	3.82	-	-	0.15	-	-
September	19.38	4	-	4.22	3.18	-	-	-	-	-	-	-	-
October	12.92	3	35.21	2.04	4.92	-	-	-	-	-	-	-	-
November	9.42	2	-	1.99	2.36	-	-	-	-	-	-	-	-
December	7.09	2	-	1.99	2.99	-	-	3.85	-	-	-	-	-
Annual Total	**136.97**	**30**	**44.87**	**32.95**	**35.53**	**-**	**26.92**	**7.67**	**2.17**	**-**	**0.15**	**0.19**	**-**

Notes:

1. Transferred off-site to retire your tire

2. Transferred off-site by Community Living to the Beer Store

3. Scaled weights from the Bensfort Road Waste Disposal Site

4. Transported by Kawartha Disposal to Waste Connections for processing

5. Transported by Emterra to Peterborough Materials Recovery Facility for processing by HGC

6. Collected at all MTL transfer stations, transferred to the Peterborough Waste Management Facility

7. Transported by Kawartha Disposal to Kings Auto Wreckers

8. Transported and processed by Quantum Life Cycle LPP on contract with the County of Peterborough

9. Limited MHSW collected at all transfer sites, including batteries (Call 2 Cycle), flourscent tubes (Photech), empty oil/anitfreeze containers (Pnweko), and car batteries (Photech)

10. Event Cancelled in 2020 due to the COVID -19 pandemic

11. Transported and Processed by Pnewko on contract with the County of Peterborough

12. Transferred to the Diabetes Association and Jakes House

13. County Program cancelled in 2020 due to COVID-19 pandemic

Appendix A

Environmental Compliance Approval No. A341202

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A341202
Issue Date: January 10, 2017

The Corporation of the Municipality of Trent Lakes
760 Peterborough County Road 36
Trent Lakes, Ontario
K0M 1A0

Site Location: Crystal Lake Transfer Station
1018 Crystal Lake Road
Municipality of Trent Lakes, County of Peterborough

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a 12.53 hectare Waste Disposal Site comprised of a 1.2 hectare closed Landfill Site and associated attenuation zone, a Transfer Station for the receipt, temporary storage and transfer of solid, non-hazardous municipal waste, MHSW, WEEE and organic waste.

For the purpose of this environmental compliance approval, the following definitions apply:

a. " ***Approval*** " means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A";

b. "***clean wood***" means waste that is wood or a wood product, including tree trunks and tree branches greater than 7 cm in diametre, that is not contaminated with chromated copper arsenate, ammoniacal copper arsenic pentachlorophenol or creosote, is not part of an upholstered article, is not painted or stained, has minimal adhesive content, does not have an affixed or adhered rigid surface and from which hardware or fittings have been removed;

c. "***construction and demolition waste***" means solid, non-hazardous waste, excluding soil, produced from the construction, renovation or demolition of an industrial, commercial, institutional or residential building;

d. "***Director***" means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the *EPA* as a Director for the purposes of Part II.1 of the *EPA;*

e. "***District Manager***" means the District Manager of the local district office of the *Ministry* for the geographic area in which the *Site* is located;

f. "***EPA***" means the *Environmental Protection Act,* R.S.O. 1990, C.E-19, as amended;

g. "***Landfill Site***" means the 1.2 hectare landfill area, as identified in Item 1, Schedule A, which was closed in 2002;

h. "***leaf and yard waste***" means waste plant materials including natural Christmas trees but excludes tree limbs or other woody materials in excess of 7 centimetres in diameter;

i. "***MHSW***" means Municipal Hazardous and/or Special Waste restricted to waste classes 121, 122,

148, 252 and 331, generated within the geographic boundaries of the Municipality of Trent Lakes;

j. "***Ministry***" and *"**MOECC**"* means the ministry of the government of Ontario responsible for the *EPA* and includes all officials, employees or other persons acting on its behalf;

k. "***Ontario Regulation 393/04***" means Ontario Regulation 393/04 Waste Electrical and Electronic Equipment made under the Waste Diversion Act 2002;

l. "***Ontario Regulation 463/10***" means Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons, made under the *EPA;*

m. "***Operator***" means any person, other than the *Owner's* employees, authorized by the *Owner* as having the charge, management or control of any aspect of the *Site;*

n. "***Owner***" means The Corporation of the Municipality of Trent Lakes, and includes its officers, employees, agents and contractors;

o. "***OWRA***" means the *Ontario Water Resources Act,* R.S.O. 1990, c. O.40, as amended;

p. "***PA***" means the *Pesticides Act,* R.S.O. 1990, c. P-11, as amended from time to time;

q. "***Provincial Officer***" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* or section 17 of *PA;*

r. "***Transfer Station***" means the area of land identified as the proposed waste, *recyclable material, MHSW, WEEE* and organic waste transfer station as described in Item 1, Schedule "A";

s. "***recyclable material***" means solid, non-hazardous municipal waste that includes, but is not limited to, waste in one or more of the categories set out in *Ontario Regulation 101/94,* Schedules 1, 2 and 3;

t. "***Regulation 347***" means Regulation 347, R.R.O. 1990, General - Waste Management, made under the *EPA,* as amended from time to time;

u. "***Site***" means the 12.53 hectare property located at 1018 Crystal Lake Road, Municipality of Trent Lakes, legally described as part Lot 10, Concession XI, part Lot 11, Concession XI, Part 1, Plan 45R16252, Former Road Allowance Between Lots 10 and 11, Concession 11, Part 2, Plan 45R16252, Geographic Township of Galway, Municipality of Trent Lakes (former Township of Galway-Cavendish and Harvey), County of Peterborough and consisting of a 1.2 hectare *Landfill Site* and a *Transfer Station;* and

v. *"**WEEE**"* means a device that is a waste electrical or electronic equipment, that required an electric current to operate and includes household appliances, information technology equipment, telecommunications equipment, audio-visual equipment, toys, leisure equipment, sports equipment, electrical or electronic tool and instruments.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PART 1 - GENERAL

Revoke and Replace

1.1 This *Approval* revokes Provisional Certificates of Approval No. A341202, issued March 19, 1980, Notice No. 1 issued July 10, 2002, Notice No. 2 issued August 14, 2006 and Notice No. 3 issued June 11, 2009. The approval given herein, including the terms and conditions set out, replaces all previously issued approvals and related terms and conditions under Part V of the *EPA* for this *Site.*

Certificate of Requirement/Registration on Title

1.2 The *Owner* shall:

a. Within sixty (60) days of the date of the issuance of this *Approval,* submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site,* inclusive of the additional 2.53 hectares of land acquired by the *Owner* and added to the *Site;* and

b. Within 10 calendar days of receiving the Certificate of Requirement authorized by the *Director,* register the Certificate of Requirement in the appropriate Land Registry Office on title to the *Site* and submit to the *Director* and the *District Manager* duplicate registered copies immediately following registration.

1.3 Pursuant to Section 197 of the *EPA,* neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *Approval* to each person acquiring an interest in the *Site* as a result of the dealing.

Legal Requirements

1.4 The requirements specified in this *Approval* are the requirements under the *EPA.* The issuance of this *Approval* in no way abrogates the *Owner's* legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

1.5 The requirements of this *Approval* are severable. If any requirement of this *Approval,* or the application of any requirement of this *Approval* to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this *Approval* shall not be affected in any way.

1.6 The *Owner* shall ensure compliance with all the terms and conditions of this *Approval.* Any non-compliance constitutes a violation of the *EPA* and is grounds for enforcement.

1.7 a. The *Owner* shall, forthwith upon request of the *Director, District Manager* or *Provincial Officer*, furnish any information requested by such persons with respect to compliance with this *Approval,* including but not limited to, any records required to be kept under this *Approval;* and

b. In the event the *Owner* provides the *Ministry* with information, records, documentation or notification in accordance with this *Approval* (for the purposes of this condition referred to as "Information"),

i. the receipt of Information by the *Ministry;*

ii. the acceptance by the Ministry of the Information's completeness or accuracy; or

iii. the failure of the *Ministry* to prosecute the *Owner,* or to require the *Owner* to take any action, under this *Approval* or any statute or regulation in relation to the Information;

shall not be construed as an approval, excuse or justification by the *Ministry* of any act or omission of the *Owner* relating to the Information, amounting to non-compliance with this *Approval* or any statute or regulation.

Inspections

1.8 The *Owner* shall allow *Ministry* personnel, or a *Ministry* authorized representative(s), upon presentation of credentials, to:

a. carry out any and all inspections authorized by Section 156, 157 or 158 of the *EPA,* Section 15, 16 or 17 of the *OWRA,* or Section 19 or 20 of the *PA,* of any place to which this *Approval* relates; and,

b. without restricting the generality of the foregoing, to:
   i. enter upon the premises where the records required by the conditions of this *Approval* are kept;
   ii. have access to and copy, at reasonable times, any records required by the conditions of this *Approval;*
   iii. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this *Approval;* and
   iv. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this *Approval.*

Interpretation

1.9 a. Where there is a conflict between a provision of any document referred to in Schedule “A”, and the conditions of this *Approval,* the conditions in this *Approval* shall take precedence; and

b. Where there is a conflict between documents listed in Schedule “A”, the document bearing the most recent date shall prevail.

Notification Requirements

1.10 The *Owner* shall ensure that all communications/correspondence made pursuant to this *Approval* includes reference to the *Approval* number.

1.11 The *Owner* shall notify the *Director* in writing of any of the following changes within thirty (30) days of the change occurring:

a. a change in ownership of the *Site;*
b. appointment of, or a change in, an *Operator* of the *Site;*
c. change of address of the *Owner;*
d. change of partners where the *Owner* or *Operator* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the **Business Names Act**, 1991 shall be included in the notification to the *Director;*
e. any change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of Ontario Regulation 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the **Corporations Information Act** shall be included in the notification to the *Director;* and
f. change in directors or officers of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

1.12 In the event of any change in ownership of the *Site,* the *Owner* shall notify, in writing, the succeeding owner of the existence of this *Approval,* and a copy of such notice shall be forwarded to the *Director.*

Public Access to Information

1.13 Any information relating to this *Approval* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the **Freedom of Information and Protection of Privacy Act**, R.S.O. 1990, C. F-31.

Record Retention

1.14 All records and monitoring data required by the conditions of this *Approval* must be kept on the *Owner's* premises for a minimum period of two (2) years from the date of their creation.

Security

1.15 The *Site* shall be operated and maintained in a secure manner, such that unauthorized persons

cannot enter the *Site.*

PART 2 - LANDFILL SITE

Closure

2.1 The *Landfill Site* is hereby closed in accordance with Items 7 through 10 in Schedule "A".

2.2 The *Owner* shall take all necessary action to ensure that no additional waste is deposited in or on the *Landfill Site.*

Long Term Care and Monitoring Plan

2.3 The *Owner* shall perform the groundwater and surface water monitoring of the *Landfill Site* in accordance with recommendations discussed in Items 8 and 9 of Schedule "A".

2.4 Results of, and interpretation of, the monitoring program shall be included in the Annual Report required under Condition 5.1.

2.5 The *Owner* may make changes to the monitoring program in accordance with the recommendations of the annual report provided that the *District Manager* agrees, in writing, to such changes to the program.

Inspections

2.6 The *Owner* shall perform inspections of the *Landfill Site* in accordance with Item 7 in Schedule "A".

Stormwater Management

2.7 a. A detailed storm water management plan shall be included in the Closure and Long Term Care and Monitoring Plan for the *Landfill Site;* and

b. Storm water management controls constructed as part of the above plan shall be constructed in accordance with the *OWRA.*

PART 3 - TRANSFER STATION OPERATIONS

In Accordance

3.1 Except as otherwise provided by these conditions, the *Transfer Station* shall be located, constructed, used, maintained, operated, inspected, reported and closed, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Environmental Compliance Approval application dated May 10, 2016, and supporting documentation, and plans and specifications listed in Schedule "A".

Hours of Operation

3.2 a. The *Owner* shall set operational hours which provides an adequate level of service. The hours of operation shall be any day of the week, during daylight hours.

b. Hours of operation may be changed by the *Owner* at any time, provided that the hours are correctly posted at the *Site* gate, and that suitable public notice is given of any change.

c. The *Owner* shall notify the *District Manager,* in writing, of any changes to the hours of operation.

Approved Waste and Quantities

3.3 The *Transfer Station* shall only accept municipal waste limited to solid non-hazardous residential, industrial, commercial, institutional, *construction and demolition waste WEEE,* and *MHSW* from the Municipality of Trent Lakes located in the County of Peterborough.

3.4 The *Transfer Station* may receive up to 500 m3 of waste per day, of which a maximum of 20 m3 may be *MHSW.*

3.5 The total volumes of waste/materials stored at the *Transfer Station* at any one time shall not exceed:

a. municipal waste (non-segregated) 130 m3

b. recyclable materials 120.m3

c. tires 200 m3

d. white goods 200 m3

e. metal 200 m3

f. *leaf and yard waste* 200 m3

g. *construction and demolition waste* 200 m3

h. *MHSW* 50 m3

i. *WEEE* 30 m3

j. organic waste 0.75 m3

3.6 Further to Condition 3.5 h., the 50 m3 approved quantity of *MHSW* shall be further restricted as follows:

a. a maximum of 50 vehicular batteries;
b. a maximum of one 250 litre drum of lithium, dry cell and rechargeable batteries;
c. a maximum of one 250 litre capacity container for the bulk collection of empty motor oil containers;
d. a maximum of 50 units of fluorescent light bulbs.

3.7 All incoming waste shall be inspected prior to being received at the *Transfer Station* to ensure that the *Transfer Station* is approved to accept such waste.

Waste Storage

3.8 All recycling bins, roll-off containers and segregated waste storage areas shall be clearly marked showing the type of waste they are to contain.

3.9 The *Owner* will monitor segregated waste and reuse areas daily to remove unauthorized materials.

3.10 The *Owner* ensure that waste is stored in the following manner:

a. waste (non-segregated) shall be stored in designated bins;
b. recyclable materials shall be stored in designated bins;
c. *construction and demolition waste, clean wood,* bulky waste (including but not limited to furniture), tires, white goods and metal shall be stored in a designated concrete bunkers as shown on Item 13 of Schedule "A";
d. *leaf and yard waste* shall be stored in a designated area as shown on Item 13 of Schedule "A";

3.11 The *Owner* shall ensure that *MHSW* is stored as follows:

a. vehicles batteries shall be stored on pallets in a manner which protects them from the elements;
b. lithium, dry cell and rechargeable batteries shall be bulked into a 250 L plastic or metal drum, either bagged or with the terminal ends of each battery taped over or otherwise stored in a manner which prevents the terminal ends from touching;
c. empty motor oil containers shall be bulked into a 250 L plastic or metal drum;
d. fluorescent bulbs shall be stored in a rigid container in a manner which prevents the breakage of bulbs during storage and transport.

3.12 The *Owner* shall ensure that *WEEE* is stored as follows:

a. all *WEEE* shall be stored in a lockable, weather resistant shipping container to which the public does not have access;

b. all *WEEE* shall be stored either on gaylords positioned on pallets or directly on pallets;

c. pallets shall not be stacked and shall have a minimum separation distance of 0.9 metres between pallets;

d. waste stored directly on pallets shall be shrink wrapped before shipment off site.

3.13 White goods received at the *Transfer Station* which contain refrigerants shall:

a. be stored in an upright position and in such a manner to allow for the safe handling and removal from the *Site* for removal of refrigerants as required by *Ontario Regulation 463/10;* and

b. have refrigerants removed by a licensed technician in accordance with *Ontario Regulation 463/10,* or as amended prior to be transferred form the *Site;* or

c. shall be transferred only to facilities where the refrigerants can removed by a licensed technician in accordance with *Ontario Regulation 463/10.*

3.14 The *Owner* shall ensure that all bins used for emptying the organic waste underground containers, as described in Item 11 of Schedule "A", properly contain all organic waste placed inside.

Disposal

3.15 The *Owner* shall ensure that all wastes at the *Transfer Station* are managed and disposed in accordance with *Regulation 347,* and the *EPA.*

3.16 Disposal of waste from the *Transfer Station* shall be to the Peterborough County (Oton-1) Landfill Site.

Nuisance Control

3.17 The *Owner* shall ensure that the *Transfer Station* is operated in a safe and secure manner which minimizes the impacts of dust, odour, noise and litter on the general public, site personnel, and the natural environment.

3.18 The organics collection program shall be operated and maintained in such a manner that does not pose a danger or health risk to the environment or public.

Inspections

3.19 The *Owner* shall conduct daily inspections of the equipment and facilities at the *Transfer Station* to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in

a log, and promptly corrected.

Complaints

3.20 Complaints related to adverse effects received from the public or adjacent neighbours shall be recorded in a log book created and maintained for the purpose, and the *Owner* shall contact the *District Manager* forthwith, notifying him of the nature of the complaint and within seven (7) days of the receipt of the complaint, provide him with a written description of the complaint and the actions taken to address the concern(s).

Emergency Response

3.21 Copies of the Transfer Station Safety and Emergency Response Procedures, Item 5 of Schedule A and the Municipality of Trent Lakes Emergency Management Program (By-law B2016-138 dated December 20, 2016) shall be kept on the *Site* at all times, in a central location available to all staff.

3.22 The *Owner* shall review the Transfer Station Safety and Emergency Response Procedures on an annual basis, at a minimum, and update the document as required.

3.23 The *Owner* shall ensure that the contingency equipment and materials outlined in the Transfer Station Safety and Emergency Response Procedures and Emergency Management Program are immediately available on the *Site* at all times, in a good state of repair, and fully operational.

3.24 The *Owner* shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this *Transfer Station,* including the operation of the organic collection system. All spills, as defined in the *EPA,* shall be immediately reported to the *Ministry's* Spills Action Centre at 416-325-3000 or 1-800-268-6060.

3.25 All waste material resulting from a spill or process upset, shall be managed and disposed of in accordance with *Regulation 347.*

Training

3.26 The *Owner* shall ensure that all operating personnel are trained in the following at a minimum:

a. an outline of the responsibilities of the *Site* personnel;

b. terms, conditions and operating requirements of this *Approval;*

c. receiving and recording procedures (including recording procedures of wastes which are refused at the *Site);*

d. storage, handling, sorting and shipping procedures;

e. operation of equipment, equipment inspection and maintenance procedures and procedures to be followed in the event of equipment malfunction / process upset;

f. housekeeping and nuisance control procedures;

g. *Site* inspection procedures;

h. occupational health and safety concerns pertaining to the wastes received and handled;

i. procedures for recording and responding to public complaints;

j. procedures to be followed in the event of a spill, fire, medical or other emergency.

Closure

3.27 The *Owner* must submit, in writing to the *Director,* a notice stating the *Owner's* intent to close the

Transfer Station one (1) month prior to the closure of the *Transfer Station.* This notice must include an updated description of the work that will be done to facilitate closure and cleanup of the *Transfer Station* and a schedule for completion of the work.

3.28 Within ten (10) days after closure of the *Transfer Station,* the *Owner* must notify the *Director,* in writing, that the facility has been closed in accordance with the approved Closure Plan.

PART 4 - DOCUMENTATION

Record Keeping

4.1 The *Owner* shall maintain on-site a written record of daily inspections of the *Transfer Station.* This record shall be in the form of a Transfer Station Inspection daily log(s) and shall include as a minimum:

a. date and time of inspection;

b. name, title and signature of trained personnel supervising the inspection;

c. a listing of all equipment, fencing, gates, etc. inspected and any deficiencies observed;

d. any maintenance conducted as a result of these inspections;

e. recommendations for remedial action and date remedial action, if necessary, was completed;

f. date and time of any complaints received at the *Site* and their nature; and

g. date and time of any environmentally significant incidents.

4.2 The *Owner* shall maintain a daily written record of the waste received at the *Transfer Station,* and the waste transferred from the *Transfer Station.* This record shall be in the form of a daily log(s) and shall include as a minimum the date, quantity and source of waste received and date, quantity and the destination of material removed/transferred from the *Site.*

4.3 The *Owner* shall maintain a daily written record of the *recyclable material* received at the *Transfer Station,* and the *recyclable material* transferred from the *Transfer Station.* This record shall be in the form of a daily log(s) and shall include as a minimum the date, quantity and source of *recyclable material* received and date, quantity and the destination of *recyclable material* removed/transferred from the *Site.*

4.4 The *Owner* shall maintain a written record of the *MHSW* received at the *Transfer Station,* and transferred from the *Transfer Station.* This record shall be in the form of daily log(s) and shall include as a minimum date, waste class, quantity, and source of *MHSW,* date, quantity, waste class and the destination of *MHSW* transferred from the *Site.*

4.5 For white goods which contain refrigerants, the *Owner* shall record the following additional information:

a. date of the record;

b. types, quantities and source of white goods which contain refrigerants received;

c. destination of the white goods; or

d. the details on removal of refrigerants, if conducted on *Site,* and the quantities and destination of the refrigerants transferred from the *Site.*

4.6 With respect to the organics collection, the *Owner* shall retain a record of the following information:

a. date the containers are emptied;

b. approximate volume transferred to the collection truck per load; and

c. a record of any spills that occur during emptying and a description outlining any remediation measures that were implemented.

4.7 The *Owner* shall record the details of any spills or upsets that occur at the *Site,* including, but not limited to, the following:

a. the date;

b. the nature of the spill or upset; and

c. the action taken for clean-up, correction and prevention of future occurrences.

Design and Operations Manual

4.8 The *Owner* shall have in place a Site Operation and Maintenance Manual outlining the *Site* operating procedures, as permitted by this *Approval* and defined by Condition 3.1. This manual shall include, but not be limited to:

a. incoming waste inspection procedures, including the follow-up on unacceptable waste delivered to the *Site;* and

b. *Site* operation and maintenance procedures, as described in the supporting documentation listed in Schedule "A" or as required by conditions of this *Approval;*

c. schedule for inspections at the *Site,* including outdoor storage facilities;

d. waste and recyclable materials handling and storage procedures;

e. *Site* clean-up schedule and proposed clean-up activities; and

f. contingency plans outlining a set of procedures to follow in the event of an operational disruption.

4.9 a. The *Owner* shall review the Site Operations and Maintenance Manual on an annual basis, at a minimum to ensure that it reflects current practices, and update it as necessary; and

b. Applications to amend this *Approval* shall include submission of the most current version of the Site Operation and Maintenance Manual.

PART 5 - REPORTING REQUIREMENT

Annual Report - Landfill Site

5.1 By July 1st of each year, the *Owner* shall submit an annual report to the *District Manager* concerning the status of the *Landfill Site* during the preceding calendar year. The annual report shall include the following:

a. the results, and an interpretive analysis of the results, of the surface waste, groundwater and landfill gas monitoring;

b. a summary of the inspections of the *Landfill Site* undertaken;

c. recommendations respecting any proposed changes to the groundwater or landfill gas monitoring programs;

d. recommendations on the requirements for any remedial work or contingency activities based on the monitoring results;

e. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903– R.R.O. 1990, Wells, amended to Ontario Regulation 128/03, made under the *OWRA;* and

f. any other information with respect to the *Site* which the *District Manager* may require from time to time.

5.2 In the event that the results of the monitoring program are such that an off-site exceedance of *Guideline B-7 – Incorporation of the Reasonable Use Concept Into MOEE Groundwater Management Activities (MOE, 1994),* or background groundwater chemistry for the *Site,* can reasonably be predicted to occur, the *Owner* shall include in the annual report:

a. the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;

b. a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;

c. a discussion of the modifications, if any, which should be made to the monitoring program; and

d. a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

Annual Report - Transfer Station

5.3 By July 1st of each year, the *Owner* shall submit to the *District Manager,* an annual report that reports on the previous calendar year, which shall include, but not be limited to, the following:

a. a monthly balance of waste received and transferred from the *Transfer Station;*

b. a summary of any rejected wastes;

c. a summary of any incidents;

d. a summary of complaints received;

e. any changes to the Site Operations and Maintenance Manual and/or the Transfer Station Safety and Emergency Response Procedures since the last annual report;

f. a statement as to compliance with all conditions of this *Approval,* a description of any operational changes and/or *Transfer Station* improvements undertaken and all other operational issues;

g. any recommendations to minimize environmental impacts from the operation of the *Site* and to improve *Site* operations and monitoring programs in this regard.

Schedule A

This Schedule A forms part of Environmental Compliance Approval No. A341202.

1. Application for Approval of a Waste Disposal Site dated February 15, 2002 .

2. Township of Galway-Cavendish and Harvey, Crystal Lake Landfill Site Transfer Station, Design, Operation, Maintenance and Closure Report, prepared by Totten Sims Hubicki Associates, dated February 2002.

3. Letter from Michael Cant of Totten Sims Hubicki Associates to Heather Brodie-Brown of the Ministry of the Environment and Energy, dated June 25, 2002, with details pertaining to, the volume of waste to

be stored, the contingency plan and construction schedule, and documents pertaining to the name change for the Township and the contingency and emergency plan.

4. Copy of an excerpt of an order to amalgamate the Corporation of the Township of Galway and Cavendish and the Corporation of the Township of Harvey to a township under the name of "The Township of Galway-Cavendish and Harvey" (Order Made Under Section 25.2(4) of the Municipal Act).

5. Township of Galway-Cavendish and Harvey, Crystal Lake Landfill Site Transfer Station Safety and Emergency Response Procedures.

6. Letter from Michael Cant of Totten Sims Hubicki Associates to Heather Brodie-Brown on the Ministry of the Environment and Energy, dated July 8, 2002, with details pertaining to hours of operation.

7. Report entitled "Crystal Lake Landfill Site - Closure Plan" prepared for the Township of Galway-Cavendish and Harvey by TSH dated September 2002.

8. Memorandum dated January 13, 2003 addressed to Ms. Heather Brodie-Brown, Ministry of the Environment from Ms. Laurel Grills, Ministry of the Environment providing surface water review comments and recommendations on surface water monitoring.

9. Memorandum dated September 23, 2003 addressed to Mr. Ian Parrot, Ministry of the Environment from Mr. Bob Putzlocher, Ministry of the Environment providing groundwater review comments and recommendations on groundwater monitoring wells and monitoring requirements.

10. Letter dated June 28, 2006 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Colleen Carter, TSH providing updated drawings for the closure of the landfill.

11. Letter dated June 9, 2008 requesting an amendment to an existing Certificate of Approval, signed by Catrina Switzer, Environmental Services, County of Peterborough, including all supporting information.

12. Environmental Compliance Approval application, signed by Lois O-Neill-Jackson, CAO/Economic Development Officer, Municipality of Trent Lakes, dated May 10, 2016.

13. Correspondence from D. Bucholtz, Cambium Inc., to MOECC, dated May 10, 2016, re: description of proposed changes sought under the application to amend ECA No. A341202 including Figure 2, Proposed Site Layout, dated May 2016.

14. Plan 45R-16252, Plan of Survey of Part of Lot 11, Concession 11 and Part of the Road Allowance Between Lots 10 and 11, Concession 11, Municipality of Trent Lakes, prepared by COE Fisher Cameron, dated August 25, 2016.

The reasons for the imposition of these terms and conditions are as follows:

The reason for Condition 1.1 is to clarify that the previously issued Certificate of Approval No. A341202 issued on March 19, 1980, and subsequent Notices of Amendment issued July 10, 2002, August 14, 2006 and June 11, 2009, are no longer in effect and has been replaced and superseded by the Terms and Conditions stated in this Approval.

Condition 1.2 is required because Section 46 of the EPA prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used, unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future occupants of the land and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants

by the Approval being registered on title.

The reason for Condition 1.3 and 1.12 is to ensure that subsequent owners of the Site are informed of the terms and conditions of this Approval. This also applies to all supporting documentation listed in Schedule "A".

The reason for Conditions 1.4, 1.5, 1.6, 1.7 and 1.13 is to clarify the legal rights and responsibilities of the Owner.

The reason for Condition 1.8 is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Landfill Site and Transfer Station which are permitted under this Approval. Condition 1.8 is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA, the OWRA, and the PA, as amended.

The reason for Condition 1.9 is to clarify how to interpret this Approval in relation to the application and supporting documentation submitted by the Owner.

The reason for Condition 1.10 is to ensure that information submitted is attributed to the correct Approval.

The reason for Condition 1.11 to ensure that the Site is operated under the corporate name which appears on the application form submitted for this Approval.

The reason for Condition 1.14 is to ensure the availability of records and drawings for inspection and information purposes.

The reason for Condition 1.15 is to ensure that the Site is secure when unattended to prevent vandalism or theft.

The reasons for Condition 2.1 is to ensure the Owner closes the Landfill Site in accordance with the submitted information in Schedule "A". This is to ensure the long-term health and safety of the public and the environment.

The reason for Conditions 2.2 is to ensure that landfilling of waste at the Site is discontinued.

The reason for Condition 2.3 is to ensure the Owner installs the environmental monitoring wells and conducts environmental monitoring at the Landfill Site in accordance with the Ministry's recommendations. This is to ensure the long-term health and safety of the public and the environment.

The reason for Conditions 2.4 and 2.6 is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

The reason for Condition 2.5 is to provide a mechanism to permit changes to the monitoring program.

The reason for condition 2.7 is to ensure that storm water does not become contaminated by past or present uses.

The reason for Condition 3.1 is to ensure that the Transfer Site is operated in accordance with the application and supporting documentation submitted by the Company, and not in a manner which the Director has not been asked to consider.

The reasons for Condition 3.2 is to specify the hours of operation for the Transfer Station and to provide a mechanism for amendment of the hours of operation, as required.

The reason for Conditions 3.3, 3.4, 3.5, 3.6, 3.7 and 3.9 is to ensure that the types and amounts of waste received at the Transfer Station are in accordance with that considered by the Director.

Conditions 3.8, 3.10, 3.11, 3.12, 3.13 and 3.14 are included to ensure that waste storage is done in a manner and duration which does not result in a nuisance or a hazard to the health and safety of the environment or people.

Conditions 3.15 and 3.16 ensure that an approved end disposal site is available for the waste stored at the Transfer Station.

The reason for Conditions 3.17 and 3.18 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 3.19 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of any person or the natural environment.

The reason for Condition 3.20 is to ensure that complaints are properly and quickly resolved and that complaints and follow-up actions have been documented.

The reason for Conditions 3.21, 3.22 and 3.23 is to ensure that the Owner is prepared and properly equipped to take action in the event of a spill, fire or other operation upset.

The reason for Condition 3.24 is to ensure that the Owner immediately responds to a spill and notifies the Ministry forthwith of any spills as required in Part X of the EPA so that appropriate spills response can be determined.

The reason for Condition 3.25 is to ensure that any waste generated from emergency response activities are appropriately handled.

The reason for Condition 3.26 is to ensure that the Owner's staff are properly trained in the operation of the equipment used at the Site ad emergency response procedures.

The reason for Conditions 3.27 and 3.28 is to ensure that the Transfer Station is closed in accordance with the Ministry standards and to protect the health and safety of the public and the environment.

The reason for Conditions 4.1, 4.2, 4.3, 4.4, 4.5, 4.6 and 4.7 is to ensure that accurate records are maintained to ensure compliance with the conditions in this Approval, the EPA and its regulations.

The reason for Conditions 4.8 and 4.9 is to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner so that it does not result in a hazard or nuisance to the natural environment or any person.

The reason for Conditions 5.1, 5.2 and 5.3 is to ensure that the Site is operated and operating as approved.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A341202 issued on March 19, 1980

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with

respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 10th day of January, 2017

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

VP/
c: District Manager, MOECC Peterborough

EWART

O'DWYER

Barristers and Solicitors

PLEASE REFER REPLY TO: M. JOHN EWART

March 29, 2017

Municipality of Trent Lakes
760 County Road 36
Trent Lakes, Ontario
K0M 1A0

Attention: Lois O'Neill-Jackson

Dear Ms. O'Neill-Jackson:

Re: Certificate of Requirement – Crystal Lake (5604-003)
Our File Number: 1233-093

Please be advised that we completed the registration of the Certificate of Requirement with respect to the Crystal Lake Waste Disposal Site on March 23, 2017 by Instrument No. PE264769. We have enclosed herewith a copy of the electronic receipt confirming registration of the Certificate of Requirement.

At this matter has been completed, we have prepared and enclose herewith our statement of account for services rendered to date with respect to this file which we trust you will find to be in order.

Please do not hesitate to contact our office if you have any questions or concerns or if anything further is required with respect to this matter.

Very truly yours,
EWART O'DWYER

M. John Ewart
/cdw
Encl.

Properties

PIN	28344 - 0112 LT
Description	FIRSTLY: PART LOT 10 CONCESSION 11 GALWAY AS IN R363713; SECONDLY: PART LOT 11 CONCESSION 11 GALWAY PART 1 PLAN 45R16252, S/T INTEREST IN R495099; THIRDLY: PART OF THE ROAD ALLOWANCE BETWEEN LOTS 10 AND 11, CONCESSION 11, GALWAY, PART 2 PLAN 45R16252, STOPPED AND CLOSED BY BYLAW REGISTERED AS PE260820
Address	KINMOUNT

Party From(s)

Name	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF THE ENVIRONMENT AND CLIMATE CHANGE
Address for Service	Dale Gable, Director, Ministry of the Environment and Climate Change 135 St. Clair Avenue West 1st Floor Toronto, Ontario M4V 1P5

This document is not authorized under Power of Attorney by this party.

This document is being authorized by a representative of the Crown.

Statements

Schedule: See Schedules

Signed By

Michael John Ewart	311 George St., Suite 301 Peterborough K9J 3H3	acting for Party From(s)	Signed	2017 03 23

Tel 705-874-0404

Fax 705-874-1165

I have the authority to sign and register the document on behalf of the Party From(s).

Submitted By

EWART O'DWYER	311 George St., Suite 301 Peterborough K9J 3H3	2017 03 23

Tel 705-874-0404

Fax 705-874-1165

Fees/Taxes/Payment

Statutory Registration Fee	$63.35
Total Paid	$63.35

File Number

Party From Client File Number : 1233-093

SCHEDULE "A"

CERTIFICATE OF REQUIREMENT

s.197 (2)

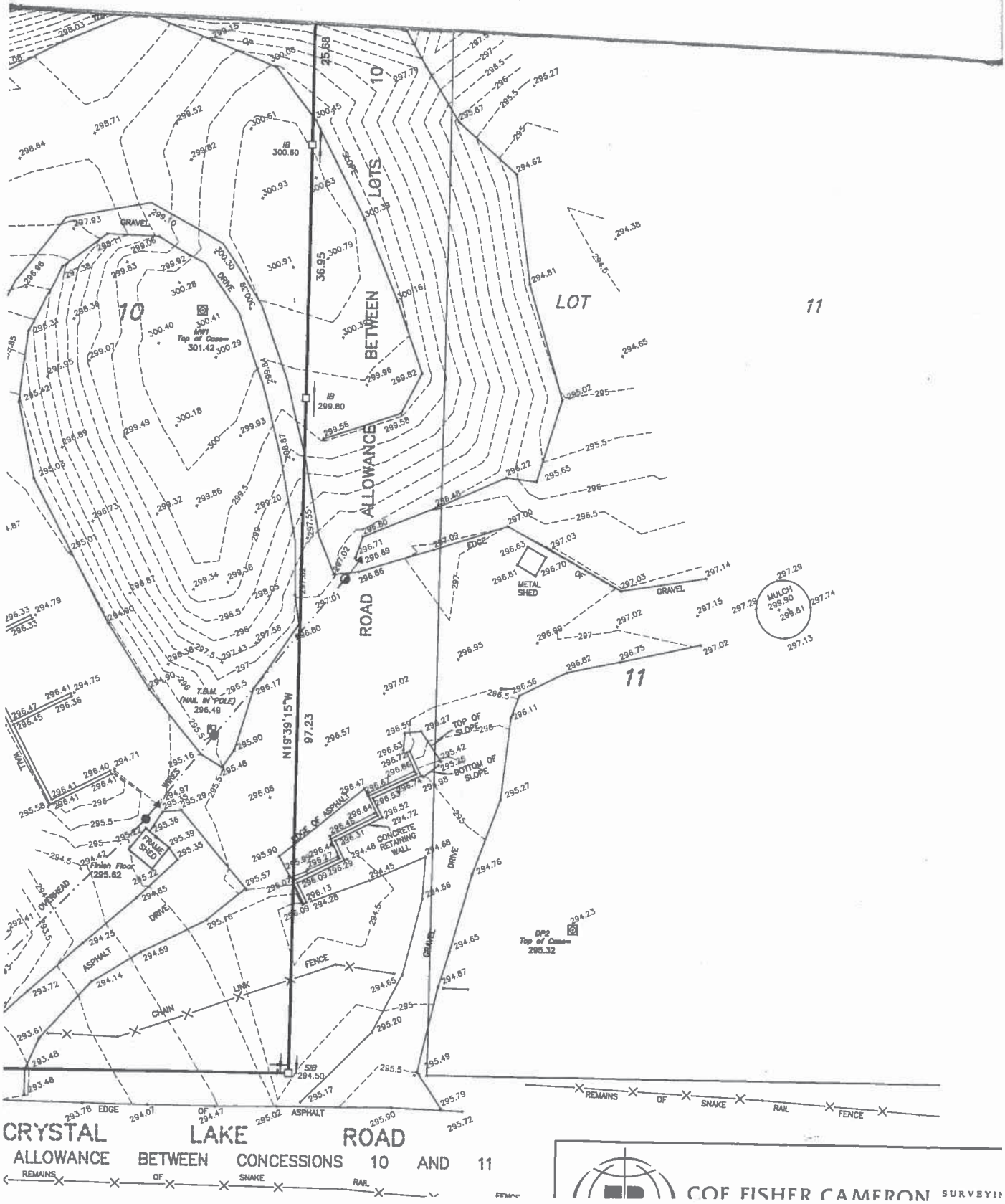
Environmental Protection Act

This is to certify that pursuant to Certificate of Property Use Number A341202 issued by Dale Gable, Director of the Ministry of the Environment and Climate Change under subsections 168.8(1) and 197(1) of the Environmental Protection Act dated January 10, 2017, being a Certificate of Property Use and order under subsection 197(1) of the Environmental Protection Act relating to the property known as 1018 Crystal Lake Road, Municipality of Trent Lakes, Ontario, Part of Lot 10, Concession 11, Galway, Part of Lot 11, Concession 1, Galway, being Part 1, Plan 45R16252 and part of the road allowance between Lots 10 and 11, Concession 1, Galway, being Part 2, Plan 45R16252, being all of Property Identifier Number (PIN) 28344-0112 (LT) (collectively the "property") with respect to a Risk Assessment and certain Risk Management Measures on the property (including restrictions on property use and construction of any building, groundwater monitoring, health and safety plan and reporting requirements) and the Record of Site Condition filed on the Environmental Site Registry of the Ministry of the Environment as number A341202on January 10, 2017,

THE CORPORATION OF THE MUNICIPALITY OF TRENT LAKES

and any other persons having an interest in the property are required before dealing with the property in any way, to give a copy of the Certificate of Property Use, including any amendments thereto, to every person who will acquire an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, the requirement applies to each person who, subsequent to the registration of the certificate, acquires an interest in the real property.



COE FISHER CAMERON SURVEYI

Appendix B
Field and Climate Data

LOCATION: Crystal Lake WDS DATE: April 21, 2020 WEATHER (SAMPLE DAY): -2°C Overcast 7°C

PROJECT NUMBER: 10520-003 SAMPLED BY: M. Pion and N. Morin WEATHER (PREVIOUS DAY): 8°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
MW1-U	6.43	10.34	50.8	0.86	24	Dry x 1 8	7.8	6.55	990	6.58	89	<5	Clear	Yellow	None	None	Ambient CH4: 0% LEL
MW1-L	21.19	22.47	50.8	0.87	8	Dry x 1 3.00	7.9	7.02	1110	7.56	94	<5	Clear	Yellow	None	None	Ambient CH4: 0% LEL
BH16-1S	0.82	6.34	38.1	0.64	19	Dry x 1 10	4.8	7.58	600	10.01	88	<5	Cloudy	Grey	None	None	Ambient CH4: 0ppm
BH16-1D	7.89	10.46	38.1	0.58	9	Dry x 1 4	7.3	8.04	910	10.91	112	<5	Opaque	Grey	None	None	Ambient CH4: 0ppm
BH16-2	1.80	8.12	38.1	0.85	22	Dry x 1 12	6.1	8.59	620	3.26	80	15	Opaque	Grey	None	None	QA/QC Ambient CH4: 0ppm
DP1	1.43	2.62	32.1	0.86	3.00	Dry x 1 2.5	5.6	6.76	1510	6.20	110	75	Cloudy	Yellow	Swampy	None	Ambient CH4: 0ppm
DP2	1.15	2.57	32.1	1.15	3.50	Dry x 1 1.25	3.3	6.84	650	9.04	64	<5	Cloudy	Brown	PHC	None	Ambient CH4: 0% LEL
DP3	0.86	1.70	32.1	0.72	2	Dry x 1 0.75	3.2	7.21	410	3.63	46	<5	Cloudy	Brown	None	None	Ambient CH4: 0% LEL
DP4	1.51	2.63	32.1	1.42	2.75	Dry x 1 1.00	4.7	7.36	460	4.11	44	<5	Cloudy	Orange	None	None	Ambient CH4: 0% LEL

LOCATION: Crystal Lake WDS DATE: April 21, 2020 WEATHER (SAMPLE DAY): -2°C Overcast 7°C

PROJECT NUMBER: 10520-003 SAMPLED BY: M. Pion and N. Morin WEATHER (PREVIOUS DAY): 8°C Sun

FIELD SHEET – SURFACE WATER SAMPLING

Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m^3/s)	Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Observations				
										Clarity	Colour	Odour	Sheen	Other
SW2	0.20	Ponded - No Observable Flow			5.0	7.30	310	9.52	70	Clear	Yellow	None	None	
SW3	0.25	0.40	< 0.10	< 0.010	6.1	8.30	480	10.57	54	Cloudy	None	None	None	Low volume
SW4	0.18	1.50	2.10	0.25	5.5	7.77	320	9.99	61	Clear	None	None	None	
SW5	0.35	1.25	0.30	0.08	4.8	8.17	260	11.00	69	Clear	None	None	None	QA/QC
SW6	0.05	0.20	< 0.10	< 0.001	2.7	7.87	340	11.72	41	Clear	None	None	None	

LOCATION: Crystal Lake WDS DATE: July 08, 2020 WEATHER (SAMPLE DAY): 21°C Sun 33°C

PROJECT NUMBER: 10520-003 SAMPLED BY: M. Pion WEATHER (PREVIOUS DAY): 39°C Sun

FIELD SHEET – SURFACE WATER SAMPLING

Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m^3/s)	Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Observations				
										Clarity	Colour	Odour	Sheen	Other
SW2	Ponded - No Observable Flow				21.9	7.01	320	4.68	160	Clear	Yellow	None	None	
SW3	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW4	0.10	1.50	0.40	0.020	21.3	7.25	320	6.22	173	Clear	Yellow	None	None	Adjacent roadway had recent work done, smells like tar
SW5	0.05	Ponded - No Observable Flow			21.3	6.95	390	3.32	192	Clear	Yellow	None	None	QA/QC
SW6	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Volume

LOCATION: Crystal Lake WDS DATE: November 12, 2020 WEATHER (SAMPLE DAY): 1°C Sun 8°C

PROJECT NUMBER: 10520-003 SAMPLED BY: N. Morin + M. Pion WEATHER (PREVIOUS DAY): 12°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
MW1-L	21.13	22.47	50.8	0.87	9	Dry x 1 3.25	8.7	7.92	1308	6.77	183	<5	Clear	None	None	None	Ambient: <5ppm
MW1-U	6.70	10.34	50.8	0.86	23	Dry x 1 9	9.3	7.06	1406	5.57	191	<5	Cloudy	Grey	None	None	Ambient: <5ppm
BH16-1S	1.14	6.34	38.1	0.64	18	Dry x 1 7	9.0	7.68	409	5.78	253	<5	Cloudy	None	None	None	Ambient: <5ppm
BH16-1D	8.15	10.46	38.1	0.58	8	Dry x 1 3	6.1	7.60	562	10.42	190	<5	Opaque	Grey	None	None	Ambient: <5ppm
BH16-2	1.84	8.12	38.1	0.85	22	Dry x 1 8	7.8	8.34	396	3.74	255	<5	Opaque	Grey	None	None	Ambient: <5ppm, QA/QC
DP1	1.42	2.62	32.1	0.86	3	Dry x 1 1.50	7.5	6.55	1112	5.96	251	<5	Cloudy	None	None	None	Ambient: <5ppm
DP2	1.07	2.57	32.1	1.15	3.50	Dry x 1 1.50	8.1	6.88	663	5.14	199	<5	Opaque	Red-brown	None	None	Ambient: <5ppm
DP4	1.51	2.63	32.1	1.42	2.75	Dry x 1 1.25	7.1	7.46	297	9.06	200	<5	Opaque	Red-brown	None	None	Ambient: <5ppm
DP3	0.95	1.70	32.1	0.72	1.75	Dry x 1 0.75	7.2	7.01	312	3.47	190	<5	Opaque	Red-brown	None	None	Ambient: <5ppm

LOCATION: Crystal Lake WDS DATE: November 12, 2020 WEATHER (SAMPLE DAY): 1°C Sun 8°C

PROJECT NUMBER: 10520-003 SAMPLED BY: N. Morin + M. Pion WEATHER (PREVIOUS DAY): 12°C Sun

FIELD SHEET – SURFACE WATER SAMPLING

Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m^3/s)	Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Observations				
										Clarity	Colour	Odour	Sheen	Other
SW2	0.05	Ponded - No Observable Flow			4.9	7.25	188	3.64	188	Clear	Yellow	None	None	
SW3	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW4	0.03	1.50	1.00	0.018	7.2	7.75	207	9.45	248	Clear	None	None	None	
SW5	0.26	Ponded - No Observable Flow			6.4	7.33	189	6.80	266	Clear	None	None	None	QA/QC, Beaver dam inside culvert
SW6	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Volumes for Sample Collection

Government of Canada / Gouvernement du Canada

Daily Data Report for April 2020

SPRUCEDALE
ONTARIO
Current Station Operator: CCN

Latitude:	45°25'30.000" N	**Longitude:**	79°29'15.000" W	**Elevation:**	337.10 m		
Climate ID:	6117981	**WMO ID:**		**TC ID:**			

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †						0.0	0.0	0.0	9		
02 †						0.0	T	0.0	4		
03 †						6.0	0.0	6.0	0		
04 †						0.2	0.0	0.2	T		
05 †						0.0	0.0	0.0	T		
06 †						0.0	0.0	0.0	T		
07 †						0.8	0.0	0.8	T		
08 †						0.0	0.4	0.4	0		
09 †						0.0	1.0	1.0	4		
10 †						0.0	0.0	0.0	3		
11 †						0.0	0.0	0.0	T		
12 †						6.0	0.0	6.0	T		
13 †						0.0	1.8	0.0	T		
14 †						0.0	1.0	0.0	T		
15 †						0.0	1.8	1.8	T		
16 †						0.0	T	0.0	T		
17 †						0.0	0.0	0.0	T		
18 †						3.4	0.0	3.4	0		
19 †						1.6	T	1.6	T		
20 †						0.0	9.2	10.0	T		
21 †						0.0	2.2	2.0	10		
22 †						0.0	0.0	0.0	7		
23 †						0.0	0.8	0.8	T		
24 †						0.0	0.0	0.0	T		
25 †						0.0	0.0	0.0	0		
26 †						0.0	0.0	0.0	T		
27 †						0.0	0.0	0.0	0		
28 †						0.8	0.0	0.8	0		
29 †						19.6	0.0	19.6	0		
30 †						16.4	0.0	16.4	0		
Sum						54.8	18.2	70.8			
Avg											

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Xtrm											

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2020-09-17

Government of Canada / Gouvernement du Canada

Daily Data Report for July 2020

SPRUCEDALE
ONTARIO
Current Station Operator: CCN

Latitude:	45°25'30.000" N	**Longitude:**	79°29'15.000" W	**Elevation:**	337.10 m	
Climate ID:	6117981	**WMO ID:**		**TC ID:**		

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †						0.0	0.0	0.0	0		
02 †						0.0	0.0	0.0	0		
03 †						0.0	0.0	0.0	0		
04 †						3.0	0.0	3.0	0		
05 †						0.0	0.0	0.0	0		
06 †									0		
07											
08 †						0.0	0.0	0.0			
09 †						0.0	0.0	0.0	0		
10 †						21.6	0.0	21.6	0		
11 †						8.6	0.0	8.6	0		
12 †						0.0	0.0	0.0	0		
13 †						T	0.0	T	0		
14 †						0.0	0.0	0.0	0		
15 †						0.0	0.0	0.0	0		
16 †						19.0	0.0	19.0	0		
17 †						0.0	0.0	0.0	0		
18 †						6.2	0.0	6.2	0		
19 †						13.0	0.0	13.0	0		
20 †						0.2	0.0	0.2	0		
21 †						0.0	0.0	0.0	0		
22 †						7.8	0.0	7.8	0		
23 †						0.0	0.0	0.0	0		
24 †						0.0	0.0	0.0	0		
25 †						0.0	0.0	0.0	0		
26 †						25.0	0.0	25.0	0		
27 †						0.4	0.0	0.4	0		
28 †						0.6	0.0	0.6	0		
29 †						T	0.0	T	0		
30 †						7.6	0.0	7.6	0		
31 †						0.0	0.0	0.0	0		
Sum						113.0^	0.0^	113.0^			

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Avg											
Xtrm											

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
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- F = Accumulated and estimated
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- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2020-09-17

Government of Canada / Gouvernement du Canada

Daily Data Report for November 2020

SPRUCEDALE
ONTARIO
Current Station Operator: CCN

Latitude:	45°25'30.000" N	**Longitude:**	79°29'15.000" W	**Elevation:**	337.10 m		
Climate ID:	6117981	**WMO ID:**		**TC ID:**			

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †						1.4	1.4	2.8	0		
02 †						1.4	1.4	2.8	0		
03 †						T	0.0	T	0		
04 †						T	0.0	T	0		
05 †						T	0.0	T	0		
06 †						T	0.0	T	0		
07 †						0.0	0.0	0.0	0		
08 †						T	0.0	T	0		
09 †						0.0	0.0	0.0	0		
10 †						11.6	0.0	11.6	0		
11 †						0.4	0.0	0.4	0		
12 †						0.0	0.0	0.0	0		
13 †						2.4	0.0	2.4	0		
14 †						3.2	0.0	3.2	0		
15 †						20.2	0.0	20.2	0		
16 †						0.0	0.4	0.0	0		
17 †						T	T	T	T		
18 †						0.0	T	0.0	T		
19 †						T	0.0	T	T		
20 †						T	0.0	T	0		
21 †						0.0	0.4	0.0	0		
22 †						0.0	5.8	5.8	T		
23 †						0.0	1.8	1.0	11		
24 †						0.0	0.0	0.0	9		
25 †						0.4	0.0	0.4	7		
26 †						6.6	0.0	6.6	4		
27 †						0.0	1.0	0.0	T		
28 †						T	0.0	T	T		
29 †						1.0	0.0	1.0	0		
30 †						4.0	9.2	8.0	0		
Sum						52.6	21.4	66.2			
Avg											

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Xtrm											

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2020-09-17

Appendix C

Laboratory Certificates of Analysis

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10488 (i)**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		DP3	DP4	MW1-U	MW1-L
			Sample I.D.		B20-10488-1	B20-10488-2	B20-10488-3	B20-10488-4
			Date Collected		21-Apr-20	21-Apr-20	21-Apr-20	21-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-20/O	158		790	266
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-20/O	377		1780	1730
pH @25°C	pH Units		SM 4500H	24-Apr-20/O	7.57		7.35	8.08
Total Dissolved Solids	mg/L	3	SM 2540D	27-Apr-20/O	194		979	951
Total Suspended Solids	mg/L	3	SM2540D	23-Apr-20/K			98	146
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-Apr-20/O	5.8		18.9	5.7
BOD(5 day)	mg/L	3	SM 5210B	23-Apr-20/K			< 3	< 3
COD	mg/L	5	SM 5220D	24-Apr-20/O	28		58	37
Chloride	mg/L	0.5	SM4110C	27-Apr-20/O	4.2		90.0	323
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Apr-20/K	0.08	0.06	0.25	0.02
Sulphate	mg/L	1	SM4110C	27-Apr-20/O	24		62	136
Nitrate (N)	mg/L	0.05	SM4110C	27-Apr-20/O	0.31		0.06	0.27
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	0.4	1.4	1.2	0.6
Hardness (as CaCO3)	mg/L	1	SM 3120	23-Apr-20/O	184	142	734	78
Barium	mg/L	0.001	SM 3120	23-Apr-20/O	0.024	0.014	0.029	0.042
Boron	mg/L	0.005	SM 3120	23-Apr-20/O	0.146	0.020	0.297	1.46
Calcium	mg/L	0.02	SM 3120	23-Apr-20/O	66.2	53.2	255	26.0
Iron	mg/L	0.005	SM 3120	23-Apr-20/O	9.27	8.55	0.868	0.069
Magnesium	mg/L	0.02	SM 3120	23-Apr-20/O	4.40	2.28	23.6	3.19
Manganese	mg/L	0.001	SM 3120	23-Apr-20/O	0.118	0.123	3.62	0.013
Potassium	mg/L	0.1	SM 3120	23-Apr-20/O	6.7	4.1	11.5	6.5
Sodium	mg/L	0.2	SM 3120	23-Apr-20/O	6.0	3.9	139	355

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10488 (i)**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		DP2	DP1	BH16S	BH16D
			Sample I.D.		B20-10488-5	B20-10488-6	B20-10488-7	B20-10488-8
			Date Collected		21-Apr-20	21-Apr-20	21-Apr-20	21-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-20/O	353	448	199	253
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-20/O	795	1510	536	836
pH @25°C	pH Units		SM 4500H	24-Apr-20/O	7.19	7.36	7.92	8.09
Total Dissolved Solids	mg/L	3	SM 2540D	27-Apr-20/O	417	821	278	441
Total Suspended Solids	mg/L	3	SM2540D	23-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-Apr-20/O	19.1	5.2	5.3	10.8
BOD(5 day)	mg/L	3	SM 5210B	23-Apr-20/K				
COD	mg/L	5	SM 5220D	24-Apr-20/O	93	103	12	990
Chloride	mg/L	0.5	SM4110C	27-Apr-20/O	38.2	214	30.5	41.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Apr-20/K	1.10	0.12	0.02	0.05
Sulphate	mg/L	1	SM4110C	27-Apr-20/O	< 1	25	27	110
Nitrate (N)	mg/L	0.05	SM4110C	27-Apr-20/O	0.06	0.12	0.07	0.08
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	2.3	0.6	0.2	1.1
Hardness (as CaCO3)	mg/L	1	SM 3120	23-Apr-20/O	312	538	242	206
Barium	mg/L	0.001	SM 3120	23-Apr-20/O	0.068	0.042	0.022	0.008
Boron	mg/L	0.005	SM 3120	23-Apr-20/O	0.030	0.405	0.034	2.05
Calcium	mg/L	0.02	SM 3120	23-Apr-20/O	117	189	84.9	72.8
Iron	mg/L	0.005	SM 3120	23-Apr-20/O	21.4	55.6	0.033	1.97
Magnesium	mg/L	0.02	SM 3120	23-Apr-20/O	4.74	15.9	7.18	5.89
Manganese	mg/L	0.001	SM 3120	23-Apr-20/O	0.665	8.71	0.040	0.049
Potassium	mg/L	0.1	SM 3120	23-Apr-20/O	1.6	6.9	6.3	15.2
Sodium	mg/L	0.2	SM 3120	23-Apr-20/O	8.5	93.3	19.5	150

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10488 (i)**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		BH16-2	GWQA/QC		
			Sample I.D.		B20-10488-9	B20-10488-10		
			Date Collected		21-Apr-20	21-Apr-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-20/O	154	151		
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-20/O	552	549		
pH @25°C	pH Units		SM 4500H	24-Apr-20/O	8.46	8.33		
Total Dissolved Solids	mg/L	3	SM 2540D	27-Apr-20/O	286	285		
Total Suspended Solids	mg/L	3	SM2540D	23-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-Apr-20/O	2.5	2.5		
BOD(5 day)	mg/L	3	SM 5210B	23-Apr-20/K				
COD	mg/L	5	SM 5220D	24-Apr-20/O	1740	1760		
Chloride	mg/L	0.5	SM4110C	27-Apr-20/O	70.7	69.9		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Apr-20/K	0.81	0.58		
Sulphate	mg/L	1	SM4110C	27-Apr-20/O	20	19		
Nitrate (N)	mg/L	0.05	SM4110C	27-Apr-20/O	0.12	0.09		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	4.1	3.3		
Hardness (as CaCO3)	mg/L	1	SM 3120	23-Apr-20/O	103	102		
Barium	mg/L	0.001	SM 3120	23-Apr-20/O	0.081	0.079		
Boron	mg/L	0.005	SM 3120	23-Apr-20/O	0.274	0.272		
Calcium	mg/L	0.02	SM 3120	23-Apr-20/O	32.1	31.9		
Iron	mg/L	0.005	SM 3120	23-Apr-20/O	0.422	0.316		
Magnesium	mg/L	0.02	SM 3120	23-Apr-20/O	5.49	5.32		
Manganese	mg/L	0.001	SM 3120	23-Apr-20/O	0.087	0.083		
Potassium	mg/L	0.1	SM 3120	23-Apr-20/O	2.0	2.0		
Sodium	mg/L	0.2	SM 3120	23-Apr-20/O	83.2	82.1		

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10488 (ii)**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		MW1-U	MW1-L		
			Sample I.D.		B20-10488-3	B20-10488-4		
			Date Collected		21-Apr-20	21-Apr-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Acetone	µg/L	30	EPA 8260	24-Apr-20/R	< 30	< 30		
Benzene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Bromodichloromethane	µg/L	2	EPA 8260	24-Apr-20/R	< 2	< 2		
Bromoform	µg/L	5	EPA 8260	24-Apr-20/R	< 5	< 5		
Bromomethane	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Carbon Tetrachloride	µg/L	0.2	EPA 8260	24-Apr-20/R	< 0.2	< 0.2		
Chloroethane	µg/L	3	EPA 8260	24-Apr-20/R	< 3	< 3		
Chloroform	µg/L	1	EPA 8260	24-Apr-20/R	< 1	< 1		
Chloromethane	µg/L	2	EPA 8260	24-Apr-20/R	< 2	< 2		
Dibromochloromethane	µg/L	2	EPA 8260	24-Apr-20/R	< 2	< 2		
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	24-Apr-20/R	< 0.2	< 0.2		
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichlorodifluoromethane	µg/L	2	EPA 8260	24-Apr-20/R	< 2	< 2		
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	24-Apr-20/R	< 5	< 5		
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloropropene 1,3- cis+trans	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	24-Apr-20/R	< 0.2	< 0.2		
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10488 (ii)**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		MW1-U	MW1-L		
			Sample I.D.		B20-10488-3	B20-10488-4		
			Date Collected		21-Apr-20	21-Apr-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ethylbenzene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Hexane	µg/L	5	EPA 8260	24-Apr-20/R	< 5	< 5		
Xylene, m,p-	µg/L	1.0	EPA 8260	24-Apr-20/R	< 1.0	< 1.0		
Methyl Ethyl Ketone	µg/L	20	EPA 8260	24-Apr-20/R	< 20	< 20		
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	24-Apr-20/R	< 20	< 20		
Methyl-t-butyl Ether	µg/L	2	EPA 8260	24-Apr-20/R	< 2	< 2		
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Xylene, o-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Styrene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Tetrachloroethylene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Toluene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Trichloroethylene	µg/L	0.5	EPA 8260	24-Apr-20/R	< 0.5	< 0.5		
Trichlorofluoromethane	µg/L	5	EPA 8260	24-Apr-20/R	< 5	< 5		
Trimethylbenzene,1,3,5-	µg/L	0.1	EPA 8260	24-Apr-20/R	< 0.1	< 0.1		
Vinyl Chloride	µg/L	0.2	EPA 8260	24-Apr-20/R	< 0.2	< 0.2		
Xylene, m,p,o-	µg/L	1.1	EPA 8260	24-Apr-20/R	< 1.1	< 1.1		

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10482**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW4	SW2	SW6	SW5
			Sample I.D.		B20-10482-1	B20-10482-2	B20-10482-3	B20-10482-4
			Date Collected		21-Apr-20	21-Apr-20	21-Apr-20	21-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-20/O	123	81	121	98
Colour	TCU	2	SM 2120C	24-Apr-20/O	18	38	12	17
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-20/O	218	238	283	219
pH @25°C	pH Units		SM 4500H	24-Apr-20/O	7.69	7.59	7.94	7.76
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-Apr-20	111	122	145	112
Total Suspended Solids	mg/L	3	SM2540D	24-Apr-20/K	< 3	5	6	< 3
Turbidity	NTU	0.1	SM 2130	24-Apr-20/O	0.4	0.8	0.5	0.4
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-Apr-20/O	4.9	9.8	5.9	5.3
BOD(5 day)	mg/L	3	SM 5210B	23-Apr-20/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM 5220D	24-Apr-20/O	13	27	11	11
Phenolics	mg/L	0.002	MOEE 3179	23-Apr-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	27-Apr-20/O	3.3	20.4	9.6	4.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Apr-20/K	0.02	0.03	0.01	0.01
Ammonia (N)-unionized	mg/L	0.01	CALC	23-Apr-20/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	27-Apr-20/O	5	3	6	6
Nitrite (N)	mg/L	0.05	SM4110C	27-Apr-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Apr-20/O	0.08	0.08	0.07	0.06
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-Apr-20/K	0.2	0.7	0.2	0.2
Mercury	mg/L	0.00002	SM 3112 B	27-Apr-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	27-Apr-20/O	120	106	141	115
Aluminum	mg/L	0.01	SM 3120	23-Apr-20/O	0.03	0.03	0.03	0.03
Arsenic	mg/L	0.0001	EPA 200.8	24-Apr-20/O	0.0002	0.0001	0.0002	0.0001
Barium	mg/L	0.001	SM 3120	27-Apr-20/O	0.023	0.010	0.012	0.023
Boron	mg/L	0.005	SM 3120	27-Apr-20/O	0.007	0.009	0.013	0.006
Cadmium	mg/L	).000015	EPA 200.8	24-Apr-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	24-Apr-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	24-Apr-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10482**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW4	SW2	SW6	SW5
			Sample I.D.		B20-10482-1	B20-10482-2	B20-10482-3	B20-10482-4
			Date Collected		21-Apr-20	21-Apr-20	21-Apr-20	21-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	24-Apr-20/O	0.0004	0.0003	0.0009	0.0003
Iron	mg/L	0.005	SM 3120	27-Apr-20/O	0.024	0.200	0.037	0.033
Lead	mg/L	0.00002	EPA 200.8	24-Apr-20/O	0.00004	0.00007	0.00003	< 0.00002
Nickel	mg/L	0.01	SM 3120	27-Apr-20/O	< 0.01	< 0.01	< 0.01	< 0.01
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Apr-20/K	< 0.01	0.06	< 0.01	< 0.01
Selenium	mg/L	0.001	EPA 200.8	24-Apr-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	24-Apr-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	mg/L	0.005	SM 3120	27-Apr-20/O	0.005	0.024	0.009	0.009

Michelle Dubien
Lab Manager

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Final Report

C.O.C.: G93147 **REPORT No. B20-10482**

Report To:

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PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW QA/QC	SW3		
			Sample I.D.		B20-10482-5	B20-10482-6		
			Date Collected		21-Apr-20	21-Apr-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-20/O	96	117		
Colour	TCU	2	SM 2120C	24-Apr-20/O	17	27		
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-20/O	221	413		
pH @25°C	pH Units		SM 4500H	24-Apr-20/O	7.78	7.71		
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-Apr-20	113	213		
Total Suspended Solids	mg/L	3	SM2540D	24-Apr-20/K	< 3	11		
Turbidity	NTU	0.1	SM 2130	24-Apr-20/O	0.4	2.3		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-Apr-20/O	5.3	7.4		
BOD(5 day)	mg/L	3	SM 5210B	23-Apr-20/K	< 3	< 3		
COD	mg/L	5	SM 5220D	24-Apr-20/O	11	18		
Phenolics	mg/L	0.002	MOEE 3179	23-Apr-20/K	< 0.002	< 0.002		
Chloride	mg/L	0.5	SM4110C	27-Apr-20/O	4.3	57.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Apr-20/K	0.01	0.02		
Ammonia (N)-unionized	mg/L	0.01	CALC	23-Apr-20/K	< 0.01	< 0.01		
Sulphate	mg/L	1	SM4110C	27-Apr-20/O	6	3		
Nitrite (N)	mg/L	0.05	SM4110C	27-Apr-20/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	27-Apr-20/O	0.06	0.08		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-Apr-20/K	0.2	0.4		
Mercury	mg/L	0.00002	SM 3112 B	27-Apr-20/O	< 0.00002	< 0.00002		
Hardness (as CaCO3)	mg/L	1	SM 3120	27-Apr-20/O	117	164		
Aluminum	mg/L	0.01	SM 3120	23-Apr-20/O	0.03	0.03		
Arsenic	mg/L	0.0001	EPA 200.8	24-Apr-20/O	0.0002	0.0002		
Barium	mg/L	0.001	SM 3120	27-Apr-20/O	0.022	0.012		
Boron	mg/L	0.005	SM 3120	27-Apr-20/O	0.007	0.009		
Cadmium	mg/L	).000015	EPA 200.8	24-Apr-20/O	< 0.000015	< 0.000015		
Chromium	mg/L	0.001	EPA 200.8	24-Apr-20/O	< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	24-Apr-20/O	< 0.0001	0.0002		

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Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93147 **REPORT No. B20-10482**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Apr-20
DATE REPORTED: 29-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW QA/QC	SW3		
			Sample I.D.		B20-10482-5	B20-10482-6		
			Date Collected		21-Apr-20	21-Apr-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	24-Apr-20/O	0.0003	0.0004		
Iron	mg/L	0.005	SM 3120	27-Apr-20/O	0.040	0.606		
Lead	mg/L	0.00002	EPA 200.8	24-Apr-20/O	< 0.00002	0.00003		
Nickel	mg/L	0.01	SM 3120	27-Apr-20/O	< 0.01	< 0.01		
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Apr-20/K	< 0.01	0.04		
Selenium	mg/L	0.001	EPA 200.8	24-Apr-20/O	< 0.001	< 0.001		
Silver	mg/L	0.0001	EPA 200.8	24-Apr-20/O	< 0.0001	< 0.0001		
Zinc	mg/L	0.005	SM 3120	27-Apr-20/O	0.006	0.005		

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G87737 **REPORT No. B20-19451**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-Jul-20
DATE REPORTED: 17-Jul-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW5	SW QA/QC	SW4	SW2
			Sample I.D.		B20-19451-1	B20-19451-2	B20-19451-3	B20-19451-4
			Date Collected		08-Jul-20	08-Jul-20	08-Jul-20	08-Jul-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	10-Jul-20/O	159	158	139	125
Colour	TCU	2	SM 2120C	10-Jul-20/O	48	49	48	94
Conductivity @25°C	µmho/cm	1	SM 2510B	10-Jul-20/O	320	320	283	296
pH @25°C	pH Units		SM 4500H	10-Jul-20/O	7.84	7.78	7.91	7.63
TDS (Calc. from Cond.)	mg/L	1	Calc.	13-Jul-20	164	164	145	152
Total Suspended Solids	mg/L	3	SM2540D	10-Jul-20/K	12	12	< 3	12
Turbidity	NTU	0.1	SM 2130	10-Jul-20/O	2.2	2.3	1.6	4.1
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Jul-20/O	13.3	13.1	10.9	22.7
BOD(5 day)	mg/L	3	SM 5210B	10-Jul-20/K	3	< 3	< 3	< 3
COD	mg/L	5	SM 5220D	10-Jul-20/O	30	34	25	61
Phenolics	mg/L	0.002	MOEE 3179	14-Jul-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	10-Jul-20/O	2.5	2.5	2.1	14.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	13-Jul-20/K	0.06	0.05	0.05	0.04
Ammonia (N)-unionized	mg/L	0.01	CALC	13-Jul-20/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	10-Jul-20/O	1	1	1	< 1
Nitrite (N)	mg/L	0.05	SM4110C	10-Jul-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	10-Jul-20/O	0.10	0.09	0.12	0.11
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	14-Jul-20/K	0.6	0.6	0.5	1.5
Mercury	mg/L	0.00002	SM 3112 B	14-Jul-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	13-Jul-20/O	169	186	159	163
Aluminum	mg/L	0.01	SM 3120	13-Jul-20/O	0.02	0.02	0.03	0.02
Arsenic	mg/L	0.0001	EPA 200.8	13-Jul-20/O	0.0009	0.0008	0.0006	0.0003
Barium	mg/L	0.001	SM 3120	13-Jul-20/O	0.051	0.056	0.033	0.019
Boron	mg/L	0.005	SM 3120	13-Jul-20/O	0.010	0.010	0.011	0.009
Cadmium	mg/L	).000015	EPA 200.8	13-Jul-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	13-Jul-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	13-Jul-20/O	0.0002	0.0002	< 0.0001	0.0002

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G87737 **REPORT No. B20-19451**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-Jul-20
DATE REPORTED: 17-Jul-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW5	SW QA/QC	SW4	SW2
			Sample I.D.		B20-19451-1	B20-19451-2	B20-19451-3	B20-19451-4
			Date Collected		08-Jul-20	08-Jul-20	08-Jul-20	08-Jul-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	13-Jul-20/O	0.0005	0.0005	0.0006	0.0007
Iron	mg/L	0.005	SM 3120	13-Jul-20/O	0.884	0.951	0.148	0.312
Lead	mg/L	0.00002	EPA 200.8	13-Jul-20/O	0.00008	0.00006	0.00009	0.00009
Nickel	mg/L	0.01	SM 3120	13-Jul-20/O	< 0.01	< 0.01	< 0.01	< 0.01
Phosphorus-Total	mg/L	0.01	E3199A.1	14-Jul-20/K	0.05	0.05	0.02	0.10
Selenium	mg/L	0.001	EPA 200.8	13-Jul-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	13-Jul-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	mg/L	0.005	SM 3120	13-Jul-20/O	< 0.005	0.013	< 0.005	0.009

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099371 **REPORT No. B20-35881**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 13-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		BH16-2_A	GW QA/QC	DP3_A	DP4_A
			Sample I.D.		B20-35881-1	B20-35881-2	B20-35881-3	B20-35881-4
			Date Collected		12-Nov-20	12-Nov-20	12-Nov-20	12-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	147	148	171	
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	556	556	405	
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	8.49	8.62	7.79	
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	288	288	209	
Total Suspended Solids	mg/L	3	SM2540D	17-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	18-Nov-20/O	1.2	1.1	4.5	
COD	mg/L	5	SM5220C	16-Nov-20/K	183	225	78	105
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	66.2	66.1	4.9	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.22	0.23	0.08	0.07
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	22	21	19	
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	0.17	0.09	0.08	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Nov-20/K	0.4	0.4	0.4	0.5
Hardness (as CaCO3)	mg/L	1	SM 3120	19-Nov-20/O	97	98	196	
Barium	mg/L	0.001	SM 3120	19-Nov-20/O	0.033	0.033	0.024	
Boron	mg/L	0.005	SM 3120	19-Nov-20/O	0.276	0.281	0.194	
Calcium	mg/L	0.02	SM 3120	19-Nov-20/O	30.6	31.0	70.8	
Iron	mg/L	0.005	SM 3120	19-Nov-20/O	0.016	0.021	10.2	
Magnesium	mg/L	0.02	SM 3120	19-Nov-20/O	4.90	5.10	4.63	
Manganese	mg/L	0.001	SM 3120	19-Nov-20/O	0.046	0.045	0.183	
Potassium	mg/L	0.1	SM 3120	19-Nov-20/O	1.6	1.6	7.5	
Sodium	mg/L	0.2	SM 3120	19-Nov-20/O	84.6	85.3	7.7	

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099371 **REPORT No. B20-35881**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 13-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

	Client I.D.	MW1-U_B	MW1-L	DP1_A	DP2_A
	Sample I.D.	B20-35881-5	B20-35881-6	B20-35881-7	B20-35881-8
	Date Collected	12-Nov-20	12-Nov-20	12-Nov-20	12-Nov-20

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	776	259	420	339
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	1780	1720	1330	776
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.20	8.03	6.97	7.31
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	975	943	722	407
Total Suspended Solids	mg/L	3	SM2540D	17-Nov-20/K	82	51		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	18-Nov-20/O	21.5	3.1	3.0	11.9
COD	mg/L	5	SM5220C	16-Nov-20/K	100	13	33	116
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K	< 3	< 3		
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	81.2	296	153	32.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.73	0.05	0.15	0.71
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	57	140	22	< 1
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	0.17	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Nov-20/K	2.5	0.6	0.7	2.2
Hardness (as CaCO3)	mg/L	1	SM 3120	19-Nov-20/O	721	77	436	338
Barium	mg/L	0.001	SM 3120	19-Nov-20/O	0.028	0.041	0.032	0.067
Boron	mg/L	0.005	SM 3120	19-Nov-20/O	0.358	1.49	0.494	0.043
Calcium	mg/L	0.02	SM 3120	19-Nov-20/O	255	25.5	153	127
Iron	mg/L	0.005	SM 3120	19-Nov-20/O	1.08	0.062	66.5	20.5
Magnesium	mg/L	0.02	SM 3120	19-Nov-20/O	20.4	3.25	12.9	5.06
Manganese	mg/L	0.001	SM 3120	19-Nov-20/O	5.81	0.014	6.57	0.776
Potassium	mg/L	0.1	SM 3120	19-Nov-20/O	9.9	6.1	6.2	1.6
Sodium	mg/L	0.2	SM 3120	19-Nov-20/O	170	352	92.0	10.5

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099371 **REPORT No. B20-35881**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 13-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		BH16-1S_A	BH16-1D_B		
			Sample I.D.		B20-35881-9	B20-35881-10		
			Date Collected		12-Nov-20	12-Nov-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	190	232		
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	543	830		
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.92	8.04		
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	281	437		
Total Suspended Solids	mg/L	3	SM2540D	17-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	18-Nov-20/O	2.0	5.1		
COD	mg/L	5	SM5220C	16-Nov-20/K	13	274		
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	32.8	36.4		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.07	0.11		
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	27	121		
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Nov-20/K	0.2	0.2		
Hardness (as CaCO3)	mg/L	1	SM 3120	19-Nov-20/O	242	140		
Barium	mg/L	0.001	SM 3120	19-Nov-20/O	0.020	0.007		
Boron	mg/L	0.005	SM 3120	19-Nov-20/O	0.032	2.03		
Calcium	mg/L	0.02	SM 3120	19-Nov-20/O	85.8	47.1		
Iron	mg/L	0.005	SM 3120	19-Nov-20/O	0.018	0.011		
Magnesium	mg/L	0.02	SM 3120	19-Nov-20/O	6.77	5.50		
Manganese	mg/L	0.001	SM 3120	19-Nov-20/O	0.016	0.021		
Potassium	mg/L	0.1	SM 3120	19-Nov-20/O	6.0	14.6		
Sodium	mg/L	0.2	SM 3120	19-Nov-20/O	19.6	133		

1. Results unavailable for certain requested parameters due to low sample volumes

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099371 **REPORT No. B20-35880**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 13-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW5	SW QA/QC	SW4	SW2
			Sample I.D.		B20-35880-1	B20-35880-2	B20-35880-3	B20-35880-4
			Date Collected		12-Nov-20	12-Nov-20	12-Nov-20	12-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	122	123	129	92
Colour	TCU	2	SM 2120C	17-Nov-20/O	29	29	35	150
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	268	268	272	262
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.89	7.91	7.94	7.59
TDS (Calc. from Cond.)	mg/L	1	Calc.	18-Nov-20	137	137	139	134
Total Suspended Solids	mg/L	3	SM2540D	17-Nov-20/K	< 3	< 3	< 3	4
Turbidity	NTU	0.1	SM 2130	17-Nov-20/O	0.4	0.5	2.4	1.5
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	18-Nov-20/O	7.1	7.1	8.2	20.1
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	16-Nov-20/K	5	18	22	63
Phenolics	mg/L	0.002	MOEE 3179	25-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	4.1	4.1	3.4	22.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.03	0.02	0.02	0.03
Ammonia (N)-unionized	mg/L	0.01	CALC	18-Nov-20/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	5	5	5	< 1
Nitrite (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Nov-20/K	0.3	0.3	0.4	1.3
Mercury	mg/L	0.00002	SM 3112 B	18-Nov-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	18-Nov-20/O	148	148	149	116
Aluminum	mg/L	0.01	SM 3120	18-Nov-20/O	0.04	0.04	0.04	0.02
Arsenic	mg/L	0.0001	EPA 200.8	26-Nov-20/O	0.0002	0.0002	0.0003	0.0002
Barium	mg/L	0.001	SM 3120	18-Nov-20/O	0.026	0.026	0.032	0.012
Boron	mg/L	0.005	SM 3120	18-Nov-20/O	0.007	0.006	0.010	0.022
Cadmium	mg/L	).000015	EPA 200.8	26-Nov-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	26-Nov-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	26-Nov-20/O	< 0.0001	< 0.0001	< 0.0001	0.0002

Michelle Dubien
Lab Manager

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Final Report

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Report To:

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285 Dalton Ave
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Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 13-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Crystal Lake WDS
P.O. NUMBER: 10520-003
WATERWORKS NO.

			Client I.D.		SW5	SW QA/QC	SW4	SW2
			Sample I.D.		B20-35880-1	B20-35880-2	B20-35880-3	B20-35880-4
			Date Collected		12-Nov-20	12-Nov-20	12-Nov-20	12-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	26-Nov-20/O	0.0002	0.0002	0.0005	0.0002
Iron	mg/L	0.005	SM 3120	18-Nov-20/O	0.054	0.048	0.078	0.524
Lead	mg/L	0.00002	EPA 200.8	26-Nov-20/O	< 0.00002	< 0.00002	< 0.00002	0.00005
Nickel	mg/L	0.01	SM 3120	18-Nov-20/O	< 0.01	< 0.01	< 0.01	< 0.01
Phosphorus-Total	mg/L	0.01	E3199A.1	24-Nov-20/K	< 0.01	< 0.01	< 0.01	0.12
Selenium	mg/L	0.001	EPA 200.8	26-Nov-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-Nov-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	mg/L	0.005	SM 3120	18-Nov-20/O	0.011	0.007	0.010	0.009

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

Appendix D
Site Photographs

Photograph 1: Monitor DP1, April 2020

Photograph 2: Monitor DP1, October 2017

Photograph 3: Monitor DP2, April 2020

Photograph 4: Monitor DP2, November 2020

Photograph 5: Monitor DP3, April 2020

Photograph 6: Monitor DP3, November 2019

Photograph 7: Monitor DP4, April 2019

Photograph 8: Monitor DP4, November 2019

Photograph 9: Monitor MW1-U and MW1-L, April 2019

Photograph 10: Monitor MW1-U and MW1-L, April 2020

Photograph 11: Monitor BH16-1S and BH16-1D, April 2019

Photograph 12: Monitor BH16-1S and BH16-1D, April 2020

Photograph 13: Monitor BH16-2, November 2019

Photograph 14: Monitor BH16-2, April 2020

Photograph 15: Surface water monitoring station SW2, April 2020

Photograph 16: Surface water monitoring station SW2, July 2020

Photograph 17: Surface water monitoring station SW2, November 2020

Photograph 18: Surface water monitoring station SW3, April 2020

Photograph 19: Dry - Surface water monitoring station SW3, July 2020

Photograph 20: Dry - Surface water monitoring station SW3, November 2020

Photograph 21: Surface water monitoring station SW4, April 2020

Photograph 22: Surface water monitoring station SW4, July 2020

Photograph 23: Surface water monitoring station SW4, November 2020

Photograph 24: Surface water monitoring station SW5, April 2020

Photograph 25: Surface water monitoring station SW5, July 2020

Photograph 26: Surface water monitoring station SW6, April 2020

Photograph 27: Insufficient Volumes - Surface water monitoring station SW6, July 2020

Photograph 28: Surface water monitoring station SW6, November 2020

Appendix E

Borehole Logs

BOREHOLE NO. BH16-1d

PROJECT NAME: CRYSTAL LAKE CLOSED LANDFILL SITE/TRANSFER STATION
PROJECT NO.: 121-15605-01
CLIENT: MUNICIPALITY OF TRENT LAKES
DATE COMPLETED: Oct 18, 2016
BOREHOLE TYPE: 168 mm AIR HAMMER DRILL
SUPERVISOR: LBJ
GROUND ELEVATION: NOT DETERMINED
REVIEWER: TB

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE PID (ppm)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH 50 100 150 200 (Intact (Max) Cu, Remoulded Cu)	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0.0	**TOPSOIL:** Dark brown silty sand and gravel TOPSOIL, occasional rootlets, moist										Monitoring well installed with 50 mm inner diameter schedule 40 PVC risers, with a 3.04 m length No. 10 screen size well screen.
0.6	**SAND AND GRAVEL:** Brown SAND AND GRAVEL, some cobbles / boulders, moist										
1.8	**BEDROCK:** Pink GRANITE (chip samples)										
10.1	Borehole terminated at 10.1 m below ground surface in BEDROCK.										Borehole open upon completion of drilling.

WSP GEOTECH (METRIC) CRYSTAL LAKE_DRAFT.GPJ WSP_ENV_V1.GDT 5/11/17

BOREHOLE NO. BH16-1s

PROJECT NAME: CRYSTAL LAKE CLOSED LANDFILL SITE/TRANSFER STATION
PROJECT NO.: 121-15605-01

CLIENT: MUNICIPALITY OF TRENT LAKES
DATE COMPLETED: Oct 18, 2016

BOREHOLE TYPE: 168 mm AIR HAMMER DRILL
SUPERVISOR: LBJ

GROUND ELEVATION: NOT DETERMINED
REVIEWER: TB

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE PID (ppm)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH 50 100 150 200 Intact (Max) Cu, Remoulded Cu	WATER CONTENT % 10 20 30 W_P W_L	REMARKS
0.0	**SAND AND GRAVEL:** Dark brown silty SAND AND GRAVEL with moss cover, occasional rootlets, moist										Monitoring well installed with 50 mm inner diameter schedule 40 PVC risers, with a 3.04 m length No. 10 screen size well screen
0.6	**SAND AND GRAVEL:** Brown SAND AND GRAVEL, some cobbles / boulders, moist										
1.5	**BEDROCK:** Pink GRANITE (chip samples).										
5.5	Borehole terminated at 5.5 m below ground surface in BEDROCK.										Borehole open upon completion of drilling

WSP GEOTECH (METRIC) CRYSTAL LAKE_DRAFT.GPJ WSP_ENV_V1.GDT 5/11/17

BOREHOLE NO. BH16-2

PROJECT NAME: CRYSTAL LAKE CLOSED LANDFILL SITE/TRANSFER STATION
PROJECT NO.: 121-15605-01
CLIENT: MUNICIPALITY OF TRENT LAKES
DATE COMPLETED: Oct 19, 2016
BOREHOLE TYPE: 168 mm AIR HAMMER DRILL
SUPERVISOR: LBJ
GROUND ELEVATION: NOT DETERMINED
REVIEWER: TB

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE PID (ppm)	CONE PENETRATION 'N' VALUE 10 20 30 / SHEAR STRENGTH 50 100 150 200 (-φ- Intact (MaX) Cu, → Remoulded Cu)	WATER CONTENT % 10 20 30 (Wp, WL)	REMARKS
0.0	**FILL:** Clear Stone (100mm)										Monitoring well installed with 50 mm inner diameter, schedule 40 PVC risers, with a 3.04 m length No. 10 screen size well screen.
1.2	**PEAT:** Black silty sand, decaying organics, moist to wet										
3.4	**SILTY SAND:** Light brown silty sand, some gravel, wet to saturated										
4.6	**SILT:** Grey SILT, trace gravel, wet										
9.1	Borehole terminated at 9.1 m below ground surface in SILT.										Borehole caved to 8.5 m below ground surface upon completion

WSP GEOTECH (METRIC) CRYSTAL LAKE_DRAFT.GPJ WSP_ENV_V1.GDT 5/11/17