Associated Environmental

REPORT

Hullcar Valley
Groundwater Monitoring Well Installation,
Aquifer Testing, and Water Quality Sampling

Submitted to the
Province of British Columbia

MARCH 2020

A Carbon Neutral Company

BEST MANAGED COMPANIES Platinum member

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1 INTRODUCTION

Associated Environmental Consultants Inc. (Associated) was retained by the Province of British Columbia (the Province) to complete the following:

- Installation of two new monitoring wells in the upper unconfined Hullcar aquifer (Aquifer 103)
- Installation of two new monitoring wells in the lower semi-confined Hullcar aquifer (Aquifer 102), and
- Hydraulic testing and sampling of the new wells and three existing monitoring wells (WWAL 2019)

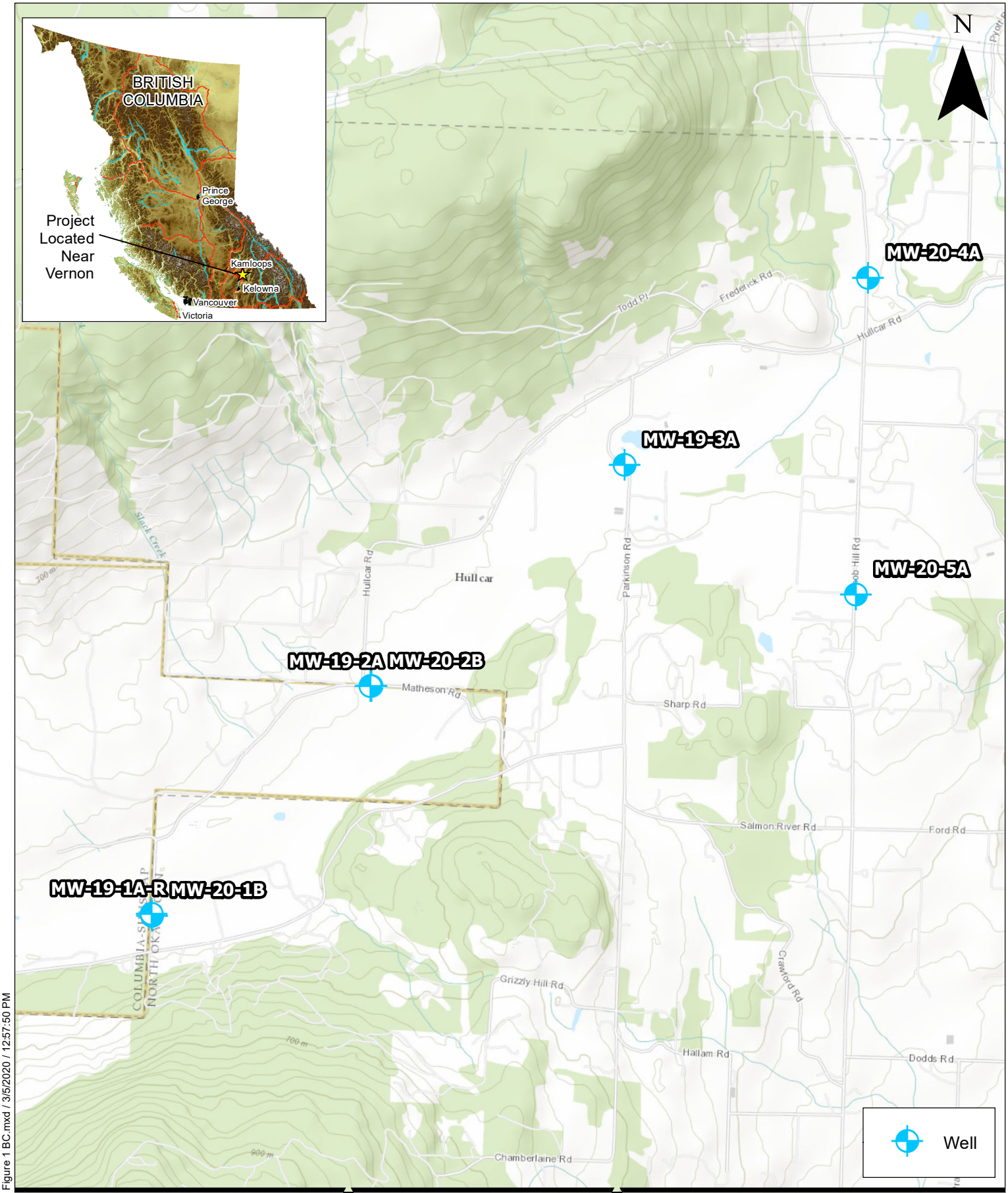
All of the monitoring wells are located within the Hullcar area in the Township of Spallumcheen, BC (the Township) (Figure 2-1).

2 OBJECTIVES AND SCOPE OF WORK

The objective of the project is to support the Provinces goals of improving the understanding of the groundwater flow direction, groundwater quality, and aquifer properties in Hullcar Valley mapped Aquifers 102 and 103, through the installation of new monitoring wells, hydraulic testing, and water quality sampling.

To meet this objective, Associated completed the following scope of work:

- Applied for and obtained required permits from the Township for completing works within the Township's Right-of-Way.
- Retained SEL Surveys to survey and locate property boundaries and retained Quadra Utility Locating to complete underground utilities and irrigation line check prior to drilling.
- Retained a Qualified Well Driller and supervised the drilling and construction of four monitoring wells, and the decommissioning of well MW-19-1A.
- Inspected drill cuttings on site to characterize the lithology at each well site.
- Conducted well hydraulic testing at each of the four new wells and the three previously drilled wells and interpreted data to determine the hydraulic properties of the aquifer.
- Collected water quality samples from each of the four new wells and three of the wells drilled in 2019 and submitted samples to an accredited laboratory for water quality analyses.
- Surveyed the ground elevation and top of casing at each new well.
- Reported results of surveying, drilling, decommissioning, well development, hydraulic testing, and water quality sampling.



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Associated Environmental

PROJECT NO.: 2020-8527.000.000
DATE: March 2020
DRAWN BY: DA

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Meters

FIGURE 1-1: Monitoring Well Locations

Province of BC

Hullcar Valley Groundwater Well Installation

3 METHODS

3.1 Permit

Prior to drilling, Tony Friesen, M.Sc., GIT, of Associated, visited the site on January 28, 2020 to review proposed well locations. He was accompanied by Dave Thomson of the Province, and Justin Faasse, Len Faasse and Scott Stuart of Ground Source Drilling Ltd. The location of each proposed well site was discussed and agreed upon on site. Once the well sites were selected, Associated applied for a permit from the Township of Spallumcheen to complete works within the Township's Right-of-Way. A copy of the permit is provided in Appendix A.

3.2 Site Survey and Preparation

Associated retained SEL Surveys (SEL) to survey the relevant property boundaries at each of the well locations. Raw survey data collect is provided in Appendix B. On January 28, 2020, Tony Friesen met Doug Jacobi of SEL on site to survey and mark the boundaries in relation to the proposed well locations to ensure that the wells were located at least one metre away from all property boundaries. Once the sites had been surveyed, Associated retained Taber Contracting Services to clear the snow at each location to allow access for drilling equipment and utility locates. On January 31, Grant Clements of Quadra Utility Locating used both Ground Penetrating Radar (GPR) and Electro Magnetic Scanner (EM) to scan each site and locate any underground utilities.

3.3 Well Decommissioning

On February 4, 2020, Associated supervised the decommissioning of well MW-19-1A[1], which was conducted by Ground Source Drilling Ltd (Qualified Well Driller Justin Faasse and number WD 11071401). The well was decommissioned in accordance to the *Groundwater Protection Regulation* (B.C. Reg. 39/2016), and consisted of filling the 3-inch PVC casing with coated bentonite pellets to within 2.2 metres of the ground surface before augering out the upper 2.2 metres of PVC casing, followed by filling the newly augered hole with bentonite chips to the ground surface. Associated calculated the volume of the monitoring well to ensure that no bridging occurred during the filling process. Once full, the bentonite chips were hydrated after installation to ensure a quick seal.

3.4 Drilling, Well Installation, and Development

Associated supervised the drilling of four boreholes between February 4 and February 14, 2020. The boreholes were drilled using a track-mounted air rotary drilling rig operated by Justin Faasse of Ground Source Drilling Ltd (Qualified Well Driller #11071401). Each borehole was completed with a 5-inch (120 mm) threaded steel casing to the target depth (i.e., two completed at a depth of approximately 45 m, and two at a depth of approximately 25 m). During the drilling of each borehole, Associated was on site to record the lithology, including texture, density, colour and moisture following Associated's Standard Operating Procedure for soil logging[2]. During drilling, a member of the Splatsin First Nation was on site to act as a cultural observer.

On completion of each borehole, Associated used the information gathered during the drilling to design the monitoring well at the target depth. Prior to installation, the well designs were reviewed by Marta Green, P.Geo., Senior Hydrogeologist of Associated, before being submitted to the Province for approval. Once approval was

[1] Well MW-19-1A, which was installed in 2019 (WWAL 2019), became damaged shortly after installation due to challenging subsurface conditions. Well MW-19-1A-R has been installed as a replacement (WWAL 2019); therefore, MW-19-1A is no longer needed.

[2] Our Soil Logging SOP is a modified (simplified) version of the ASTMD2487-17: Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and ASTM D2488-17: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) (ASTM 2017a and b).

received, each borehole was completed as a monitoring well by lowering the 3-inch (75mm) diameter (PVC) screen and casing into the hollow casing to the target depth. Filter sand was used to backfill any void below the screen and the annulus between the casing and the screen to approximately one metre above the top of the screen. Once the filter sand was in place, the steel casing was pulled back to expose the screen. Additional filter sand was added if any settling occurred. Coated bentonite chips were used to seal a minimum of one metre above the filter sand. The remainder of the annulus was sealed using high solids liquid bentonite grout installed using a 20 mm (¾-inch) tremie pipe and grout pump. Once the grout was in place, the steel casing was pulled back and removed.

Each well was capped with a J-plug and outfitted with a steel stick-up protector that was cemented in the ground. Each well was developed by Ground Source Drilling Ltd. with air for a minimum of two hours or until the water was relatively clear with little to no sand.

The four wells were identified as MW-20-1B, MW-20-2B, MW-20-4A, and MW-20-5A. Subsequent hydraulic testing and water quality sampling (Sections 3.5 and 3.6) were conducted at these wells and at three previously drilled wells identified as MW-19-1A-R[3], MW-19-2A, and MW-19-3A (Figure 2-1). Detailed well logs for the new wells are provided in Appendix C.

3.5 Hydraulic Testing and Analysis

Associated completed constant rate pumping tests at MW20-1B, MW-19-1A-R, MW-20-2B, MW-19-2A and MW-20-4A from February 11 to 13, 2020. Pumping tests were not completed on MW-20-5A due to the well being dry and on MW19-3A due a 2-inch Solinst™ cap that restricted access to the well. The decision to not complete the pumping test in these wells was discussed at the time with Dave Thomson, Regional Hydrogeologist with Province. Each pumping test was completed using a 76 mm (3-inch) diameter 0.5 Hp Grundfos™ submersible pump with a 20mm (¾-inch) diameter discharge line. Discharge rates were controlled with a ball-valve and measured using a calibrated bucket and stopwatch. Groundwater was discharged approximately 30 m downgradient using a 25mm (1-inch) diameter garden hose. Groundwater levels were monitored with an electronic well sounder and programable transducer during pumping and after pump shut-off (recovery). Where applicable, neighbouring monitoring wells were monitored using a Solinst manual water level meter during the pumping test to determine any well interference.

At MW19-1A-R and MW19-2A, due to very high transmissivity[4], the pump capacity did not allow for inducing enough drawdown to be useful for analysis and determination of the hydraulic properties of the aquifer. As an alternative, a slug test method was used for these wells. For each slug test, the transducer was set to record water levels at one-second intervals. A one-metre PVC solid cylinder was then quickly lowered into the well, displacing the water in the well. The instantaneous rise and fall of the groundwater level in the well were recorded over time. This process was completed several times at each well to ensure ample data for analysis.

The test data were input to AQTESOLV™, a third-party aquifer testing software. The software facilitates the analysis of hydraulic tests through comparison of test results with various analytical aquifer models to estimate the hydraulic conductivity of the aquifer in which the well is installed. Multiple analytical models were used to analyze each test for comparison.

[3] WWAL (2019) refers to MW-19-1A-R as MW-19-1B. For clarity, this report and future documents will refer to the well as MW-19-1A-R.
[4] The aquifer is comprised of coarse sand and gravel.

Table 3-1 summarizes the pumping tests, including type and length of test, pumping rates, aquifer types, and analytical solutions that were used to interpret the test results (Section 4.3).

Table 3-1
Summary of hydraulic test results and analytical solutions

Well ID	Test Type	Length of Test	Pumping Rate	Aquifer Response Type	Analytical Solutions Used for Data Interpretation
MW-19-1A-R	Slug Test	N/A	N/A	Unconfined	Bouwer-Rice, and Horslev
MW-20-1B	Pumping Test	120 minutes	0.22 l/sec (3.5 USgpm)	Confined	Theis, and Cooper-Jacob
MW-19-2A	Slug Test	N/A	N/A	Unconfined	Bouwer-Rice, and Horslev
MW-20-2B	Pumping Test	120 minutes	0.41 l/sec (6.5 USgpm)	Confined	Theis, and Cooper-Jacob
MW-20-4A	Pumping Test	120 minutes	0.69 l/sec (11 USgpm)	Confined	Theis, and Cooper-Jacob

Note: N/A – not applicable

3.6 Water Quality Sampling and Analysis

Associated collected groundwater samples following standard BC sampling methods (MOE 2013a). Six wells were sampled for water quality; MW-20-5A was not sampled due to the well being dry. Wells MW-19-1A-R, MW-20-1B, MW-20-2A, MW-20-2B, and MW-20-4A were sampled using a submersible pump at the end of the pumping test. MW19-3A was sampled using a low-flow peristaltic pump. Field parameters (i.e., temperature, conductivity, pH, oxidation-reduction potential, and turbidity) were measured with calibrated field meters at the time the sample was taken.

Groundwater samples were collected in laboratory-supplied bottles, filtered and preserved in the field (where necessary), and shipped via chain of custody protocol to CARO Analytical Services in Kelowna BC (an accredited laboratory). The samples were analyzed for chloride, nitrate, nitrite, sulphate, dissolved phosphorus, total suspended solids (TSS), dissolved metals, and total metals. Additional sample bottles were filled and delivered to the Province for Isotope Analysis as part of a separate research project.

4 RESULTS

4.1 Lithology

The lithology observed during drilling is described in the well logs provided in Appendix C. A summary of the lithology at MW-20-1B, MW-20-2B, MW-20-4A, and MW-20-5A is as follows:

- MW-20-1B: Lithology consists of alternating layers of poorly sorted gravel and sand, and well sorted sand to depth of 20.42 m bgs, which agrees with the borehole log of MW-19-1A-R. Water was first encountered at 10 m bgs. Based on the observed data, MW-20-1B is assumed to be developed in Provincially Mapped

Aquifer 103. The sand and gravel layer is underlain by a 21 m thick confining layer of very well sorted silt with fine sand and clay (20.42-41.45 m bgs). Below the silt is a 7 m layer of water-bearing gravel and fine to medium sand, with an appreciable amount of fines throughout (41.45-48.46 m bgs). The aquifer formation was noted to be hard with appreciable fines throughout and only produced limited water. Beneath the aquifer is a layer of gravel with clay (till). The till extends to the bottom of the borehole, which was completed to a depth of 52.1 m bgs.

- MW-20-2B: Lithology was very consistent to what was found at MW-20-1B, with alternating layers of sand and gravel (0–16.7 m bgs) followed by a thick layer of silt with fine sand and clay (16.76–39.9 m bgs). In contrast to MW-20-1B, below the silt is a 4 m thick clay layer (39.9–44.20 m bgs) before encountering the water-bearing sand and gravel aquifer (Aquifer 102). The aquifer at this location was noted to be 'cleaner' and more productive than the aquifer at MW-20-1B.
- MW-20-4A: Lithology consists primarily of very well sorted sand to a depth of 17.67 m bgs with discrete, one metre thick layers of silts at 1.83 m bgs and 11.58 m bgs. Underlying the sand is a 5 m thick layer of poorly sorted gravel (17.67–22.86 m bgs) becoming saturated at 20 m bgs. Below the water-bearing gravel is a layer of fine silt that extends to the bottom of the borehole, which was completed to a depth of 24.7 m bgs.
- MW-20-5A: Lithology consists of a layer of sand to a depth of 3.35 m bgs, followed by a thick layer of very hard gravel with clay (till) (3.35–9.75 m bgs). Below the till is a thin layer of dry sand (9.75–10.26 m bgs) before reaching bedrock. The borehole was drilled into the bedrock to a depth of 25 m bgs. No water was found in the borehole.

4.2 Monitoring Wells

MW-20-1B and MW-20-2B were installed in the lower confined sand and gravel aquifer (Aquifer 102) at a depth of 44.95 and 50.42 m toc, respectively. MW-20-4A was installed in the shallow aquifer (Aquifer 103) at a depth of 23.61 m btoc, and MW-20-5A was completed in bedrock at a depth of 25.62 m btoc.

Table 4-1 provides the well depths, locations, elevations, static water levels, and groundwater elevations for the four new wells and the three previously drilled wells. Monitoring well installations details are included in the well logs in Appendix C.

Table 4-1
Monitoring wells details, static water levels, and groundwater elevations

Well ID	Location[3]		Elevation of Top of Casing (m asl)[4]	Depth of Well (m btoc)	Stick-up (m toc)	Static Water Level (m btoc)[5]	Groundwater Elevation (m asl) (February 20, 2020)	Aquifer ID
	Northing	Easting						
MW-20-1B[1]	5594302.27	336991.66	516.713	44.95	0.60	8.93	507.78	102
MW-19-1A-R[2]	5594313.52	336986.66	516.509	12.08	0.63	9.08	507.43	103
MW-20-2B[1]	5595915.32	338525.94	517.916	50.42	0.66	7.83	510.09	102
MW-19-2A[2]	5595913.75	338535.71	517.665	11.45	0.76	8.70	508.97	103
MW-19-3A[2]	5597470.83	340312.62	509.445	5.87	0	2.62	506.83	103
MW-20-4A[1]	5598786.75	342027.16	524.103	23.61	0.72	16.94	507.16	103
MW-20-5A[1]	5596560.57	341940.51	548.284	25.62	0.79	Dry	N/A	N/A

Notes: N/A – not applicable
[1] Installed in 2020 by Associated (Section 4.1).
[2] Installed in 2019 by Western Water Associates Ltd. (WWAL 2019).
[3] Survey by SEL Surveys in February 2020.
[4] Surveyed by SEL surveys in 2020 (Section 3.2).
[5] Measured in the field by Associated in February 2020.

4.3 Hydraulic Properties

The calculated average transmissivity values at the screen portion of the aquifer (Aquifer 102) in MW-20-1B and MW20-2B were 3.11×10^{-5} and 3.26×10^{-4} m^2/sec, respectively. This is consistent with values for the lower range of sand and gravel (Freeze and Cherry 1979) and agrees with the observations during drilling.

Transmissivity values calculated for the wells completed in the upper aquifer (Aquifer 103) ranged from an average of $5.66 \times 10^{-5} m^2$/sec in MW-19-1A-R to $4.69 \times 10^{-3} m^2$/sec in MW-20-4A. MW-20-4A has a calculated transmissivity of 9.19×10^{-4} m^2/sec. These values are consistent the well logs for MW-19-1A-R, MW20-4A and MW-19-2A, and with the theoretical values presented by Freeze and Cherry (1979), for similar material.

Table 4-2 provides the pumping test and slug test results, including the calculated transmissivity and hydraulic conductivity for each well. Pumping test and slug test data are provided in Appendix D, and outputs from AQTESOLV are in provided in Appendix E.

Table 4-2
Pumping test and slug test results

Well ID	Lithology	Testing Method	Solution	Aquifer Thickness (m)	Transmissivity (m^2/sec)	Hydraulic Conductivity (m/sec)
MW-20-1B	Gravel with sand and silt	Constant Rate Pumping Test	Theis	7.01	$3.04x10^{-5}$	$4.34x10^{-6}$
			Dougherty-Babu		$3.19x10^{-5}$	$4.55x10^{-6}$
			Arithmetic Average		$3.11x10^{-5}$	$4.44x10^{-6}$
MW-19-1A-R	Gravel with coarse sand	Slug Test	Bouwer-Rice	11.97	$5.69x10^{-5}$	$4.75 x10^{-6}$
			Horslev		$5.62x10^{-5}$	$4.70 x10^{-6}$
			Arithmetic Average		$5.66x10^{-5}$	$4.73 x10^{-6}$
MW-19-2A	Gravel with coarse sand	Slug Test	Bouwer-Rice	8.92	$7.88x10^{-4}$	$8.83 x10^{-5}$
			Horslev		$1.05x10^{-3}$	$1.18 x10^{-4}$
			Arithmetic Average		$9.19x10^{-4}$	$1.03 x10^{-4}$
MW-20-2B	Gravel with sand and silt	Constant Rate Pumping Test	Theis	3.96	$4.27x10^{-4}$	$1.08 x10^{-4}$
			Cooper-Jacob		$2.24x10^{-4}$	$5.66 x10^{-5}$
			Arithmetic Average		$3.26x10^{-4}$	$8.23 x10^{-5}$
MW-20-4A	Gravel with coarse sand	Constant Rate Pumping Test	Theis	6.41	$4.76x10^{-3}$	$7.43 x10^{-4}$
			Cooper-Jacob		$4.62x10^{-3}$	$7.21 x10^{-4}$
			Arithmetic Average		$4.69x10^{-3}$	$7.32 x10^{-4}$

Note: Bold denotes best fit.

4.4 Water Quality

Water quality results for the major ions are summarised (Table 4-3). Full results, and lab reports are presented in Appendix F. Although a thorough review of the water quality data was not part of the scope of this project, we note the following drinking water guideline exceedances:

- Nitrate-N in the shallow wells MW-19-1A-R and MW-19-3A exceeded the Guidelines for Canadian Drinking Water Quality (GCDWQ) Maximum Acceptable Concentrations (MAC) of 10 mg/L (Health Canada 2019), with nitrate-N concentrations of 15.5 and 10.8 mg/L, respectively. By comparison, nitrate-N levels in MW-19-2A and MW-20-4A had concentrations of 4.07 and 1.37 mg/L, respectively (compared to a MAC of 10 mg/L). Nitrate-N levels in MW-20-1B and MW-20-2B were non-detect.
- Manganese exceeded the MAC of 0.12 mg/L in MW-20-1B, with a concentration of 0.126 mg/L
- Uranium exceeded the MAC of 0.02 mg/L in MW-20-2B and MW-19-3A with concentrations of 0.0355 mg/L and 0.0309 mg/L, respectively.

Also of note is the sulfate concentration in MW-19-1A-R (348 mg/L) was significantly higher than in any of the other well locations (with a range of 115 to 209 mg/L). Sulphate enters the water cycle through weathering of parent rocks, atmospheric deposition, and discharges from anthropogenic sources, such as mining operations, agricultural runoff, and municipal wastewater (MOE 2013b). With limited data, it is unclear what is the source of this concentration.

Table 4-3
Summary table of major ions and exceedances

Analyte	Guideline (GCDWQ)[1]	MW-19-1A-R	MW-20-1B	MW-20-2B	MW-19-2A	MW-20-4A	MW-19-3A
Chloride (mg/L)	AO<=250	39.4	1.13	24.6	38.4	99.5	25
Nitrate (as N) (mg/L)	MAC=10	15.5[2]	<0.010	<0.010	4.07	1.37	10.8
Nitrite (as N) (mg/L)	MAC=1	<0.010	<0.010	<0.010	<0.010	0.018	<0.010
Sulfate (mg/L)	AO<=500	348	115	209	145	133	180
Phosphorus, Total Dissolved (mg/L)	N/A	0.0145	0.0163	0.0056	0.0161	0.0062	0.0126
Manganese (mg/L)	0.12	0.0007	0.126	0.0633	0.0049	0.059	0.011
Uranium (mg/L)	0.02	0.00512	0.00365	0.0355	0.00847	0.0167	0.0309

Notes:

1. The Health Canada DW and BC DW guideline levels are designated as either a maximum acceptable concentration (MAC) or an aesthetic objective (AO) (Health Canada 2019a, MOE 2017a). The MAC guidelines are health-risk-based and determined based on the known health effects associated with the substance. The AO guidelines apply to those variables that adversely affect taste or intended, typical water uses (e.g., staining of laundry) but do not pose a health hazard. For interpretation purposes, whichever guideline (Health Canada or BC) is more stringent was used and referred to as the DW guideline.
2. The Guideline presented here is only one guideline that may apply. A review of all guidelines that may apply was beyond the scope of this project. GCDWQ means Guidelines for Canadian Drinking Water Quality.
3. Red means the result exceeds the guideline shown.

5 SUMMARY AND CONCLUSIONS

In 2020, Associated completed the installation of four monitoring wells and the subsequent hydraulic testing and water quality sampling of the four new wells plus three existing wells. In summary:

- Two new monitoring wells were developed in Aquifer 102 and one in Aquifer 103. The fourth well was installed into bedrock to the south of the surficial aquifers.
- Each new well was constructed in accordance with the *Groundwater Protection Regulation* (B.C. Reg. 39/2016).
- Constant rate pumping tests were completed at three wells (MW-20-1B, MW-20-2B and MW-20-4A) and slug tests were completed at two wells (MW-19-1A-R and MW-19-2A).
- Water quality *in situ* measurements and water samples were collected from each of the sampled wells (MW-20-1B, MW-19-1A-R, MW-20-2B, MW-19-2A, MW-19-4A, and MW-19-3A). Samples were submitted to an accredited laboratory for analysis of major ions and dissolved and total metals.

CLOSURE

This report was prepared for the Province to summarize the rationale and relevant information with respect to siting, drilling, construction, development, hydraulic testing and sampling of the subject wells.

The services provided by Associated Environmental Consultants Inc. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
Associated Environmental Consultants Inc.

Tony Friesen, M.Sc. GIT
Project Hydrogeologist

Marta Green, P.Geo.
Project Manager and Senior Hydrogeologist

PERMIT STAMP

REFERENCES

ASTM International. 2017a. ASTMD2487-17: Standard Practice for Description and Identification of Soils (Visual-Manual Procedures).

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Western Water Associates Ltd. (WWAL). 2019. Groundwater Observation Well Installation, Development and Sampling Aquifer 130, in Township of Spallumcheen.

APPENDIX A - PERMIT

Utility PERMIT NO. _____

ROLL NO. _____

TOWNSHIP OF SPALLUMCHEEN

APPLICATION
to
CONSTRUCT AND MAINTAIN WORKS ON MUNICIPAL RIGHT-OF-WAY

APPLICANT: Associated Environmental OWNER: Ministry of Environment (Attn Christine Bieber)

Address: 200, 2800 29th Street Address: PO Box 9362 STN PROV GOVT

Vernon, BC V1T 9P9 Victoria, BC V8W 9M2

Phone No.: 1-250-545-3672 Phone No.: _____

Cell No.: 1-250-308-6153 Cell No.: _____

Type of works: Drilling 4 Monitoring Wells

Installation address: See Attachment for locations

Legal Description: See Attachment for locations

ON SITE USE FLAGGING TO MARK LOCATION OF PROPOSED WORKS

PLEASE PROVIDE SIMPLE **SKETCH ON REVERSE** OF THIS FORM SHOWING:

- Front and side roads (if applicable)
- Location of proposed works
- Distance from nearest property line to works
- Cross-section view of works showing road, ditches, proposed works and ALL associated measurements

****

PERMIT IS HEREBY APPROVED

SUBJECT TO THE FOLLOWING AND/OR ATTACHED CONDITIONS:

_____

_____

DATE: JAN 30/2020

Public Works Manager

Information contained in this form may be subject to Freedom of Information and Protection of Privacy Act enquiries

Tony Friesen

From:	Tony Friesen
Sent:	Thursday, January 30, 2020 9:44 AM
To:	ira.adams@spallumcheentwp.bc.ca; Tyler McNeill
Subject:	Permit info for Hullcar Groundwater Well Installation (latest email with Application attached)
Attachments:	Ground Source Drilling Ltd _Township of Spallumcheen (1-28-2020 - CSIO Liability).pdf; AENG-2019-78-ENV-REV-2-Associated_Environmental-Her_Majesty_the_Quee.pdf; Hullcar Well_1B.pdf; Hullcar Well_2B.pdf; Hullcar Well_4A.pdf; Hullcar Well_5A.pdf; Hullcar Monitoring well locations.pdf; Township of Spallumcheen Application.pdf

Hello Ira and Tyler,

Associated Environmental has been retained by the Ministry of Forests, Lands, Natural Resources and Rural Developments to oversee the drilling of 4 monitoring wells at different locations within the Hullcar Area. The Drilling it to be completed by Groundsource Drilling Ltd who will be acting as the Prime Contract for the drilling. The wells are to be located on the roadside within the municipal boundaries of the Township of Spallumcheen (The Township). The following information is intended to meet the requirement of the Township to construct works on municipal right-of-way.

The Proposed scope of work includes the following:

- Clear the existing snow/ snow banks in the area that we plan to drill/work.
- Survey the municipal boundaries in the vicinity of the proposed well locations
- Complete a BC one call and private utility locate at each of the proposed locations
- Drill a monitoring well (approximately 1-2 days per location)
- Restore working area to the condition it was in prior to working beginning.

Location of Proposed works:
(Please see attachment A for mapped wells locations).

Table 1: Summary of proposed well locations.

Well ID	Easting	Northing
1B	336996.00	5594277.00
2B	338527.00	5595908.00
4A	342033.00	5598974.00
5A	341924.00	5596719.00

Schedule
The plan is to start drilling the wells on February 4, 2020 and be completed drilling and have the sites cleared by February 14, 2020. No more then 2 days will be spent at each site

Table 2: Proposed Drilling Schedule

Date	Location

February 4-6	Well 1B
February 6-7	Well 2B
February 10	Well 4A
February 11	Well 5A

Traffic Management

All the proposed work is intended to be within the municipal right of way, but off the road way. In the case that some of the work does temporarily obstruct traffic in anyway (Arrival to and Departure from each location), traffic control Management will adhere to the BC Ministry of Transportation and Infrastructure and Work Safe BC Standards of Practice.

Contractors insurance policy
The Township has been directly named as a named insured on both the insurance policy of the Prime Contractor and Associated Environmental. (A copy of both insurance policies have be attached).

Contact Info

Project Manager
Tony Friesen Hydrogeologist.
Phone # 1-250-308-6153
Email: friesent@ae.ca

Drillers/ Prime Contractor:
Groundsource Drilling
Scott Stuart
Phone # 1-250-808-7155
Email: scott@groundsourcedrilling.com

Ministry Contact
Dave Thomson, Regional Hydrogeologist
Phone # 1-250-260-4641
Email: David.Thomson@gov.bc.ca

If there is any other information that you require, please let me know. For Payment, Please let me know the best way to make this.

Thanks

Tony Friesen, M.Sc. GIT.
Hydrogeologist
Associated Environmental Consultants Inc.
#200 - 2800 29th Street, Vernon, BC V1T 9P9
Tel: 250.545.3672 | Cel: 250.308.6153 | www.ae.ca


Proposed Well 4A
Hullcar Rd
Parkinson Lake
Hullcar
Proposed Well 2B
Proposed Well 5A
Proposed Well 1B
Salmon River Rd
Knob Hill Rd
Image © 2020 Maxar Technologies
© 2019 Google
Image © 2020 Maxar Technologies
Image © 2020 CNES / Airbus
Google Earth
2004
Imagery Date: 8/21/2019 lat 50.496764° lon -119.267607° elev 519 m eye alt 8.16 km


N
Proposed 5A
0
50
100
Meters
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Ae


N
Proposed 4A
Proposed 4A
0
50
100
Meters
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Ae


N
Proposed 2B
0
50
100
Meters
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Ae

N

Proposed 1B

0 50 100
Meters

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Ae

APPENDIX B – RAW SURVEY DATA

SUBDIVISION PLAN OF PART OF THAT PART OF THE FRACTIONAL NW 1/4 OF Sec 26 SHOWN ON PLAN B1273, Tp 34, K(formerly O)DYD EXCEPT PLANS 5283, 19490, 21196, 28420 AND 29121

PLAN EPP78251

BCGS 82L.054

SCALE 1 : 1250

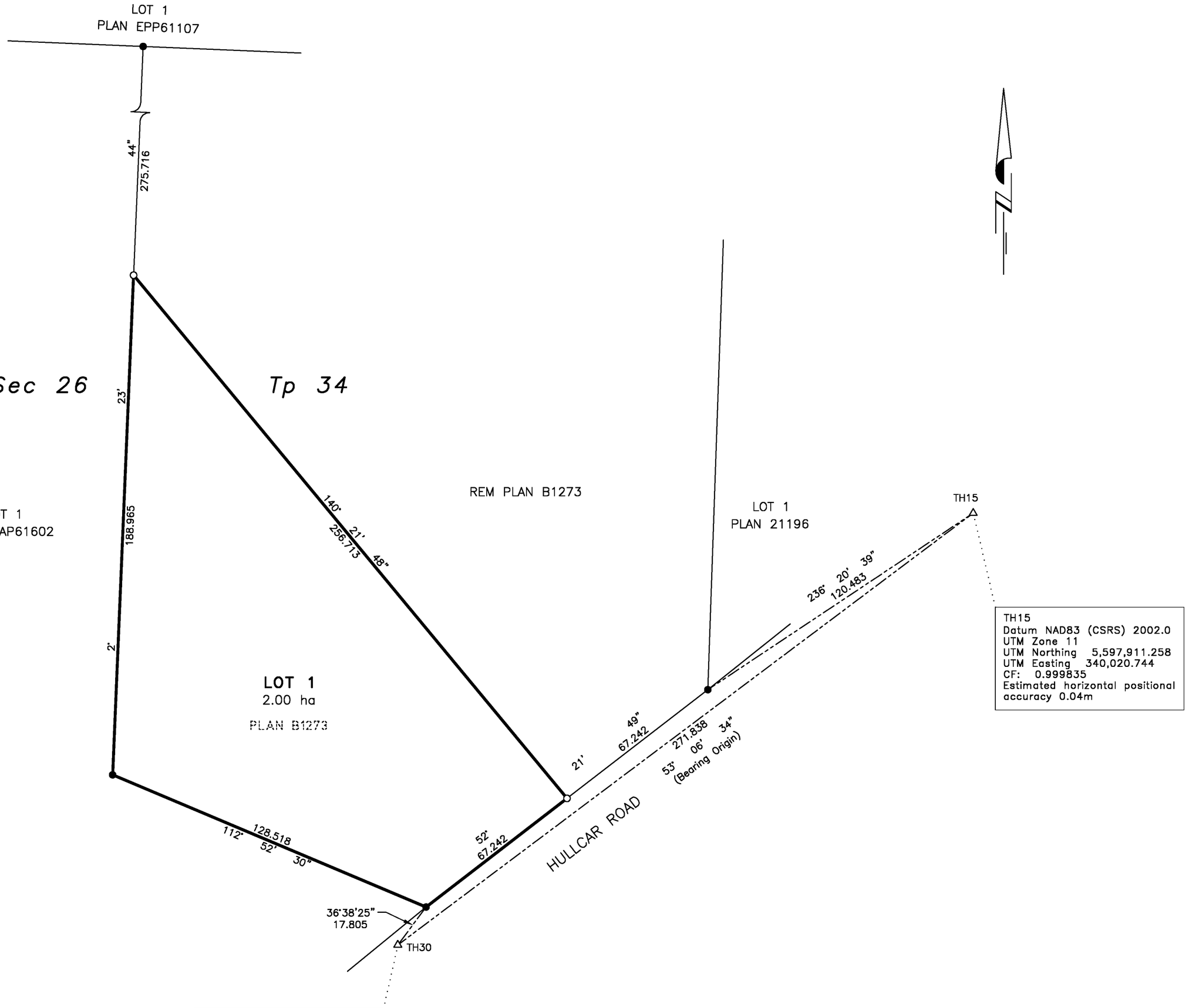
0 10 20 30 40 50 60 70 80 90

The intended plot size of this plan is 432mm in width by 560mm in height (C size) when plotted at a scale of 1:1250.

Grid bearings are derived from differential dual frequency GNSS observations and are referred to the central meridian of UTM Zone 11 (117° west longitude). To obtain local astronomic bearings referred to the meridian through TH15, subtract 1°44'30".

This plan shows horizontal ground–level distances in metres unless otherwise specified. To compute grid distances, multiply ground–level distances by the average combined factor of 0.999835, which has been determined based on an ellipsoidal elevation of 505 metres.

The UTM coordinates and estimated horizontal positional accuracy achieved are derived from differential dual frequency GNSS observations post processed using the Precise Point Positioning service of Natural Resources Canada.



TH15
Datum NAD83 (CSRS) 2002.0
UTM Zone 11
UTM Northing 5,597,911.258
UTM Easting 340,020.744
CF: 0.999835
Estimated horizontal positional accuracy 0.04m

TH30
Datum NAD83 (CSRS) 2002.0
UTM Zone 11
UTM Northing 5,597,748.104
UTM Easting 339,803.368
CF: 0.999837
Estimated horizontal positional accuracy 0.04m

LEGEND

- ● denotes standard iron post found
- o denotes standard iron post placed
- △ denotes traverse hub placed

This plan lies within the jurisdiction of the Approving Officer for the Township of Spallumcheen.
File No.: 16–0405–SPL–SUB

This plan lies within the Regional District of North Okanagan.

The field survey represented by this plan was completed on the 16th day of November, 2017.
Scott G. McPherson, BCLS 859

WILLIAM E. MADDOX
B. C. Land Surveyor
3500 – 30th Street, Vernon, BC V1T 5E8

101060R00

FILE: R10106

APPENDIX C - WELL LOGS

Project Details

Project Number: 2020-8527
Client : Province of BC
Locat ion: Hullcar Valley

MW2020-1B

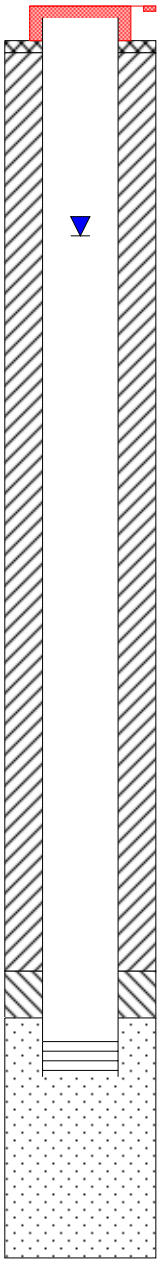
Location

Northing (m): 5594302
Easting (m): 336992
Elevat ion (m): 516. 71 (Top of casing)

Subsurface Profile

Depth (m)	Graphic Log	Description
0		Topsoil. Sand with silt and gravel (subrounded). Dark brown. Loose. Moist.(0 - 0.60 m)
4		GRAVEL (fine to medium, subrounded) with sand and trace silt. Well graded. Dark Brown. Loose. Moist. (0.60 - 3.66 m)
8		SAND (medium to coarse) with gravel (subrounded). Trace Fines. Well graded. Dense. Moist. (3.66 - 6.1 m)
12		SAND, (fine to medium). Poorly graded. Fining downwards. Brown. Loose. Moist. (6.1 - 10.05 m)
16		SAND (very coarse). Poorly graded. Trace gravel. Dark brown. Loose. Wet. (10.10 - 11.88 m)
20		GRAVEL (fine to medium) with sand. Well graded. Brown. Loose. Wet. (11.88 - 15.50 m)
24		SAND (fine to medium). Poorly graded. Grey. Loose. Wet. Trace wood fragments. (15.50 - 20.42 m)
28		SILT with sand (fine). Poorly graded. Dark grey. Loose. Wet. (20.42 - 24.38 m)
32		SILT with clay. Poorly graded. Dark grey. Loose. Wet. (24.38 - 41.45 m)
36		
40		
44		GRAVEL (fine to medium, angular, broken) with silt and trace clay. Well graded. Brown. Loose. Wet. 20-35 USgpm. (41.45 - 48.46 m)
48		Gravel with clay (till). Well graded. Grey and brown. Dense. Moist. (48.46 - 52.1 m)
52		
56		

Well Completion



Depth (m)	Details
0	Stick-up (0.6 m) Concrete (0-0.50 m)
8	Static water level - 8.33 mbtoc (Feb 20, 2020)
12	Schedule 40 PVC Casing (75 mm) (-0.6 - 42.83 m)
24	High solids bentonite grout (0.5-41.83 m)
40	Coated Bentonite Pellets (39.83 - 41.83 m)
44	Schedule 40 PVC 10-slot screen (75 mm) (42.83 - 44.37 m)
48	10-20 Sand (52.1 - 41.83 m)

Associated Environmental

Lithology Legend

- Gravel
- Sand
- Sand and Gravel
- Silt
- Till
- Topsoil

Contractor: Groundsource Drilling
Operator: Justin Fasse
Date of construction: 4 / Feb / 2020
Drilling method: Odex with Casing

Drawn by: Tony Friesen

Project Details

Project Number: 2020-8527
Client : Province of BC
Location: Hullcar Valley

MW2020-2B

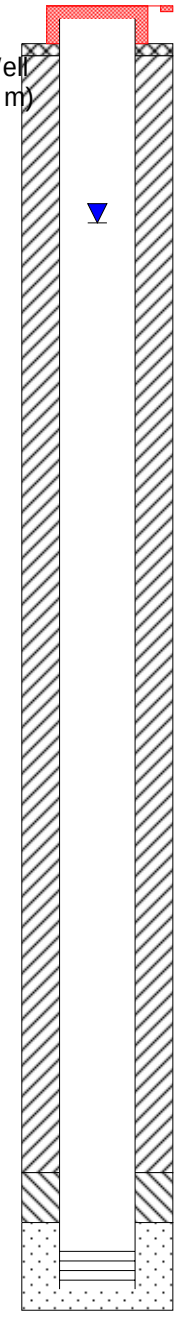
Location

Northing (m): 5595915
Easting (m): 338526
Elevation (m): 517.92 (Top of casing)

Subsurface Profile

Depth (m)	Graphic Log	Description
-4		
0		SAND (fine to medium) with gravel (subrounded). Well graded. Dark Brown. Dense. Moist. (0.0 - 4.26 m)
4		SAND (fine to medium). Poorly graded. Dark Brown. Dense. Moist. (4.26 - 5.49 m)
8		SAND (medium to coarse) with gravel (subangular). Poorly graded. Loose. Moist. (5.49 - 9.14 m)
12		SAND, (Very coarse). Poorly graded. Trace gravel (subangular). Brown. Loose. Moist. (9.14 - 11.58 m)
16		GRAVEL (fine to medium, subrounded) with sand (very coarse). Well graded. Dark Brown. Very Loose. Wet. (11.58 - 16.76 m)
20		SILT with clay. Very poorly graded. Dark grey. Loose. Wet. (16.76 - 23.16 m)
24		SAND (fine) with silt. Very poorly graded. Dark Grey. Loose. Wet (more water then above)Trace wood fragments. (23.16 - 23.77 m)
28		SILT with clay and sand (fine). Poorly graded. Dark grey. Loose. Wet. (23.77 - 39.90 m)
32		
36		
40		CLAY with silt. Poorly graded. Dark gray/blue. Dense. Moist (little water) (39.90 - 44.20 m)
44		SAND (fine) with silt. Poorly graded. Light Grey. Loose. Wet (more water then above). (44.20 - 46.63 m)
48		GRAVEL (fine to medium, subrounded) with sand (very coarse) trace silt. Well graded. Dark Brown. Very Loose. Wet (lots of water).(46.63 - 50.59 m)
52		

Well Completion



Details	Depth (m)
Stick-up (0.66 m)	-4
Concrete (0-0.50 m)	0
	4
Static water level - 7.83 mbtoc (Feb 20, 2020)	8
	12
Schedule 40 PVC Casing (75 mm) (-0.6 - 48.42 m)	16
	20
High solids bentonite grout (0.5-47.3 m)	24
	28
	32
	36
Schedule 40 PVC 10-slot screen (75 mm) (48.42 - 49.76 m)	40
Coated Bentonite Pellets (45.3-47.3 m)	44
10-20 Sand (47.3 - 50.6 m)	48
	52

Associated Environmental

Lithology Legend

- Clay
- Sand and Gravel
- Gravel
- Silt
- Sand

Contractor: Groundsource Drilling
Operator: Justin Fasse
Date of construction: 4 / Feb / 2020
Drilling method: Odex with Casing

Drawn by: Tony Friesen

Project Details

Project Number: 2020-8527
Client : Province of BC
Location: Hullcar Valley

MW2020-4A

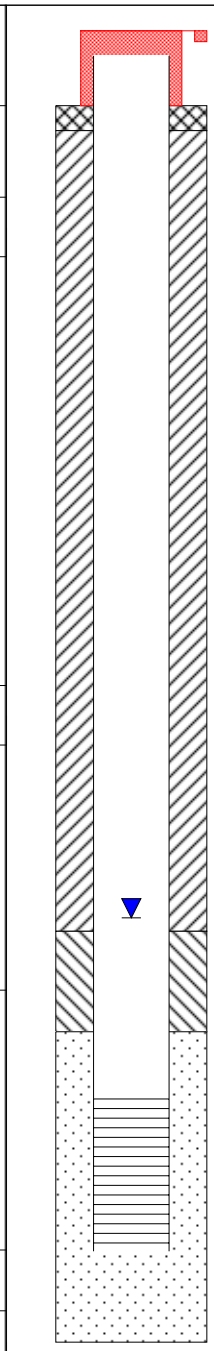
Location

Northing (m): 5598787
Easting (m): 342027
Elevation (m): 524.10 (Top of casing)

Subsurface Profile

Depth (m)	Graphic Log	Description
0		SAND (fine to medium), trace silt. Poorly sorted. Dark brown. Very loose. Moist. (0.00 - 1.83 m)
2		SILT with clay. Poorly graded. Brown. Semi loose. Moist. (1.83 - 2.44 m)
4		SAND (fine) with trace silt. Very poorly graded. Light brown. Loose. Moist. (2.44 - 11.58 m)
12		SILT with clay and trace sand. Poorly graded. Dark brown. Loose. Moist. (11.58 - 12.19 m)
14		SAND (fine) with trace silt. Very poorly graded. Brown turning to orangy brown at 17 m. Loose. Moist. (12.19 - 17.67 m)
18		GRAVEL (fine to medium, subrounded), with sand (medium) and trace silt. Well graded. Orangy brown. Loose. Wet at 20 m. (17.67 - 22.86 m)
22		SAND (fine to Coarse). Well graded. Brown. Loose. Wet. (22.86 - 24.08 m)
24		SILT with sand (fine) and clay. Poorly graded. Grey. Semi Loose. Wet, with less water. (24.08 - 24.7m)

Well Completion



Depth (m)	Details
0	Stick-up (0.72 m)
0	Concrete (0-0.50 m)
6	Schedule 40 PVC Casing (75 mm) (-0.6 - 19.85 m)
12	High solids bentonite grout (0.5-16.5 m)
16	Static water level - 16.94 mbtoc (Feb 20, 2020)
18	Coated Bentonite Pellets (16.5-18.5 m)
22	Schedule 40 PVC 10-slot screen (75 mm) (19.85 - 22.89 m)
24	10-20 Sand (18.5 - 24.70 m)

Associated Environmental

Lithology Legend

Gravel | Silt | Sand

Contractor: Groundsource Drilling
Operator: Justin Fasse
Date of construction: 4 / Feb / 2020
Drilling method: Odex with Casing

Drawn by: Tony Friesen

Project Details

Project Number: 2020-8527
Client : Province of BC
Location: Hullcar Valley

MW2020-5C

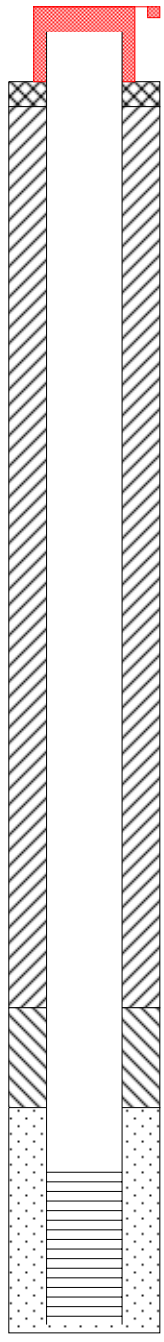
Location

Northing (m): 5596561
Easting (m): 341941
Elevation(m): 548.28 (Top of casing)

Subsurface Profile

Depth (m)	Graphic Log	Description
0		Topsoil. Sand with silt and gravel (subrounded). Dark brown. Loose. Moist. (0 - 0.60 m)
2		SAND (medium to coarse) with gravel (subrounded). Trace Fines. Well graded. Hard. Moist. (0.6 - 3.35 m)
6		Clay, gravel and sand (till). Well graded. Grey and brown. Very Hard. Moist. (3.35 - 9.75 m)
10		SAND (medium) and gravel (rounded). Well graded. Orangy brown. Semi loose. Dry. (9.75 - 10.36 m)
18		BEDROCK. Grey. Hard. Dry (10.36 - 24.83 m)

Well Completion



Depth (m)	Details
0	Stick-up (0.79 m)
0	Concrete (0-0.50 m)
6	Schedule 40 PVC Casing (75 mm) (-0.6 - 21.79 m)
12	High solids liquid bentonite grout (0.5 - 18.5 m)
18	Coated Bentonite Pellets (18.5-20.5 m)
22	10-20 Sand (20.5 - 25 m)
24	Schedule 40 PVC 10-slot screen (75 mm) (21.79 - 24.83 m)

Associated Environmental

Lithology Legend

- Sand
- Sand and Gravel
- Till
- Topsoil
- Bedrock

Contractor: Groundsource Drilling
Operator: Justin Fasse
Date of construction: 4 / Feb / 2020
Drilling method: Odex with Casing

Drawn by: Tony Friesen

APPENDIX D - AQUIFER TESTING DATA

Table C-1
Pumping Test Data

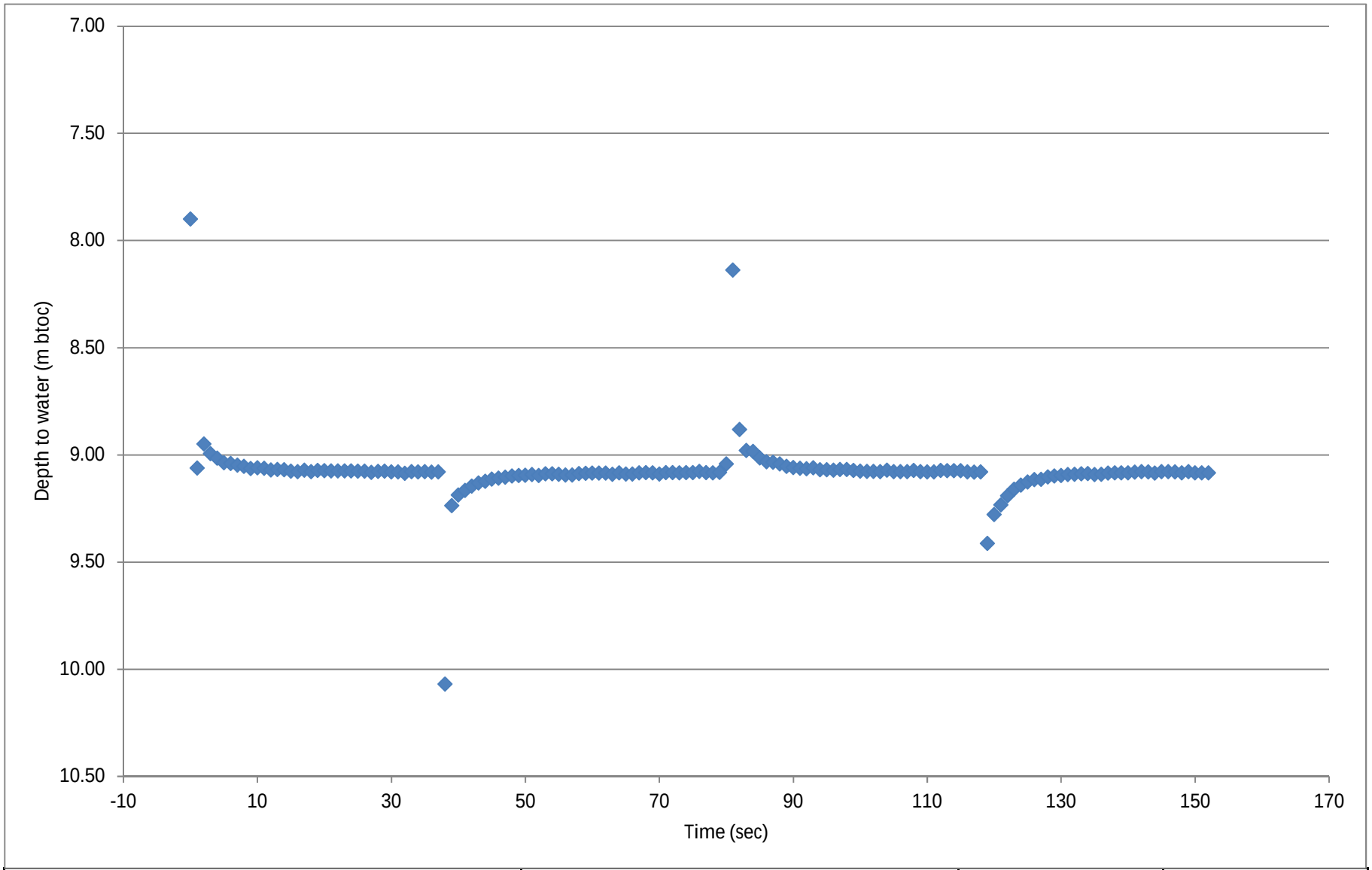
Well ID:	MW-19-1A-R	Static Water Level (mbtoc)	9.08
Start Date/Time	2/18/20 11:15 AM	Pre-Test Water Level (mbtoc)	9.08
Client	Province of BC	Total Well Depth (m)	12.08
Project	2020-8527	Volume of Cylinder (liters)	1.17
Test	Slug test		
Contractor	Associated Env		

Clock Time	Time Elapsed (sec)	Depth to Water (m)	Drawdown (m)	Comments
2/18/20 11:15 AM	0	7.90	-1.18	Slug in
2/18/20 11:15 AM	1	9.06	-0.02	
2/18/20 11:15 AM	2	8.95	-0.13	
2/18/20 11:15 AM	3	8.99	-0.09	
2/18/20 11:15 AM	4	9.02	-0.06	
2/18/20 11:15 AM	5	9.04	-0.04	
2/18/20 11:15 AM	6	9.04	-0.04	
2/18/20 11:15 AM	7	9.05	-0.03	
2/18/20 11:15 AM	8	9.05	-0.03	
2/18/20 11:15 AM	9	9.06	-0.02	
2/18/20 11:15 AM	10	9.06	-0.02	
2/18/20 11:15 AM	11	9.06	-0.02	
2/18/20 11:15 AM	12	9.07	-0.01	
2/18/20 11:15 AM	13	9.07	-0.01	
2/18/20 11:15 AM	14	9.07	-0.01	
2/18/20 11:15 AM	15	9.08	0.00	
2/18/20 11:15 AM	16	9.08	0.00	
2/18/20 11:15 AM	17	9.07	-0.01	
2/18/20 11:15 AM	18	9.08	0.00	
2/18/20 11:15 AM	19	9.07	-0.01	
2/18/20 11:15 AM	20	9.07	-0.01	
2/18/20 11:15 AM	21	9.08	-0.01	
2/18/20 11:15 AM	22	9.08	-0.01	
2/18/20 11:15 AM	23	9.08	-0.01	
2/18/20 11:15 AM	24	9.08	-0.01	
2/18/20 11:15 AM	25	9.08	0.00	
2/18/20 11:15 AM	26	9.08	0.00	
2/18/20 11:15 AM	27	9.08	0.00	
2/18/20 11:15 AM	28	9.08	0.00	
2/18/20 11:15 AM	29	9.08	0.00	
2/18/20 11:15 AM	30	9.08	0.00	
2/18/20 11:15 AM	31	9.08	0.00	
2/18/20 11:15 AM	32	9.09	0.01	
2/18/20 11:15 AM	33	9.08	0.00	
2/18/20 11:15 AM	34	9.08	0.00	
2/18/20 11:15 AM	35	9.08	0.00	
2/18/20 11:15 AM	36	9.08	0.00	
2/18/20 11:15 AM	37	9.08	0.00	
2/18/20 11:15 AM	38	10.07	0.99	Slug out
2/18/20 11:15 AM	39	9.24	0.16	
2/18/20 11:15 AM	40	9.19	0.11	
2/18/20 11:15 AM	41	9.17	0.09	
2/18/20 11:15 AM	42	9.15	0.07	
2/18/20 11:15 AM	43	9.13	0.05	
2/18/20 11:15 AM	44	9.12	0.04	
2/18/20 11:15 AM	45	9.11	0.03	
2/18/20 11:15 AM	46	9.11	0.03	
2/18/20 11:15 AM	47	9.10	0.02	
2/18/20 11:15 AM	48	9.10	0.02	
2/18/20 11:15 AM	49	9.10	0.02	
2/18/20 11:15 AM	50	9.10	0.02	
2/18/20 11:15 AM	51	9.09	0.01	
2/18/20 11:15 AM	52	9.10	0.02	
2/18/20 11:15 AM	53	9.09	0.01	
2/18/20 11:15 AM	54	9.09	0.01	

Table C-1
Pumping Test Data

Associated Environmental

Clock Time	Time Elapsed (sec)	Depth to Water (m)	Drawdown (m)	Comments
2/18/20 11:15 AM	55	9.09	0.01	
2/18/20 11:15 AM	56	9.09	0.01	
2/18/20 11:15 AM	57	9.09	0.01	
2/18/20 11:15 AM	58	9.09	0.01	
2/18/20 11:15 AM	59	9.09	0.01	
2/18/20 11:15 AM	60	9.09	0.01	
2/18/20 11:16 AM	61	9.09	0.01	
2/18/20 11:16 AM	62	9.09	0.01	
2/18/20 11:16 AM	63	9.09	0.01	
2/18/20 11:16 AM	64	9.08	0.00	
2/18/20 11:16 AM	65	9.09	0.01	
2/18/20 11:16 AM	66	9.09	0.01	
2/18/20 11:16 AM	67	9.08	0.00	
2/18/20 11:16 AM	68	9.08	0.00	
2/18/20 11:16 AM	69	9.08	0.00	
2/18/20 11:16 AM	70	9.09	0.01	
2/18/20 11:16 AM	71	9.08	0.00	
2/18/20 11:16 AM	72	9.08	0.00	
2/18/20 11:16 AM	73	9.08	0.00	
2/18/20 11:16 AM	74	9.08	0.00	
2/18/20 11:16 AM	75	9.08	0.00	
2/18/20 11:16 AM	76	9.08	0.00	
2/18/20 11:16 AM	77	9.08	0.00	
2/18/20 11:16 AM	78	9.08	0.00	
2/18/20 11:16 AM	79	9.08	0.00	
2/18/20 11:16 AM	80	9.04	-0.04	
2/18/20 11:16 AM	81	8.14	-0.94	Slug in
2/18/20 11:16 AM	82	8.88	-0.20	
2/18/20 11:16 AM	83	8.98	-0.10	
2/18/20 11:16 AM	84	8.98	-0.10	

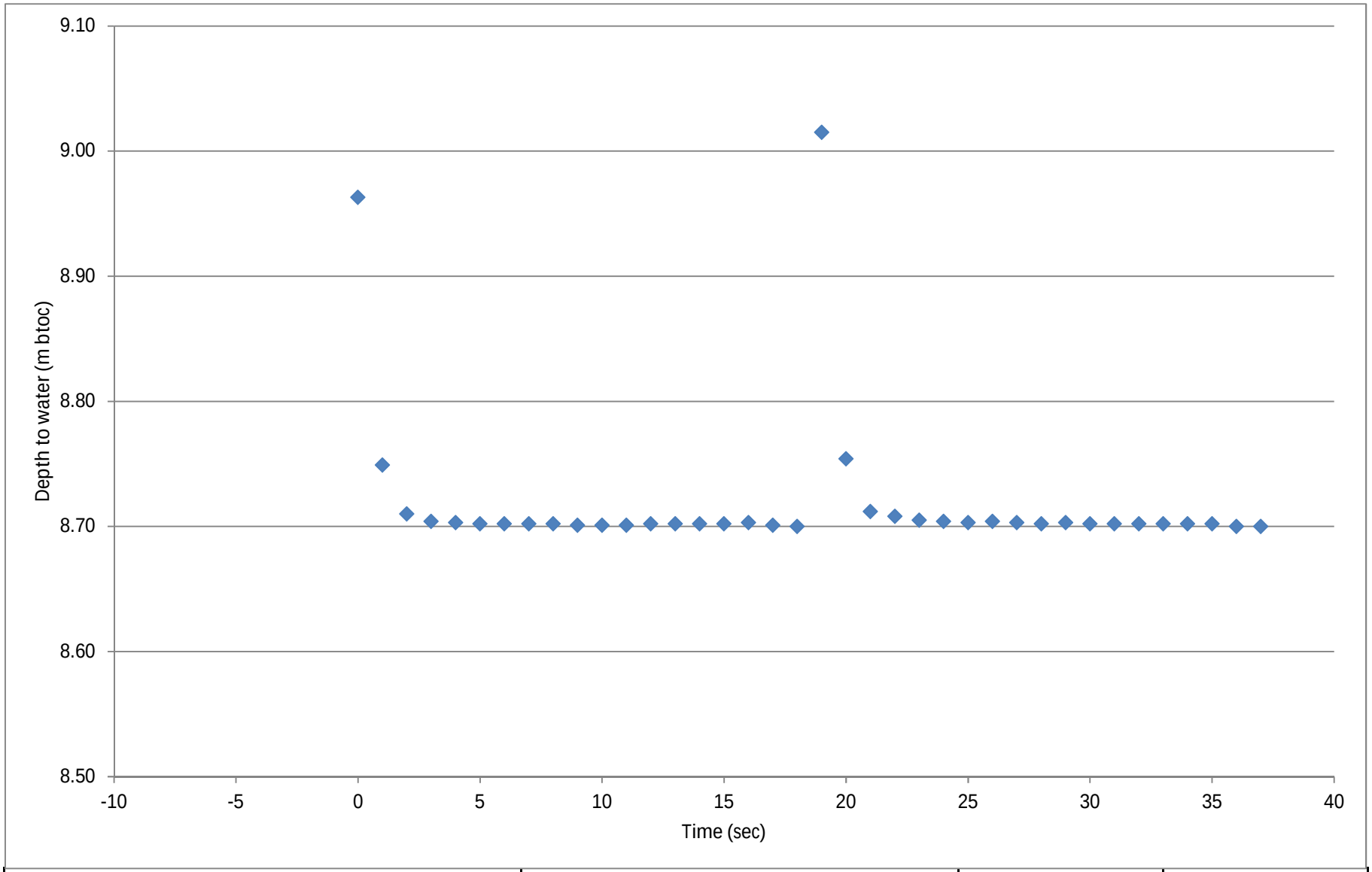


Associated Environmental	PROJECT: 2020-8527 DATE: 25-Mar-20 DRAWN BY: Tony Friesen	PREPARED FOR	FIGURE C-1
		Province of BC	Slug Test Data MW-19-1A-R

Table C-2
Slug Test Data

Well ID:	MW-19-2A	Static Water Level (mbtoc)	8.70
Start Date/Time	2/18/20 11:15 AM	Pre-Test Water Level (mbtoc)	8.70
Client	Province of BC	Total Well Depth (m)	11.45
Project	2020-8527	Volume of Cylinder (liters)	1.17
Test	Slug Test		
Contractor	Associated Env		

Clock Time	Time Elapsed (sec)	Depth to Water (m)	Drawdown (m)	Comments
2/20/20 10:35 AM	0	8.96	0.26	Slug in
2/20/20 10:35 AM	1	8.75	0.05	
2/20/20 10:35 AM	2	8.71	0.01	
2/20/20 10:35 AM	3	8.70	0.00	
2/20/20 10:35 AM	4	8.70	0.00	
2/20/20 10:35 AM	5	8.70	0.00	
2/20/20 10:35 AM	6	8.70	0.00	
2/20/20 10:35 AM	7	8.70	0.00	
2/20/20 10:35 AM	8	8.70	0.00	
2/20/20 10:35 AM	9	8.70	0.00	
2/20/20 10:35 AM	10	8.70	0.00	
2/20/20 10:35 AM	11	8.70	0.00	
2/20/20 10:35 AM	12	8.70	0.00	
2/20/20 10:35 AM	13	8.70	0.00	
2/20/20 10:35 AM	14	8.70	0.00	
2/20/20 10:35 AM	15	8.70	0.00	
2/20/20 10:35 AM	16	8.70	0.00	
2/20/20 10:35 AM	17	8.70	0.00	
2/20/20 10:35 AM	18	8.70	0.00	
2/20/20 10:35 AM	19	9.02	0.32	Slug in
2/20/20 10:35 AM	20	8.75	0.05	
2/20/20 10:35 AM	21	8.71	0.01	
2/20/20 10:35 AM	22	8.71	0.01	
2/20/20 10:35 AM	23	8.71	0.01	
2/20/20 10:35 AM	24	8.70	0.00	
2/20/20 10:35 AM	25	8.70	0.00	
2/20/20 10:35 AM	26	8.70	0.00	
2/20/20 10:35 AM	27	8.70	0.00	
2/20/20 10:35 AM	28	8.70	0.00	
2/20/20 10:35 AM	29	8.70	0.00	
2/20/20 10:35 AM	30	8.70	0.00	
2/20/20 10:35 AM	31	8.70	0.00	
2/20/20 10:35 AM	32	8.70	0.00	
2/20/20 10:35 AM	33	8.70	0.00	
2/20/20 10:35 AM	34	8.70	0.00	
2/20/20 10:35 AM	35	8.70	0.00	
2/20/20 10:35 AM	36	8.70	0.00	
2/20/20 10:35 AM	37	8.70	0.00	



Associated Environmental	PROJECT: 2020-8527 DATE: 25-Mar-20 DRAWN BY: Tony Friesen	PREPARED FOR	FIGURE C-2
		Province of BC	Slug test data MW-19-2A

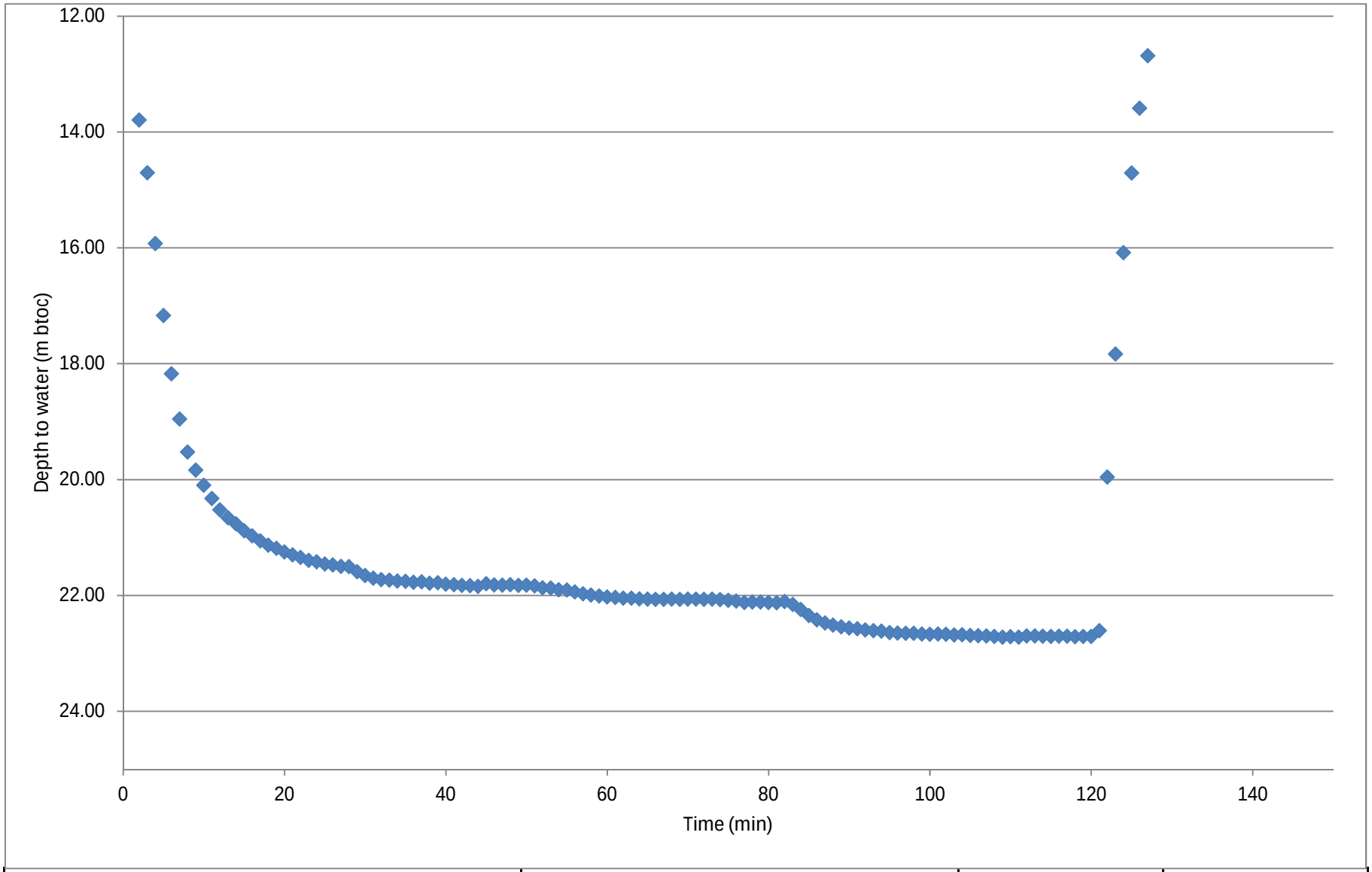
Table C-3
Pumping Test Data

Well ID:	MW-20-1B	Static Water Level (mbtoc)	8.93
Start Date/Time	2/18/20 11:15 AM	Pre-Test Water Level (mbtoc)	8.93
Client	Province of BC	Total Well Depth (m)	44.95
Project	2020-8527	Pump Intake Depth (mbtoc)	30.00
Test	Constant Rate Test	Pump Used	Grunfoss
Contractor	Associated Env	Pumping Rate (L/s)	0.22

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/18/20 11:15:00	0	8.93	0.00	
2/18/20 11:16:00	1	11.90	2.97	
2/18/20 11:17:00	2	13.80	4.87	
2/18/20 11:18:00	3	14.70	5.77	
2/18/20 11:19:00	4	15.93	7.00	
2/18/20 11:20:00	5	17.17	8.24	
2/18/20 11:21:00	6	18.18	9.25	
2/18/20 11:22:00	7	18.96	10.03	
2/18/20 11:23:00	8	19.53	10.60	
2/18/20 11:24:00	9	19.84	10.91	
2/18/20 11:25:00	10	20.10	11.17	
2/18/20 11:26:00	11	20.33	11.40	
2/18/20 11:27:00	12	20.52	11.59	
2/18/20 11:28:00	13	20.66	11.73	
2/18/20 11:29:00	14	20.76	11.83	
2/18/20 11:30:00	15	20.89	11.96	
2/18/20 11:31:00	16	20.97	12.04	
2/18/20 11:32:00	17	21.06	12.13	
2/18/20 11:33:00	18	21.13	12.20	
2/18/20 11:34:00	19	21.19	12.26	
2/18/20 11:35:00	20	21.25	12.32	
2/18/20 11:36:00	21	21.30	12.37	
2/18/20 11:37:00	22	21.35	12.42	
2/18/20 11:38:00	23	21.39	12.46	
2/18/20 11:39:00	24	21.42	12.49	
2/18/20 11:40:00	25	21.46	12.53	
2/18/20 11:41:00	26	21.48	12.55	
2/18/20 11:42:00	27	21.50	12.57	
2/18/20 11:43:00	28	21.50	12.57	
2/18/20 11:44:00	29	21.59	12.66	
2/18/20 11:45:00	30	21.66	12.73	
2/18/20 11:46:00	31	21.70	12.77	
2/18/20 11:47:00	32	21.73	12.80	
2/18/20 11:48:00	33	21.74	12.81	
2/18/20 11:49:00	34	21.75	12.82	
2/18/20 11:50:00	35	21.76	12.83	
2/18/20 11:51:00	36	21.77	12.84	
2/18/20 11:52:00	37	21.77	12.84	
2/18/20 11:53:00	38	21.79	12.86	
2/18/20 11:54:00	39	21.78	12.85	
2/18/20 11:55:00	40	21.81	12.88	
2/18/20 11:56:00	41	21.81	12.88	
2/18/20 11:57:00	42	21.83	12.90	
2/18/20 11:58:00	43	21.83	12.90	
2/18/20 11:59:00	44	21.84	12.91	
2/18/20 12:00:00	45	21.80	12.87	
2/18/20 12:01:00	46	21.82	12.89	
2/18/20 12:02:00	47	21.83	12.90	
2/18/20 12:03:00	48	21.81	12.88	
2/18/20 12:04:00	49	21.83	12.90	
2/18/20 12:05:00	50	21.82	12.89	
2/18/20 12:06:00	51	21.83	12.90	
2/18/20 12:07:00	52	21.87	12.94	Pump Turned Off
2/18/20 12:08:00	53	21.87	12.94	
2/18/20 12:09:00	54	21.90	12.97	

Table C-3
Pumping Test Data

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/18/20 12:10:00	55	21.91	12.98	
2/18/20 12:11:00	56	21.94	13.01	
2/18/20 12:12:00	57	21.97	13.04	
2/18/20 12:13:00	58	22.00	13.07	
2/18/20 12:14:00	59	22.01	13.08	
2/18/20 12:15:00	60	22.03	13.10	
2/18/20 12:16:00	61	22.04	13.11	
2/18/20 12:17:00	62	22.05	13.12	
2/18/20 12:18:00	63	22.05	13.12	
2/18/20 12:19:00	64	22.06	13.13	
2/18/20 12:20:00	65	22.07	13.14	
2/18/20 12:21:00	66	22.07	13.14	
2/18/20 12:22:00	67	22.07	13.14	
2/18/20 12:23:00	68	22.06	13.13	
2/18/20 12:24:00	69	22.07	13.14	
2/18/20 12:25:00	70	22.06	13.13	
2/18/20 12:26:00	71	22.06	13.13	
2/18/20 12:27:00	72	22.07	13.14	
2/18/20 12:28:00	73	22.06	13.13	
2/18/20 12:29:00	74	22.07	13.14	
2/18/20 12:30:00	75	22.09	13.16	
2/18/20 12:31:00	76	22.10	13.17	
2/18/20 12:32:00	77	22.12	13.19	
2/18/20 12:33:00	78	22.12	13.19	
2/18/20 12:34:00	79	22.11	13.18	
2/18/20 12:35:00	80	22.12	13.19	
2/18/20 12:36:00	81	22.13	13.20	
2/18/20 12:37:00	82	22.11	13.18	
2/18/20 12:38:00	83	22.16	13.23	
2/18/20 12:39:00	84	22.24	13.31	



Associated Environmental	PROJECT: 2020-8527 DATE: 25-Mar-20 DRAWN BY: Tony Friesen	PREPARED FOR	FIGURE C-3
		Province of BC	Pump test data MW-20-1B

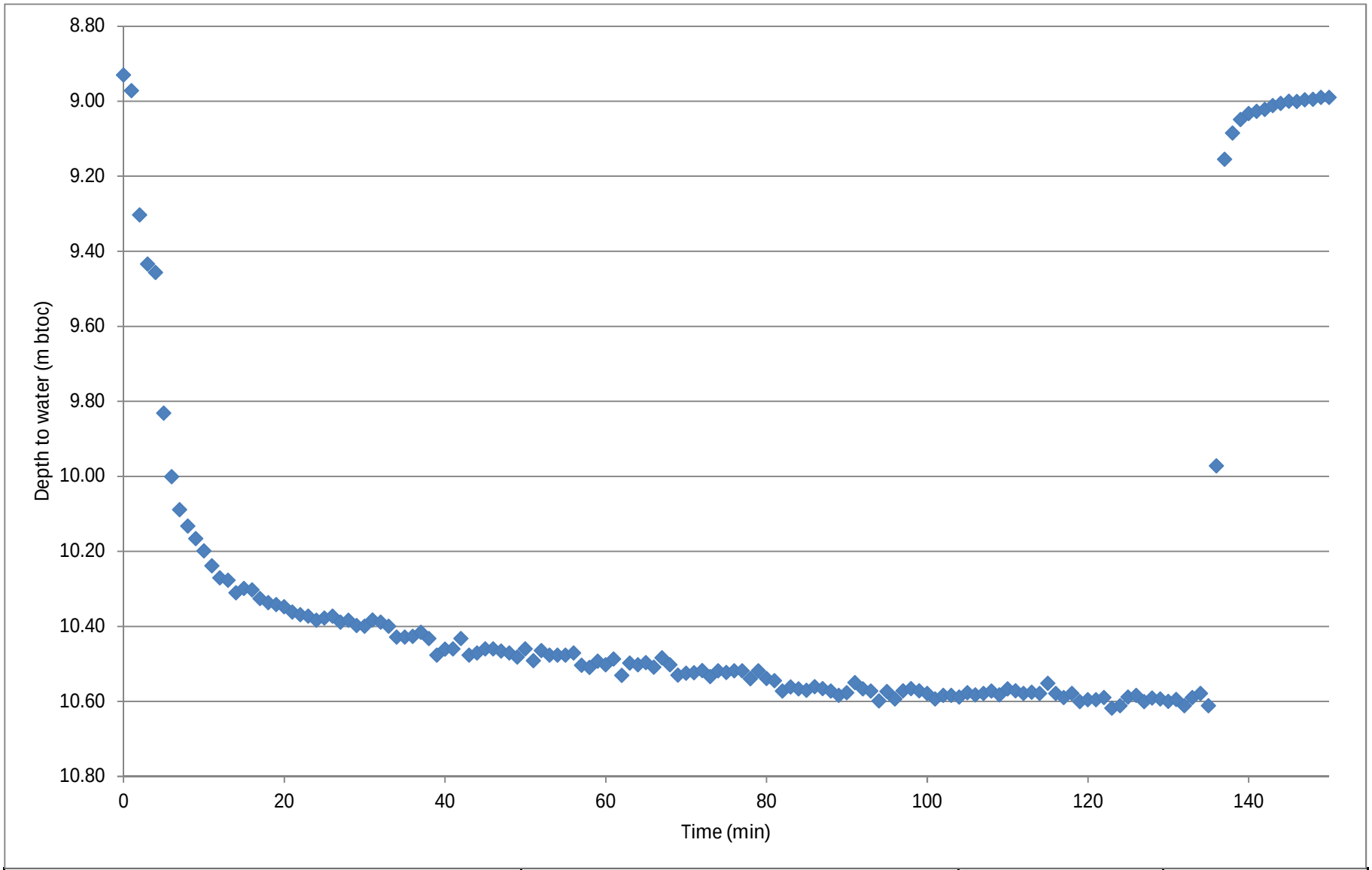
Table C-4
Pumping Test Data

Well ID:	MW-20-2B	Static Water Level (mbtoc)	8.93
Start Date/Time	2/19/20 2:15 PM	Pre-Test Water Level (mbtoc)	8.70
Client	Province of BC	Total Well Depth (m)	50.42
Project	2020-8527	Pump Intake Depth (mbtoc)	30.00
Test	Constant Rate Test	Pump Used	Grunfoss
Contractor	Associated Env	Pumping Rate (L/s)	0.41

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/19/20 14:15:00	0	8.93	0.00	
2/19/20 14:16:00	1	8.97	0.04	
2/19/20 14:17:00	2	9.30	0.37	
2/19/20 14:18:00	3	9.43	0.50	
2/19/20 14:19:00	4	9.46	0.53	
2/19/20 14:20:00	5	9.83	0.90	
2/19/20 14:21:00	6	10.00	1.07	
2/19/20 14:22:00	7	10.09	1.16	
2/19/20 14:23:00	8	10.13	1.20	
2/19/20 14:24:00	9	10.17	1.24	
2/19/20 14:25:00	10	10.20	1.27	
2/19/20 14:26:00	11	10.24	1.31	
2/19/20 14:27:00	12	10.27	1.34	
2/19/20 14:28:00	13	10.28	1.35	
2/19/20 14:29:00	14	10.31	1.38	
2/19/20 14:30:00	15	10.30	1.37	
2/19/20 14:31:00	16	10.30	1.37	
2/19/20 14:32:00	17	10.33	1.40	
2/19/20 14:33:00	18	10.34	1.41	
2/19/20 14:34:00	19	10.34	1.41	
2/19/20 14:35:00	20	10.35	1.42	
2/19/20 14:36:00	21	10.36	1.43	
2/19/20 14:37:00	22	10.37	1.44	
2/19/20 14:38:00	23	10.37	1.44	
2/19/20 14:39:00	24	10.38	1.45	
2/19/20 14:40:00	25	10.38	1.45	
2/19/20 14:41:00	26	10.37	1.44	
2/19/20 14:42:00	27	10.39	1.46	
2/19/20 14:43:00	28	10.38	1.45	
2/19/20 14:44:00	29	10.40	1.47	
2/19/20 14:45:00	30	10.40	1.47	
2/19/20 14:46:00	31	10.38	1.45	
2/19/20 14:47:00	32	10.39	1.46	
2/19/20 14:48:00	33	10.40	1.47	
2/19/20 14:49:00	34	10.43	1.50	
2/19/20 14:50:00	35	10.43	1.50	
2/19/20 14:51:00	36	10.43	1.50	
2/19/20 14:52:00	37	10.42	1.49	
2/19/20 14:53:00	38	10.43	1.50	
2/19/20 14:54:00	39	10.48	1.55	
2/19/20 14:55:00	40	10.46	1.53	
2/19/20 14:56:00	41	10.46	1.53	
2/19/20 14:57:00	42	10.43	1.50	
2/19/20 14:58:00	43	10.48	1.55	
2/19/20 14:59:00	44	10.47	1.54	
2/19/20 15:00:00	45	10.46	1.53	
2/19/20 15:01:00	46	10.46	1.53	
2/19/20 15:02:00	47	10.47	1.54	
2/19/20 15:03:00	48	10.47	1.54	
2/19/20 15:04:00	49	10.48	1.55	
2/19/20 15:05:00	50	10.46	1.53	
2/19/20 15:06:00	51	10.49	1.56	
2/19/20 15:07:00	52	10.47	1.54	
2/19/20 15:08:00	53	10.48	1.55	
2/19/20 15:09:00	54	10.48	1.55	

Table C-4
Pumping Test Data

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/19/20 15:10:00	55	10.48	1.55	
2/19/20 15:11:00	56	10.47	1.54	
2/19/20 15:12:00	57	10.50	1.57	
2/19/20 15:13:00	58	10.51	1.58	
2/19/20 15:14:00	59	10.49	1.56	
2/19/20 15:15:00	60	10.50	1.57	
2/19/20 15:16:00	61	10.49	1.56	
2/19/20 15:17:00	62	10.53	1.60	
2/19/20 15:18:00	63	10.50	1.57	
2/19/20 15:19:00	64	10.50	1.57	
2/19/20 15:20:00	65	10.50	1.57	
2/19/20 15:21:00	66	10.51	1.58	
2/19/20 15:22:00	67	10.48	1.55	
2/19/20 15:23:00	68	10.50	1.57	
2/19/20 15:24:00	69	10.53	1.60	
2/19/20 15:25:00	70	10.53	1.60	
2/19/20 15:26:00	71	10.52	1.59	
2/19/20 15:27:00	72	10.52	1.59	
2/19/20 15:28:00	73	10.53	1.60	
2/19/20 15:29:00	74	10.52	1.59	
2/19/20 15:30:00	75	10.52	1.59	
2/19/20 15:31:00	76	10.52	1.59	
2/19/20 15:32:00	77	10.52	1.59	
2/19/20 15:33:00	78	10.54	1.61	
2/19/20 15:34:00	79	10.52	1.59	
2/19/20 15:35:00	80	10.54	1.61	
2/19/20 15:36:00	81	10.55	1.62	
2/19/20 15:37:00	82	10.57	1.64	
2/19/20 15:38:00	83	10.56	1.63	
2/19/20 15:39:00	84	10.57	1.64	



Associated Environmental	PROJECT: 2020-8527 DATE: 25-Mar-20 DRAWN BY: Tony Friesen	PREPARED FOR	FIGURE C-4
		Province of BC	Pump test data MW-20-2B

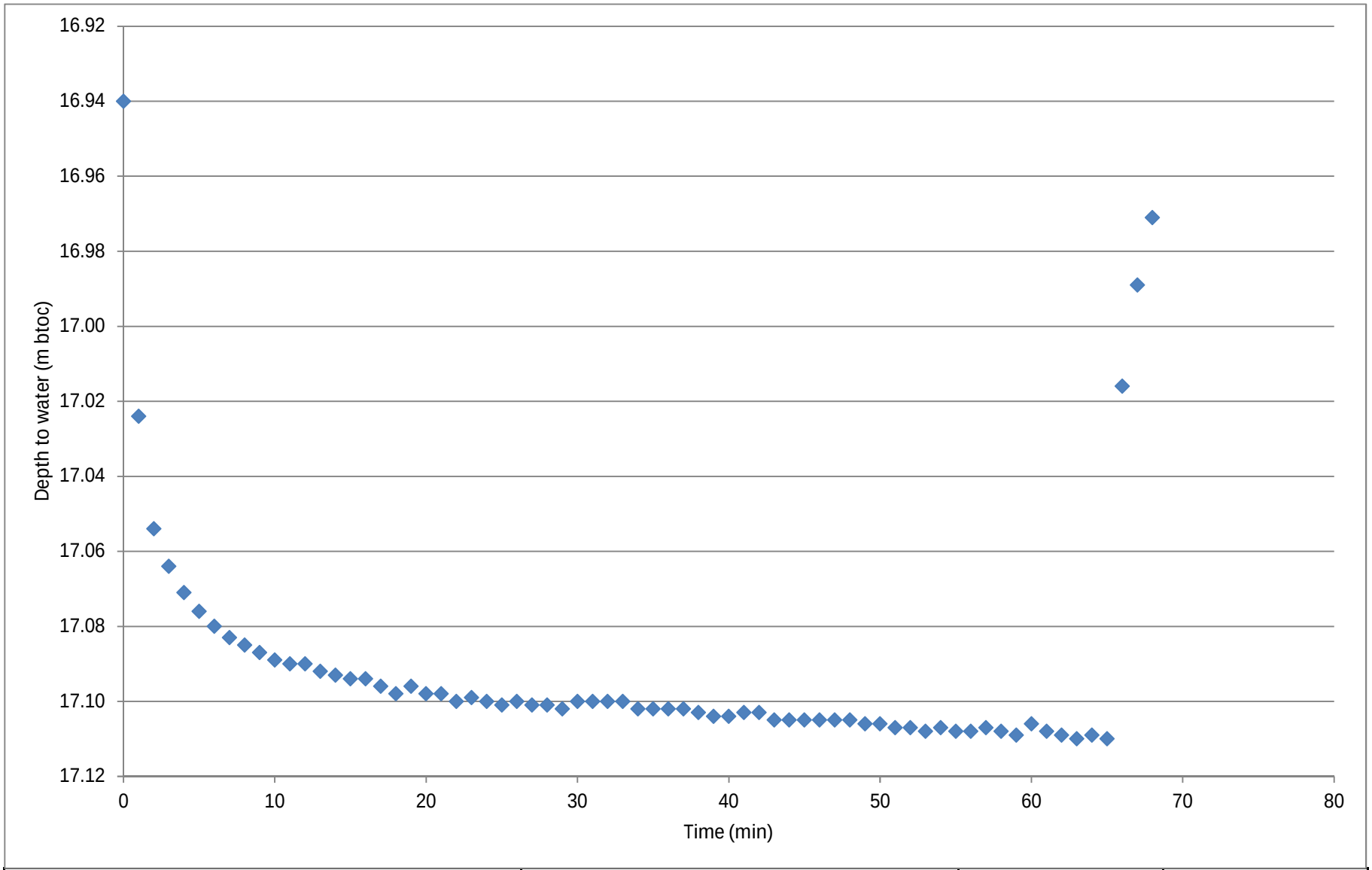
Table C-5
Pumping Test Data

Well ID:	MW-20-4A	Static Water Level (mbtoc)	16.94
Start Date/Time	2/20/20 12:35 PM	Pre-Test Water Level (mbtoc)	16.94
Client	Province of BC	Total Well Depth (m)	23.61
Project	2020-8527	Pump Intake Depth (mbtoc)	20.00
Test	Constant Rate Test	Pump Used	Grunfoss
Contractor	Associated Env	Pumping Rate (L/s)	0.69

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/20/20 12:35:00	0	16.94	0.00	
2/20/20 12:36:00	1	17.02	0.08	
2/20/20 12:37:00	2	17.05	0.11	
2/20/20 12:38:00	3	17.06	0.12	
2/20/20 12:39:00	4	17.07	0.13	
2/20/20 12:40:00	5	17.08	0.14	
2/20/20 12:41:00	6	17.08	0.14	
2/20/20 12:42:00	7	17.08	0.14	
2/20/20 12:43:00	8	17.09	0.15	
2/20/20 12:44:00	9	17.09	0.15	
2/20/20 12:45:00	10	17.09	0.15	
2/20/20 12:46:00	11	17.09	0.15	
2/20/20 12:47:00	12	17.09	0.15	
2/20/20 12:48:00	13	17.09	0.15	
2/20/20 12:49:00	14	17.09	0.15	
2/20/20 12:50:00	15	17.09	0.15	
2/20/20 12:51:00	16	17.09	0.15	
2/20/20 12:52:00	17	17.10	0.16	
2/20/20 12:53:00	18	17.10	0.16	
2/20/20 12:54:00	19	17.10	0.16	
2/20/20 12:55:00	20	17.10	0.16	
2/20/20 12:56:00	21	17.10	0.16	
2/20/20 12:57:00	22	17.10	0.16	
2/20/20 12:58:00	23	17.10	0.16	
2/20/20 12:59:00	24	17.10	0.16	
2/20/20 13:00:00	25	17.10	0.16	
2/20/20 13:01:00	26	17.10	0.16	
2/20/20 13:02:00	27	17.10	0.16	
2/20/20 13:03:00	28	17.10	0.16	
2/20/20 13:04:00	29	17.10	0.16	
2/20/20 13:05:00	30	17.10	0.16	
2/20/20 13:06:00	31	17.10	0.16	
2/20/20 13:07:00	32	17.10	0.16	
2/20/20 13:08:00	33	17.10	0.16	
2/20/20 13:09:00	34	17.10	0.16	
2/20/20 13:10:00	35	17.10	0.16	
2/20/20 13:11:00	36	17.10	0.16	
2/20/20 13:12:00	37	17.10	0.16	
2/20/20 13:13:00	38	17.10	0.16	
2/20/20 13:14:00	39	17.10	0.16	
2/20/20 13:15:00	40	17.10	0.16	
2/20/20 13:16:00	41	17.10	0.16	
2/20/20 13:17:00	42	17.10	0.16	
2/20/20 13:18:00	43	17.11	0.17	
2/20/20 13:19:00	44	17.11	0.17	
2/20/20 13:20:00	45	17.11	0.17	
2/20/20 13:21:00	46	17.11	0.17	
2/20/20 13:22:00	47	17.11	0.17	
2/20/20 13:23:00	48	17.11	0.17	
2/20/20 13:24:00	49	17.11	0.17	
2/20/20 13:25:00	50	17.11	0.17	
2/20/20 13:26:00	51	17.11	0.17	
2/20/20 13:27:00	52	17.11	0.17	
2/20/20 13:28:00	53	17.11	0.17	
2/20/20 13:29:00	54	17.11	0.17	

Table C-5
Pumping Test Data

Clock Time	Time Elapsed (min)	Depth to Water (m)	Drawdown (m)	Comments
2/20/20 13:30:00	55	17.11	0.17	
2/20/20 13:31:00	56	17.11	0.17	
2/20/20 13:32:00	57	17.11	0.17	
2/20/20 13:33:00	58	17.11	0.17	
2/20/20 13:34:00	59	17.11	0.17	
2/20/20 13:35:00	60	17.11	0.17	
2/20/20 13:36:00	61	17.11	0.17	
2/20/20 13:37:00	62	17.11	0.17	
2/20/20 13:38:00	63	17.11	0.17	
2/20/20 13:39:00	64	17.11	0.17	
2/20/20 13:40:00	65	17.11	0.17	Pump Turned Off
2/20/20 13:41:00	66	17.02	0.08	
2/20/20 13:42:00	67	16.99	0.05	
2/20/20 13:43:00	68	16.97	0.03	

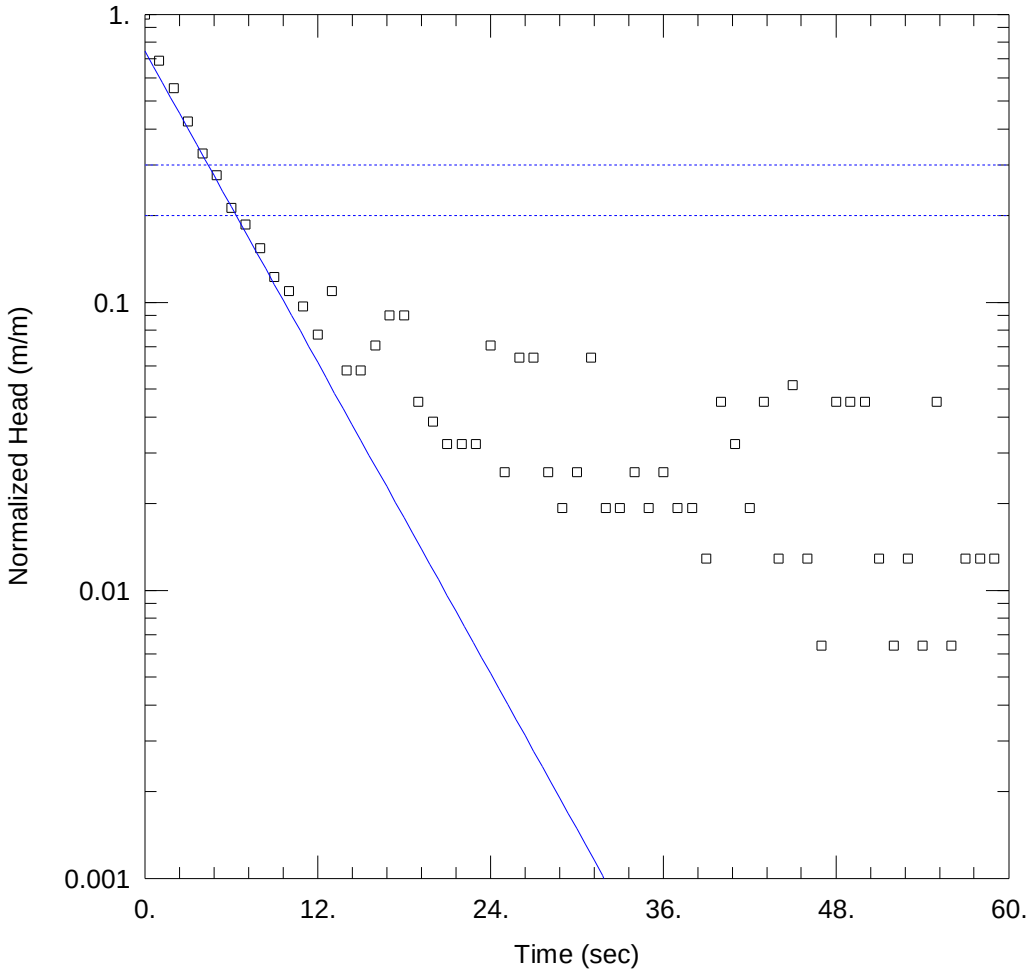


Associated Environmental	PROJECT: 2020-8527 DATE: 25-Mar-20 DRAWN BY: Tony Friesen	PREPARED FOR	FIGURE C-5
		Province of BC	Pump test data MW-20-4A

APPENDIX E - AQTESOLV OUTPUTS

MW-19-1A-R

Prepared By:	Prepared For:
Associat ed Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW19_1A\MW19_1A_R.aqt

Date: 03/24/20 Time: 20:56:02

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 5.692E-5 m/sec y0 = 0.7378 m

AQUIFER DATA

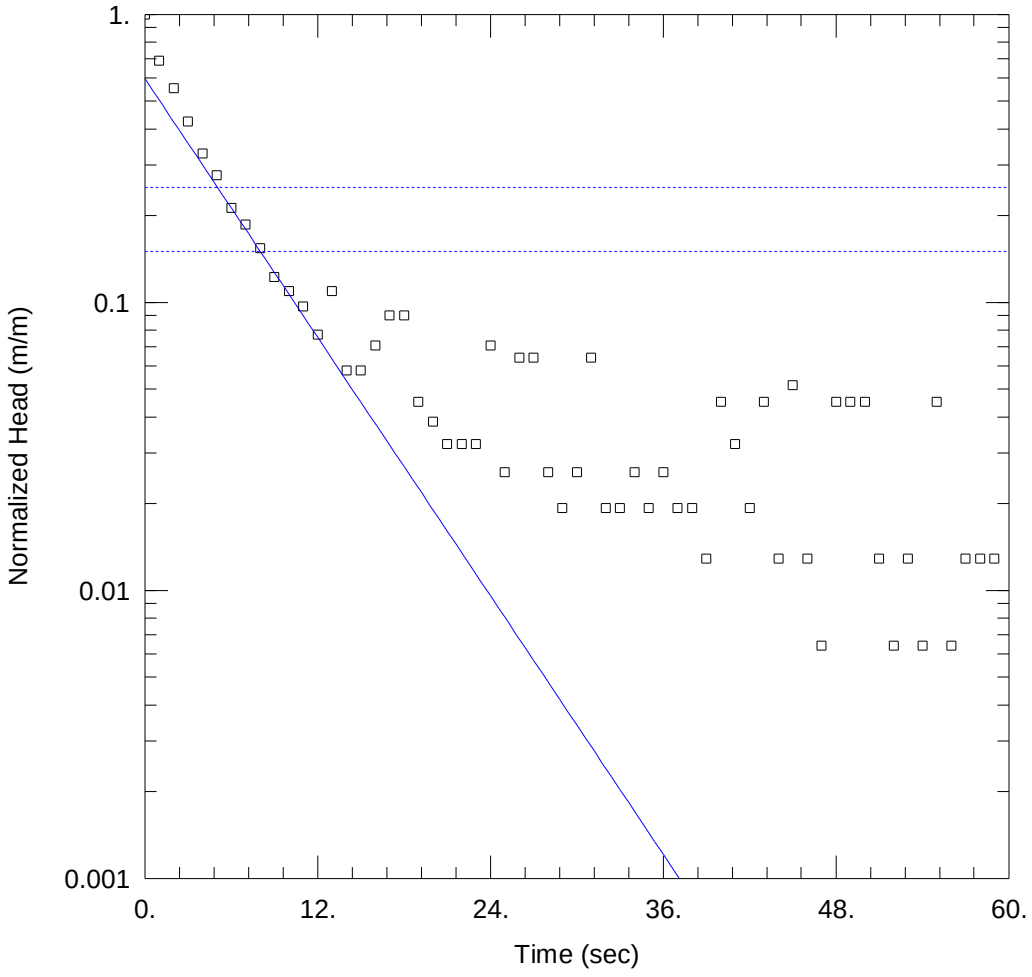
Saturated Thickness: 11.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19-1A-R)

Initial Displacement: 0.99 m
Static Water Column Height: 3.15 m
Total Well Penetration Depth: 11.6 m
Screen Length: 6.1 m
Casing Radius: 0.0254 m
Well Radius: 0.0127 m

MW-19-1A-R

Prepared By:	Prepared For:
Associat ed Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW19_1A\MW19_1A_R.aqt
Date: 03/24/20 Time: 20:54:35

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 5.624E-5 m/sec y0 = 0.5917 m

AQUIFER DATA

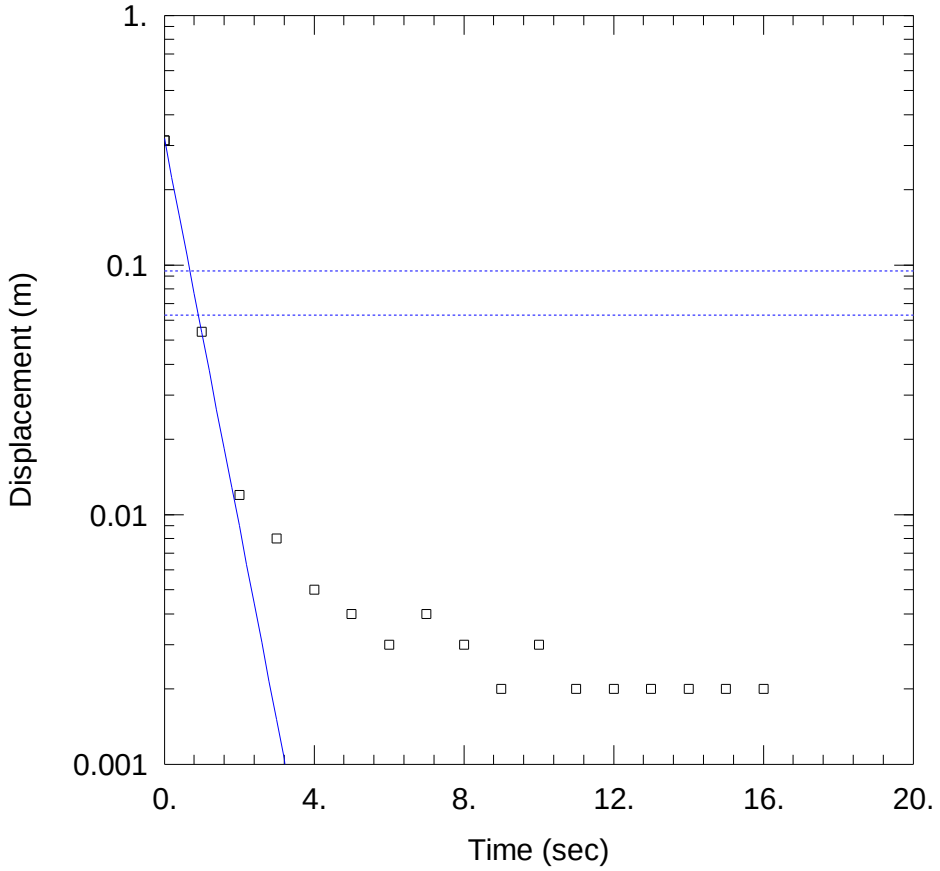
Saturated Thickness: 11.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19-1A-R)

Initial Displacement: 0.99 m
Static Water Column Height: 3.15 m
Total Well Penetration Depth: 11.6 m
Screen Length: 6.1 m
Casing Radius: 0.0254 m
Well Radius: 0.0127 m

MW-19-2A

Prepared By:	Prepared For:
Associat ed Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW19_2A\MW19_2A.aqtAQUIFER DATA
Date: 03/24/20 Time: 21:18:45

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.000788 m/sec y0 = 0.3202 m

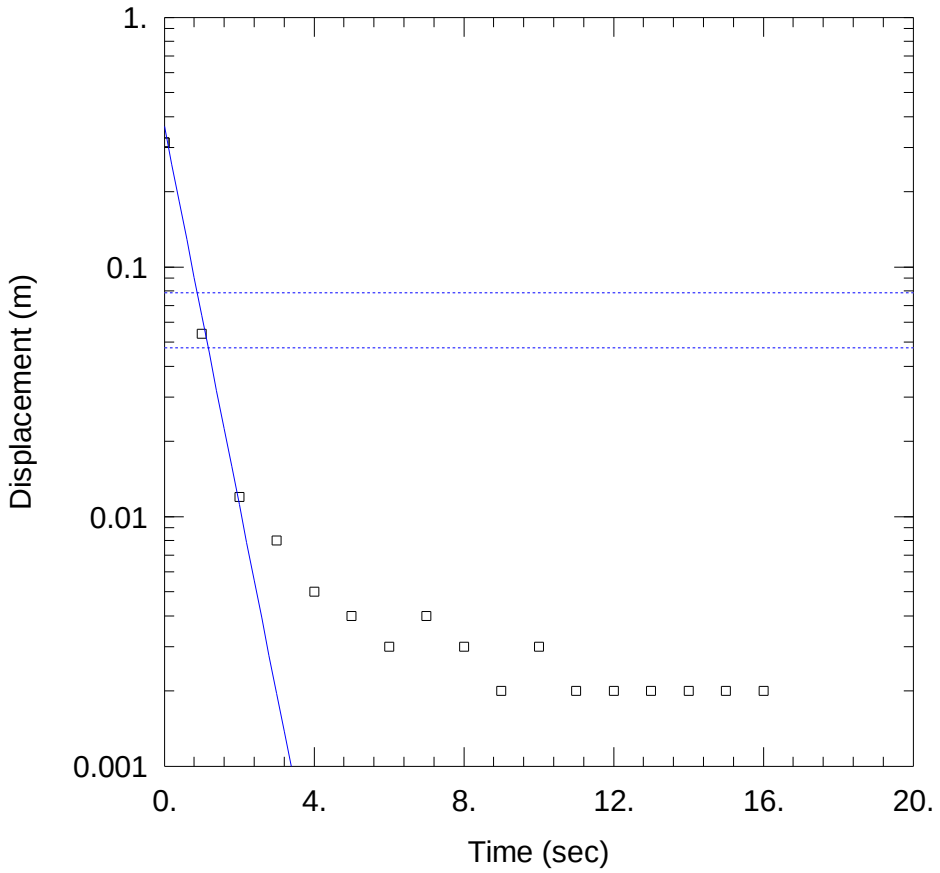
Saturated Thickness: 8.82 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19-2A)

Initial Displacement: 0.315 m
Static Water Column Height: 2.75 m
Total Well Penetration Depth: 10.4 m
Screen Length: 6.1 m
Casing Radius: 0.0381 m
Well Radius: 0.0762 m

MW-19-2A

Prepared By:	Prepared For:
Associat ed Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW19_2A\MW19_2A.aqtAQUIFER DATA
Date: 03/24/20 Time: 21:21:37

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.001053 m/sec y0 = 0.3652 m

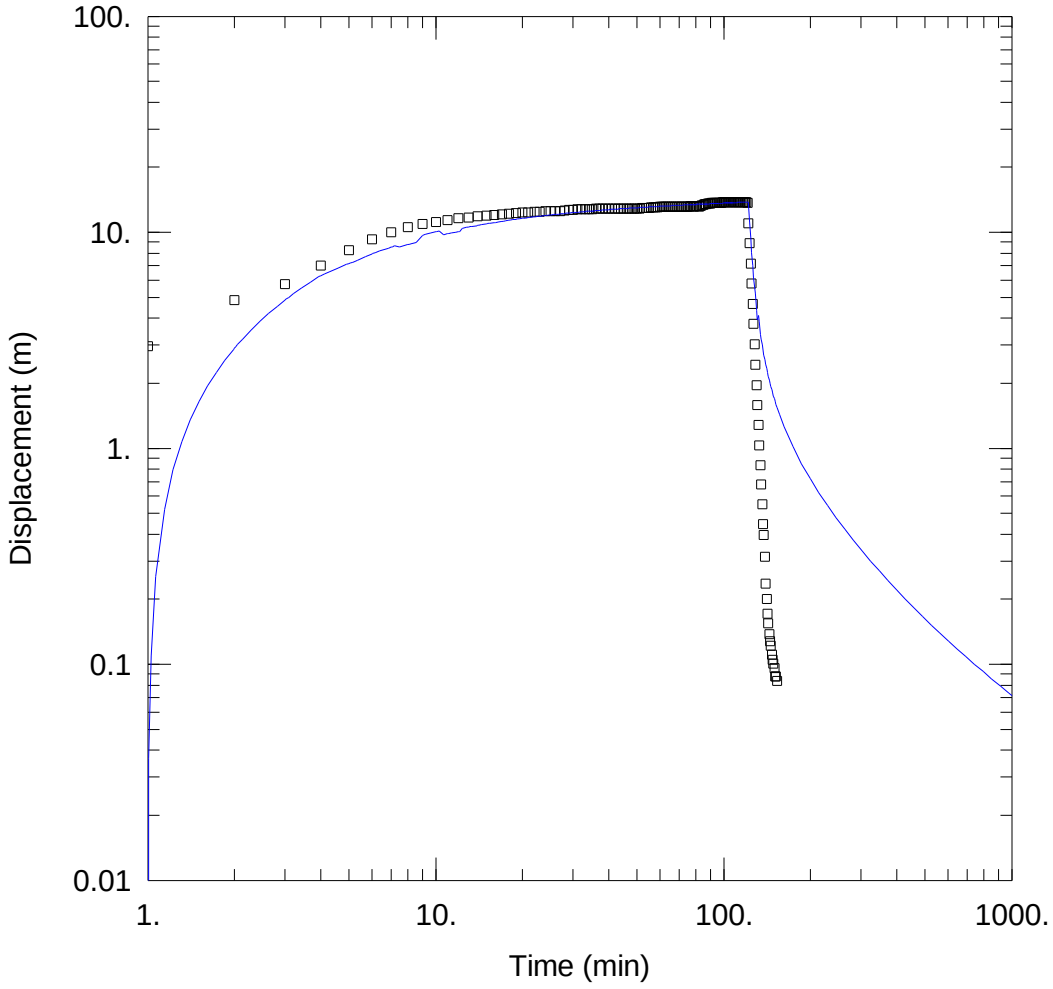
Saturated Thickness: 8.82 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19-2A)

Initial Displacement: 0.315 m
Static Water Column Height: 2.75 m
Total Well Penetration Depth: 10.4 m
Screen Length: 6.1 m
Casing Radius: 0.0381 m
Well Radius: 0.0762 m

MW-20-1B

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_1B\Hullcar_MW20_1B.aqt

Date: 03/24/20 Time: 21:38:43

SOLUTION

Aquifer Model: Confined
Solution Method: Dougherty-Babu

T = 3.191E-5 m^2/sec S = 0.05934
Kz/Kr = 1. Sw = 0.
r(w) = 0.0635 m r(c) = 0.0381 m

AQUIFER DATA

Saturated Thickness: 7.01 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

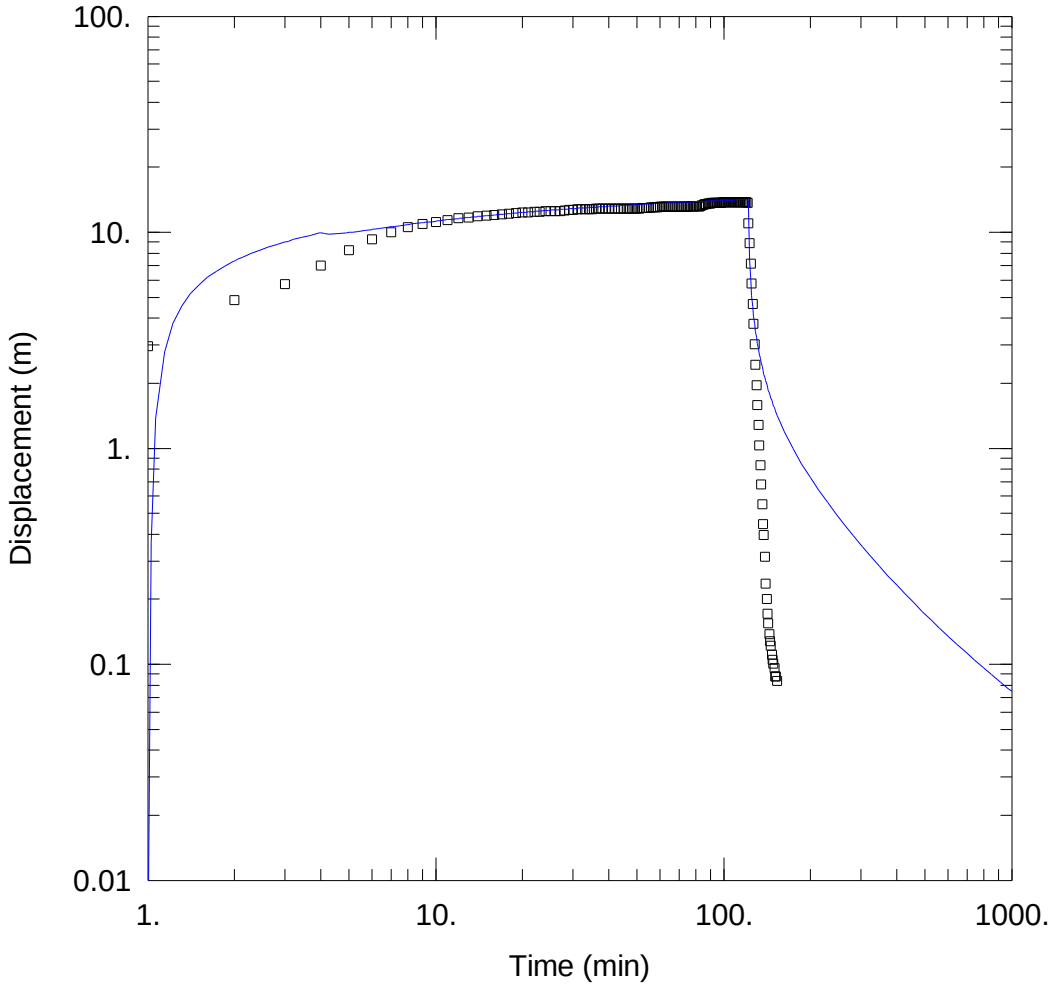
Well Name	X (m)	Y (m)
MW20-1B	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-1B	0	0

MW-20-1B

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_1B\Hullcar_MW20_1B.aqt
Date: 03/24/20 Time: 21:41:50

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3.036E-5 m^2/sec S = 0.06805
Kz/Kr = 1. b = 7.01 m

WELL DATA

Pumping Wells

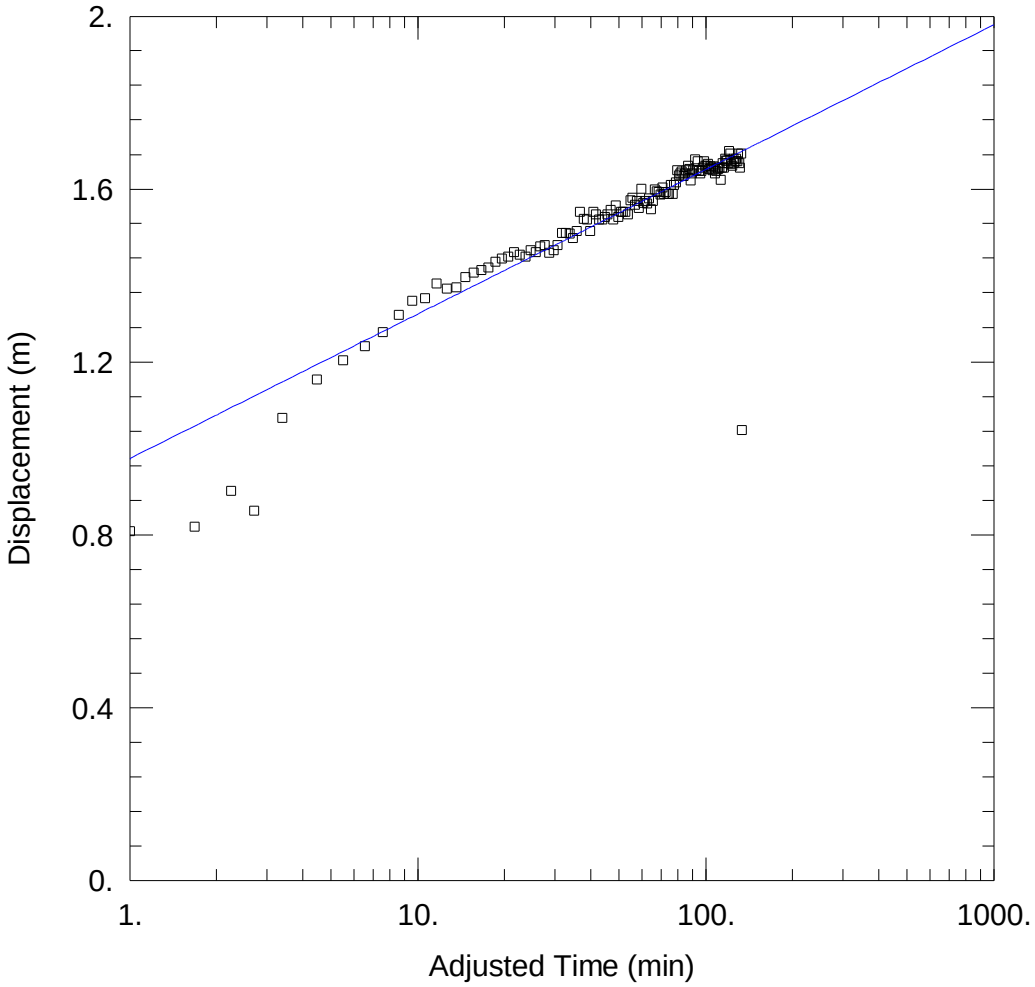
Well Name	X (m)	Y (m)
MW20-1B	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-1B	0	0

MW-20-2B

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_2B\Hullcar_MW20_2B.aqt

Date: 03/25/20 Time: 08:53:28

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Jacob

T = 0.0002245 m^2/sec S = 0.009073

AQUIFER DATA

Saturated Thickness: 3.96 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

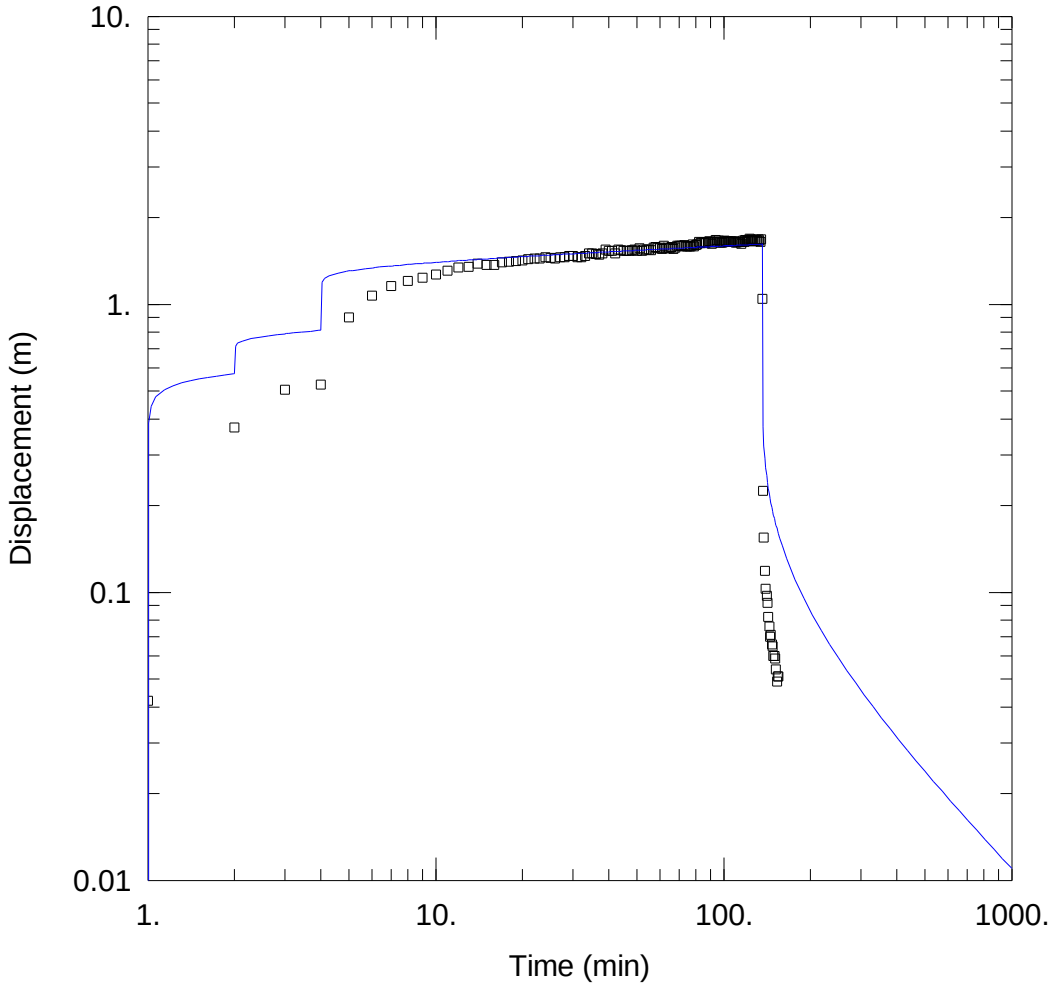
Well Name	X (m)	Y (m)
MW20-2B	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-2B	0	0

MW-20-2B

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_2B\Hullcar_MW20_2B.aqt

Date: 03/25/20 Time: 08:56:22

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.0004266 m^2/sec S = 0.0009995
Kz/Kr = 1. b = 3.96 m

WELL DATA

Pumping Wells

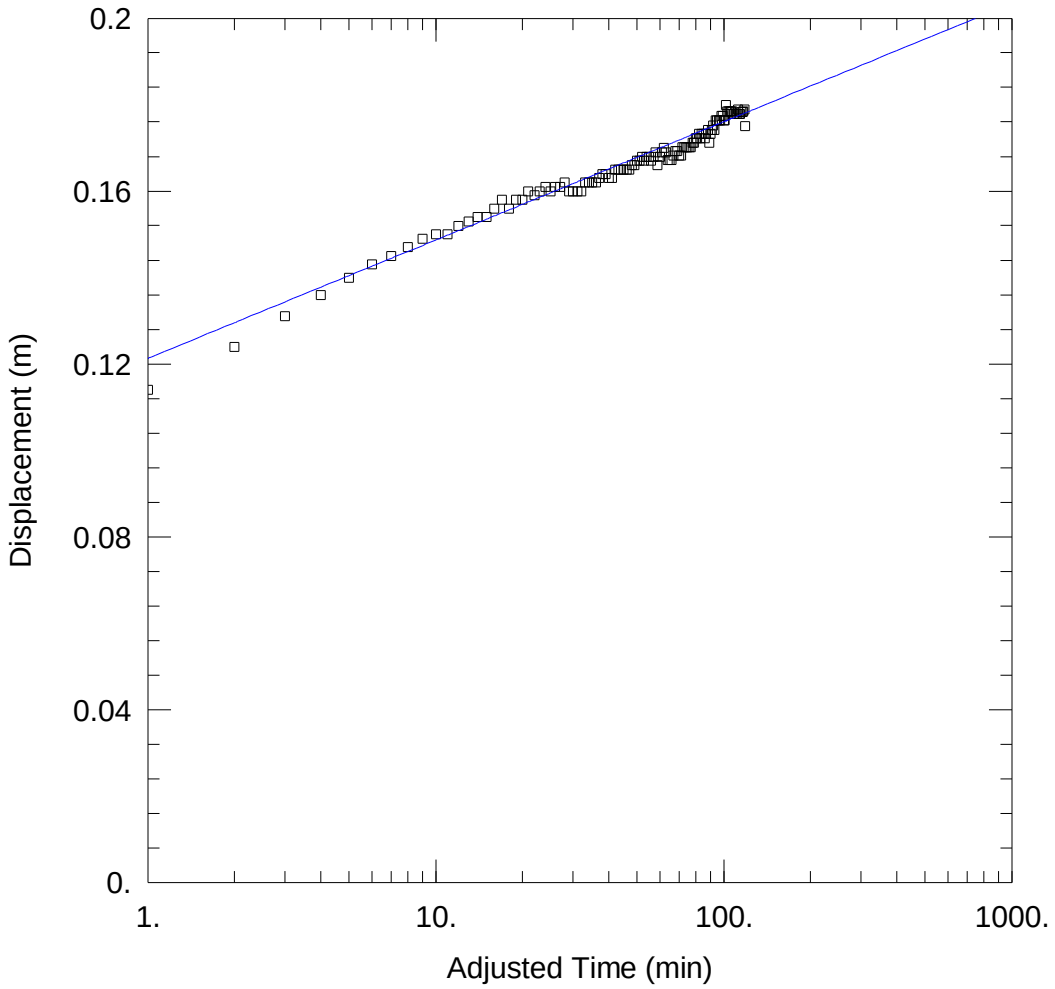
Well Name	X (m)	Y (m)
MW20-2B	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-2B	0	0

MW-20-4A

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_4A\Hullcar_MW20_4A_Pumping.AQU
Date: 03/25/20 Time: 09:48:11

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Jacob

T = 0.004616 m^2/sec S = 0.00577

AQUIFER DATA

Saturated Thickness: 6.801 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

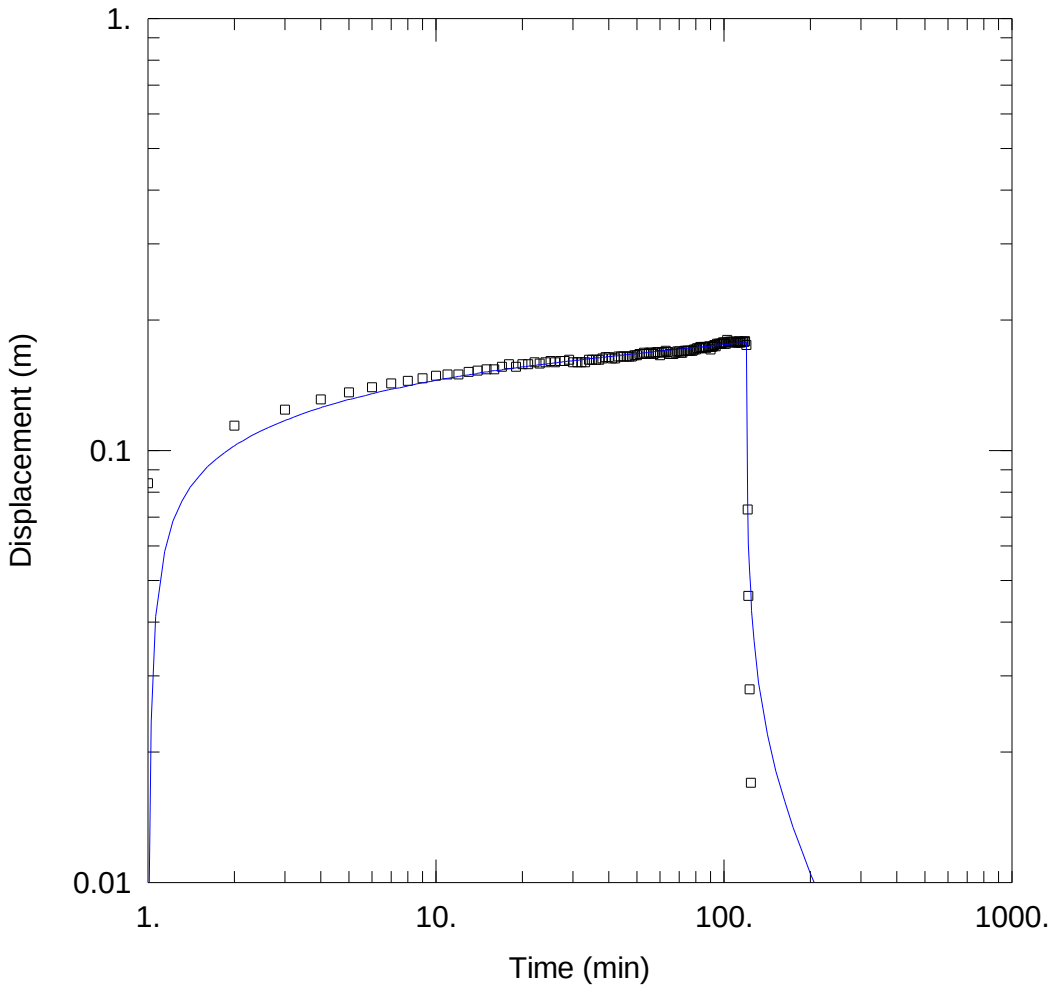
Well Name	X (m)	Y (m)
MW20-4A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-4A	0	0

MW-20-4A

Prepared By:	Prepared For:
Associated Env	Province of BC
Project:	**Location:**
2020-8527	Hullcar



Data Set: C:\Users\friesent\Desktop\Revised Hullcar Aqtesolv\MW20_4A\Hullcar_MW20_4A_Pumping TWELL DATAt
Date: 03/25/20 Time: 09:44:24

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.004763 m^2/sec S = 2.311
Kz/Kr = 1. b = 6.801 m

Pumping Wells

Well Name	X (m)	Y (m)
MW20-4A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ MW20-4A	0	0

APPENDIX F - WATER QUALITY RESULTS AND LABORATORY REPORTS

Table E-1
Tabulated Water Quality Data

Sample ID		Std (CDWQG)	MW19-1A-R	MW-20-1B	MW-20-2B	MW-19-2A	MW-20-4A	MW-19-3A
Laboratory ID			0021754-01	0021754-02	0021754-03	0021754-04	0021754-05	0021754-06
Date Sampled			2020-02-19	2020-02-19	2020-02-19	2020-02-19	2020-02-19	2020-02-19
Analyte	Units							
Field Results								
pH	pH units	AO<=250	7.11	7.74	7.45	7.17	7.09	7.28
Temperature	°C	N/A	8.7	9.1	10.7	10.1	9.9	8.0
Conductivity	µs/cm		MW19-1A-R	657	1304	983	1281	1046
Turbidity	NTU	1.0	0.88	0.79	1.82	1.11	0.83	2.02
Oxidation reduction potential	mv	N/A	82.2	20.9	-68.4	94	121	105.2
Dissolved oxygen	mg/L	N/A	10.56	1.44	2.86	8.37	6.00	6.64
Laboratory Results								
General								
Chloride	mg/L	AO<=250	39.4	1.13	24.6	38.4	99.5	25
Nitrate (as N)	mg/L	MAC=10	15.5	<0.010	<0.010	4.07	1.37	10.8
Nitrite (as N)	mg/L	MAC=1	<0.010	<0.010	<0.010	<0.010	0.018	<0.010
Sulfate	mg/L	AO<=500	348	115	209	145	133	180
Phosphorus, Total Dissolved	mg/L	N/A	0.0145	0.0163	0.0056	0.0161	0.0062	0.0126
Solids, Total Suspended	mg/L	N/A	<2.0	3.8	107	<2.0	<2.0	6
Hardness, Total (as $CaCO_3$)	mg/L	None Required	687	300	439	449	601	544
Dissolved Metals								
Lithium, dissolved	mg/L	N/A	0.00734	0.00619	0.012	0.00986	0.0239	0.00518
Aluminum, dissolved	mg/L	N/A	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony, dissolved	mg/L	N/A	<0.00020	0.00027	0.00173	0.0002	<0.00020	0.00024
Arsenic, dissolved	mg/L	N/A	0.00059	0.00192	0.00183	0.00066	<0.00050	0.00051
Barium, dissolved	mg/L	N/A	0.0948	0.0556	0.0775	0.0835	0.149	0.0609
Beryllium, dissolved	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth, dissolved	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Boron, dissolved	mg/L	N/A	0.0348	0.0116	0.0084	0.016	0.009	0.011
Cadmium, dissolved	mg/L	N/A	0.000022	<0.000010	0.000036	0.000013	0.000042	0.000047
Calcium, dissolved	mg/L	N/A	221	80.8	139	125	163	184
Chromium, dissolved	mg/L	N/A	0.00079	<0.00050	<0.00050	0.00127	<0.00050	<0.00050
Cobalt, dissolved	mg/L	N/A	<0.00010	0.00036	0.00259	<0.00010	0.00022	<0.00010
Copper, dissolved	mg/L	N/A	0.00843	0.0004	0.00157	0.00161	0.00192	0.00233
Iron, dissolved	mg/L	N/A	<0.010	0.034	0.1	<0.010	<0.010	<0.010
Lead, dissolved	mg/L	N/A	<0.00020	0.00043	0.00064	0.00028	0.0003	<0.00020
Magnesium, dissolved	mg/L	N/A	32.8	23.8	22.5	33	47.4	20.3
Manganese, dissolved	mg/L	N/A	0.00052	0.128	0.0645	0.00255	0.0607	0.0032
Mercury, dissolved	mg/L	N/A	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, dissolved	mg/L	N/A	0.00099	0.00614	0.00504	0.00136	0.00128	0.00146
Nickel, dissolved	mg/L	N/A	0.00142	0.00163	0.0165	0.0008	0.00225	0.00197
Phosphorus, dissolved	mg/L	N/A	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	mg/L	N/A	6.89	5	8.62	13.1	7.37	6.98
Selenium, dissolved	mg/L	N/A	0.0137	<0.00050	0.00184	0.00093	0.0059	0.00525
Silicon, dissolved	mg/L	N/A	13.8	11.2	9.1	13.2	11.6	9.2
Silver, dissolved	mg/L	N/A	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium, dissolved	mg/L	N/A	15	18.4	23	26.4	34.8	16
Strontium, dissolved	mg/L	N/A	1.4	0.87	1.34	1.24	2.47	1.39
Sulfur, dissolved	mg/L	N/A	131	44.4	81.5	56.4	52.1	69.8
Tellurium, dissolved	mg/L	N/A	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium, dissolved	mg/L	N/A	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thorium, dissolved	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, dissolved	mg/L	N/A	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium, dissolved	mg/L	N/A	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten, dissolved	mg/L	N/A	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium, dissolved	mg/L	N/A	0.00485	0.0035	0.0351	0.00822	0.0165	0.0275
Vanadium, dissolved	mg/L	N/A	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc, dissolved	mg/L	N/A	0.0058	<0.0040	<0.0040	<0.0040	<0.0040	0.0052
Zirconium, dissolved	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Total Metals								
Aluminum, total	mg/L	OG<0.1	<0.0050	0.0253	0.0159	0.0108	0.0219	0.07
Antimony, total	mg/L	MAC=0.006	<0.00020	0.00025	0.00161	<0.00020	<0.00020	0.00036
Arsenic, total	mg/L	MAC=0.01	0.00067	0.0019	0.00181	0.0007	<0.00050	0.00064
Barium, total	mg/L	MAC=2	0.0983	0.0562	0.0773	0.0848	0.146	0.0665
Beryllium, total	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth, total	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Boron, total	mg/L	MAC=5	0.043	0.017	0.0128	0.0204	0.0121	0.0138
Cadmium, total	mg/L	MAC=0.005	0.000025	<0.000010	0.00004	0.000017	0.000044	0.000056
Calcium, total	mg/L	None Required	238	86.7	144	132	168	211
Chromium, total	mg/L	MAC=0.05	0.00083	<0.00050	0.00051	0.00136	<0.00050	<0.00050
Cobalt, total	mg/L	N/A	<0.00010	0.00039	0.00282	<0.00010	0.00027	0.00027
Copper, total	mg/L	MAC=2	0.00812	0.00091	0.00277	0.00196	0.00229	0.00439
Iron, total	mg/L	AO<=0.3	<0.010	0.075	0.123	0.029	0.054	0.119
Lead, total	mg/L	MAC=0.005	<0.00020	0.00055	0.00097	0.00033	0.00039	<0.00020
Lithium, total	mg/L	N/A	0.00799	0.00652	0.0125	0.0103	0.0244	0.00579

Table E-1
Tabulated Water Quality Data

Sample ID		Std (CDWQG)	MW19-1A-R	MW-20-1B	MW-20-2B	MW-19-2A	MW-20-4A	MW-19-3A
Laboratory ID			0021754-01	0021754-02	0021754-03	0021754-04	0021754-05	0021754-06
Date Sampled			2020-02-19	2020-02-19	2020-02-19	2020-02-19	2020-02-19	2020-02-19
Magnesium, total	mg/L	None Required	33.1	23.3	21.7	31.9	45.5	20.7
Manganese, total	mg/L	MAC=0.12	0.0007	0.126	0.0633	0.0049	0.059	0.011
Mercury, total	mg/L	MAC=0.001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, total	mg/L	N/A	0.0011	0.0063	0.00516	0.00136	0.00121	0.00155
Nickel, total	mg/L	N/A	0.00134	0.00164	0.0158	0.00085	0.00217	0.00251
Phosphorus, total	mg/L	N/A	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	mg/L	N/A	7.2	5.09	8.51	13.3	7.37	7.48
Selenium, total	mg/L	MAC=0.05	0.0145	<0.00050	0.00175	0.00084	0.00577	0.00578
Silicon, total	mg/L	N/A	14.2	11	8.7	12.8	11.1	9.5
Silver, total	mg/L	None Required	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium, total	mg/L	AO<=200	15.6	18.6	22.9	26.4	34.4	16.8
Strontium, total	mg/L	7	1.4	0.853	1.3	1.19	2.35	1.47
Sulfur, total	mg/L	N/A	140	47	84	60.6	54	76.8
Tellurium, total	mg/L	N/A	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium, total	mg/L	N/A	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thorium, total	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	mg/L	N/A	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium, total	mg/L	N/A	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten, total	mg/L	N/A	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium, total	mg/L	MAC=0.02	0.00512	0.00365	0.0355	0.00847	0.0167	0.0309
Vanadium, total	mg/L	N/A	0.0014	0.0017	0.0011	0.0014	0.001	0.0017
Zinc, total	mg/L	AO<=5	0.0064	<0.0040	<0.0040	<0.0040	<0.0040	0.0085
Zirconium, total	mg/L	N/A	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

CERTIFICATE OF ANALYSIS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon) #200 - 2800 29th Street Vernon, BC V1T 9P9		
ATTENTION	Nicole Penner	**WORK ORDER**	0021754
PO NUMBER		**RECEIVED / TEMP**	2020-02-21 10:10 / 5°C
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20
PROJECT INFO	Hullcar Well Installations		

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at acrump@caro.ca

Authorized By:

Alana Crump
Team Lead, Client Service

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW19-1A-R (0021754-01) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**39.4**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	**15.5**	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**348**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						
Hardness, Total (as CaCO3)	**687**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.00734**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	**0.00059**	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.0948**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Boron, dissolved	**0.0348**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	**0.000022**	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**221**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	**0.00079**	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00843**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**32.8**	N/A	0.010	mg/L	2020-02-27	
Manganese, dissolved	**0.00052**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00099**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.00142**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**6.89**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	**0.0137**	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**13.8**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	
Sodium, dissolved	**15.0**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**1.40**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**131**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW19-1A-R (0021754-01) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Dissolved Metals, Continued						
Uranium, dissolved	**0.00485**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	**0.0058**	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						
Phosphorus, Total Dissolved	**0.0145**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	**0.00067**	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.0983**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Boron, total	**0.0430**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	**0.000025**	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**238**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	**0.00083**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00812**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.00799**	N/A	0.00010	mg/L	2020-02-28	
Magnesium, total	**33.1**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.00070**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00110**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.00134**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**7.20**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	**0.0145**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**14.2**	N/A	1.0	mg/L	2020-02-28	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**15.6**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**1.40**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**140**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW19-1A-R (0021754-01) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Total Metals, Continued						
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.00512**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0014**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	**0.0064**	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
MW-20-1B (0021754-02) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**1.13**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**115**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						
Hardness, Total (as CaCO3)	**300**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.00619**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	**0.00027**	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	**0.00192**	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.0556**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Boron, dissolved	**0.0116**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**80.8**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	**0.00036**	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00040**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	**0.034**	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	**0.00043**	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**23.8**	N/A	0.010	mg/L	2020-02-27	
Manganese, dissolved	**0.128**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00614**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.00163**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**5.00**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**11.2**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-1B (0021754-02) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Dissolved Metals, Continued						
Sodium, dissolved	**18.4**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**0.870**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**44.4**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Uranium, dissolved	**0.00350**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						
Phosphorus, Total Dissolved	**0.0163**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	**3.8**	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	**0.0253**	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	**0.00025**	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	**0.00190**	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.0562**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Boron, total	**0.0170**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**86.7**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	**0.00039**	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00091**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	**0.075**	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	**0.00055**	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.00652**	N/A	0.00010	mg/L	2020-02-28	
Magnesium, total	**23.3**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.126**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00630**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.00164**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**5.09**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**11.0**	N/A	1.0	mg/L	2020-02-28	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-1B (0021754-02) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Total Metals, Continued						
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**18.6**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**0.853**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**47.0**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.00365**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0017**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
MW-20-2B (0021754-03) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**24.6**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**209**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						
Hardness, Total (as CaCO3)	**439**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.0120**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	**0.00173**	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	**0.00183**	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.0775**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Boron, dissolved	**0.0084**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	**0.000036**	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**139**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	**0.00259**	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00157**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	**0.100**	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	**0.00064**	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**22.5**	N/A	0.010	mg/L	2020-02-27	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-2B (0021754-03) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Dissolved Metals, Continued						
Manganese, dissolved	**0.0645**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00504**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.0165**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**8.62**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	**0.00184**	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**9.1**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	
Sodium, dissolved	**23.0**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**1.34**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**81.5**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Uranium, dissolved	**0.0351**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						
Phosphorus, Total Dissolved	**0.0056**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	**107**	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	**0.0159**	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	**0.00161**	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	**0.00181**	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.0773**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Boron, total	**0.0128**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	**0.000040**	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**144**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	**0.00051**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	**0.00282**	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00277**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	**0.123**	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	**0.00097**	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.0125**	N/A	0.00010	mg/L	2020-02-28	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-2B (0021754-03) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Total Metals, Continued						
Magnesium, total	**21.7**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.0633**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00516**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.0158**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**8.51**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	**0.00175**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**8.7**	N/A	1.0	mg/L	2020-02-28	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**22.9**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**1.30**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**84.0**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.0355**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0011**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
MW-19-2A (0021754-04) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**38.4**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	**4.07**	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**145**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						
Hardness, Total (as CaCO3)	**449**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.00986**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	**0.00020**	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	**0.00066**	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.0835**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-2A (0021754-04) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Dissolved Metals, Continued						
Boron, dissolved	**0.0160**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	**0.000013**	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**125**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	**0.00127**	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00161**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	**0.00028**	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**33.0**	N/A	0.010	mg/L	2020-02-27	
Manganese, dissolved	**0.00255**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00136**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.00080**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**13.1**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	**0.00093**	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**13.2**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	
Sodium, dissolved	**26.4**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**1.24**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**56.4**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Uranium, dissolved	**0.00822**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						
Phosphorus, Total Dissolved	**0.0161**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	**0.0108**	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	**0.00070**	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.0848**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-2A (0021754-04) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Total Metals, Continued						
Boron, total	**0.0204**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	**0.000017**	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**132**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	**0.00136**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00196**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	**0.029**	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	**0.00033**	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.0103**	N/A	0.00010	mg/L	2020-02-28	
Magnesium, total	**31.9**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.00490**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00136**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.00085**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**13.3**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	**0.00084**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**12.8**	N/A	1.0	mg/L	2020-02-28	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**26.4**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**1.19**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**60.6**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.00847**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0014**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
MW-20-4A (0021754-05) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**99.5**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	**1.37**	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	**0.018**	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**133**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-4A (0021754-05) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Calculated Parameters, Continued						
Hardness, Total (as CaCO3)	**601**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.0239**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.149**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Boron, dissolved	**0.0090**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	**0.000042**	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**163**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	**0.00022**	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00192**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	**0.00030**	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**47.4**	N/A	0.010	mg/L	2020-02-27	
Manganese, dissolved	**0.0607**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00128**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.00225**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**7.37**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	**0.00590**	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**11.6**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	
Sodium, dissolved	**34.8**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**2.47**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**52.1**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Uranium, dissolved	**0.0165**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-4A (0021754-05) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
General Parameters, Continued						
Phosphorus, Total Dissolved	**0.0062**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	**0.0219**	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.146**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Boron, total	**0.0121**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	**0.000044**	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**168**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	**0.00027**	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00229**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	**0.054**	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	**0.00039**	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.0244**	N/A	0.00010	mg/L	2020-02-28	
Magnesium, total	**45.5**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.0590**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00121**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.00217**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**7.37**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	**0.00577**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**11.1**	N/A	1.0	mg/L	2020-02-28	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**34.4**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**2.35**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**54.0**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.0167**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0010**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-3A (0021754-06) | Matrix: Water | Sampled: 2020-02-19 10:00						
Anions						
Chloride	**25.0**	AO ≤ 250	0.10	mg/L	2020-02-22	
Nitrate (as N)	**10.8**	MAC = 10	0.010	mg/L	2020-02-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2020-02-22	
Sulfate	**180**	AO ≤ 500	1.0	mg/L	2020-02-22	
Calculated Parameters						
Hardness, Total (as CaCO3)	**544**	None Required	0.500	mg/L	N/A	
Dissolved Metals						
Lithium, dissolved	**0.00518**	N/A	0.00010	mg/L	2020-02-27	
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Antimony, dissolved	**0.00024**	N/A	0.00020	mg/L	2020-02-27	
Arsenic, dissolved	**0.00051**	N/A	0.00050	mg/L	2020-02-27	
Barium, dissolved	**0.0609**	N/A	0.0050	mg/L	2020-02-27	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Boron, dissolved	**0.0110**	N/A	0.0050	mg/L	2020-02-27	
Cadmium, dissolved	**0.000047**	N/A	0.000010	mg/L	2020-02-27	
Calcium, dissolved	**184**	N/A	0.20	mg/L	2020-02-27	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Copper, dissolved	**0.00233**	N/A	0.00040	mg/L	2020-02-27	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2020-02-27	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Magnesium, dissolved	**20.3**	N/A	0.010	mg/L	2020-02-27	
Manganese, dissolved	**0.00320**	N/A	0.00020	mg/L	2020-02-27	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2020-02-26	
Molybdenum, dissolved	**0.00146**	N/A	0.00010	mg/L	2020-02-27	
Nickel, dissolved	**0.00197**	N/A	0.00040	mg/L	2020-02-27	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2020-02-27	
Potassium, dissolved	**6.98**	N/A	0.10	mg/L	2020-02-27	
Selenium, dissolved	**0.00525**	N/A	0.00050	mg/L	2020-02-27	
Silicon, dissolved	**9.2**	N/A	1.0	mg/L	2020-02-27	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2020-02-27	
Sodium, dissolved	**16.0**	N/A	0.10	mg/L	2020-02-27	
Strontium, dissolved	**1.39**	N/A	0.0010	mg/L	2020-02-27	
Sulfur, dissolved	**69.8**	N/A	3.0	mg/L	2020-02-27	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2020-02-27	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2020-02-27	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2020-02-27	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2020-02-27	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-3A (0021754-06) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Dissolved Metals, Continued						
Uranium, dissolved	**0.0275**	N/A	0.000020	mg/L	2020-02-27	
Vanadium, dissolved	< 0.0010	N/A	0.0010	mg/L	2020-02-27	
Zinc, dissolved	**0.0052**	N/A	0.0040	mg/L	2020-02-27	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2020-02-27	
General Parameters						
Phosphorus, Total Dissolved	**0.0126**	N/A	0.0020	mg/L	2020-02-25	
Solids, Total Suspended	**6.0**	N/A	2.0	mg/L	2020-02-25	
Total Metals						
Aluminum, total	**0.0700**	OG < 0.1	0.0050	mg/L	2020-02-28	
Antimony, total	**0.00036**	MAC = 0.006	0.00020	mg/L	2020-02-28	
Arsenic, total	**0.00064**	MAC = 0.01	0.00050	mg/L	2020-02-28	
Barium, total	**0.0665**	MAC = 2	0.0050	mg/L	2020-02-28	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Boron, total	**0.0138**	MAC = 5	0.0050	mg/L	2020-02-28	
Cadmium, total	**0.000056**	MAC = 0.005	0.000010	mg/L	2020-02-28	
Calcium, total	**211**	None Required	0.20	mg/L	2020-02-28	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2020-02-28	
Cobalt, total	**0.00027**	N/A	0.00010	mg/L	2020-02-28	
Copper, total	**0.00439**	MAC = 2	0.00040	mg/L	2020-02-28	
Iron, total	**0.119**	AO ≤ 0.3	0.010	mg/L	2020-02-28	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2020-02-28	
Lithium, total	**0.00579**	N/A	0.00010	mg/L	2020-02-28	
Magnesium, total	**20.7**	None Required	0.010	mg/L	2020-02-28	
Manganese, total	**0.0110**	MAC = 0.12	0.00020	mg/L	2020-02-28	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2020-02-25	
Molybdenum, total	**0.00155**	N/A	0.00010	mg/L	2020-02-28	
Nickel, total	**0.00251**	N/A	0.00040	mg/L	2020-02-28	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2020-02-28	
Potassium, total	**7.48**	N/A	0.10	mg/L	2020-02-28	
Selenium, total	**0.00578**	MAC = 0.05	0.00050	mg/L	2020-02-28	
Silicon, total	**9.5**	N/A	1.0	mg/L	2020-02-28	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2020-02-28	
Sodium, total	**16.8**	AO ≤ 200	0.10	mg/L	2020-02-28	
Strontium, total	**1.47**	7	0.0010	mg/L	2020-02-28	
Sulfur, total	**76.8**	N/A	3.0	mg/L	2020-02-28	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2020-02-28	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2020-02-28	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2020-02-28	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2020-02-28	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-3A (0021754-06) | Matrix: Water | Sampled: 2020-02-19 10:00, Continued						
Total Metals, Continued						
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2020-02-28	
Uranium, total	**0.0309**	MAC = 0.02	0.000020	mg/L	2020-02-28	
Vanadium, total	**0.0017**	N/A	0.0010	mg/L	2020-02-28	
Zinc, total	**0.0085**	AO ≤ 5	0.0040	mg/L	2020-02-28	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2020-02-28	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
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Analysis Description	Method Ref.	Technique	Location
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2017)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
OG	Operational Guideline (treated water)
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Health Canada, Feb 2017)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:acrump@caro.ca

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B0B1752										
Blank (B0B1752-BLK1)				Prepared: 2020-02-22, Analyzed: 2020-02-22						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B0B1752-BLK2)				Prepared: 2020-02-22, Analyzed: 2020-02-22						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B0B1752-BS1)				Prepared: 2020-02-22, Analyzed: 2020-02-22						
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Nitrate (as N)	4.03	0.010	mg/L	4.00		101	90-110			
Nitrite (as N)	2.06	0.010	mg/L	2.00		103	85-115			
Sulfate	16.1	1.0	mg/L	16.0		100	90-110			
LCS (B0B1752-BS2)				Prepared: 2020-02-22, Analyzed: 2020-02-22						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Nitrate (as N)	4.02	0.010	mg/L	4.00		101	90-110			
Nitrite (as N)	2.06	0.010	mg/L	2.00		103	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
Dissolved Metals, Batch B0B2145										
Blank (B0B2145-BLK1)				Prepared: 2020-02-26, Analyzed: 2020-02-26						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B0B2145-BLK2)				Prepared: 2020-02-26, Analyzed: 2020-02-26						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B0B2145-SRM1)				Prepared: 2020-02-26, Analyzed: 2020-02-26						
Mercury, dissolved	0.00481	0.000010	mg/L	0.00489		98	80-120			
Reference (B0B2145-SRM2)				Prepared: 2020-02-26, Analyzed: 2020-02-26						
Mercury, dissolved	0.00474	0.000010	mg/L	0.00489		97	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0B2145, Continued										
Dissolved Metals, Batch B0B2211										
Blank (B0B2211-BLK1)				Prepared: 2020-02-27, Analyzed: 2020-02-27						
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B0B2211-BS1)				Prepared: 2020-02-27, Analyzed: 2020-02-27						
Lithium, dissolved	0.0205	0.00010	mg/L	0.0200		103	80-120			
Aluminum, dissolved	0.0201	0.0050	mg/L	0.0199		101	80-120			
Antimony, dissolved	0.0188	0.00020	mg/L	0.0200		94	80-120			
Arsenic, dissolved	0.0191	0.00050	mg/L	0.0200		95	80-120			
Barium, dissolved	0.0199	0.0050	mg/L	0.0198		100	80-120			
Beryllium, dissolved	0.0218	0.00010	mg/L	0.0198		110	80-120			
Bismuth, dissolved	0.0226	0.00010	mg/L	0.0200		113	80-120			
Boron, dissolved	0.0205	0.0050	mg/L	0.0200		103	80-120			
Cadmium, dissolved	0.0198	0.000010	mg/L	0.0199		99	80-120			
Calcium, dissolved	2.36	0.20	mg/L	2.02		117	80-120			
Chromium, dissolved	0.0198	0.00050	mg/L	0.0198		100	80-120			
Cobalt, dissolved	0.0192	0.00010	mg/L	0.0199		96	80-120			
Copper, dissolved	0.0196	0.00040	mg/L	0.0200		98	80-120			
Iron, dissolved	1.93	0.010	mg/L	2.02		95	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B0B2211, Continued										
LCS (B0B2211-BS1), Continued				Prepared: 2020-02-27, Analyzed: 2020-02-27						
Lead, dissolved	0.0224	0.00020	mg/L	0.0199		113	80-120			
Magnesium, dissolved	1.98	0.010	mg/L	2.02		98	80-120			
Manganese, dissolved	0.0205	0.00020	mg/L	0.0199		103	80-120			
Molybdenum, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Nickel, dissolved	0.0210	0.00040	mg/L	0.0200		105	80-120			
Phosphorus, dissolved	1.99	0.050	mg/L	2.00		99	80-120			
Potassium, dissolved	1.91	0.10	mg/L	2.02		95	80-120			
Selenium, dissolved	0.0196	0.00050	mg/L	0.0200		98	80-120			
Silicon, dissolved	1.9	1.0	mg/L	2.00		94	80-120			
Silver, dissolved	0.0206	0.000050	mg/L	0.0200		103	80-120			
Sodium, dissolved	1.99	0.10	mg/L	2.02		99	80-120			
Strontium, dissolved	0.0206	0.0010	mg/L	0.0200		103	80-120			
Sulfur, dissolved	5.1	3.0	mg/L	5.00		102	80-120			
Tellurium, dissolved	0.0191	0.00050	mg/L	0.0200		95	80-120			
Thallium, dissolved	0.0228	0.000020	mg/L	0.0199		114	80-120			
Thorium, dissolved	0.0221	0.00010	mg/L	0.0200		111	80-120			
Tin, dissolved	0.0204	0.00020	mg/L	0.0200		102	80-120			
Titanium, dissolved	0.0211	0.0050	mg/L	0.0200		106	80-120			
Tungsten, dissolved	0.0208	0.0010	mg/L	0.0200		104	80-120			
Uranium, dissolved	0.0213	0.000020	mg/L	0.0200		107	80-120			
Vanadium, dissolved	0.0203	0.0010	mg/L	0.0200		102	80-120			
Zinc, dissolved	0.0211	0.0040	mg/L	0.0200		106	80-120			
Zirconium, dissolved	0.0198	0.00010	mg/L	0.0200		99	80-120			
Reference (B0B2211-SRM1)				Prepared: 2020-02-27, Analyzed: 2020-02-27						
Lithium, dissolved	0.100	0.00010	mg/L	0.100		100	77-127			
Aluminum, dissolved	0.224	0.0050	mg/L	0.235		95	79-114			
Antimony, dissolved	0.0443	0.00020	mg/L	0.0431		103	89-123			
Arsenic, dissolved	0.430	0.00050	mg/L	0.423		102	87-113			
Barium, dissolved	3.11	0.0050	mg/L	3.30		94	85-114			
Beryllium, dissolved	0.220	0.00010	mg/L	0.209		105	79-122			
Boron, dissolved	1.64	0.0050	mg/L	1.65		100	79-117			
Cadmium, dissolved	0.221	0.000010	mg/L	0.221		100	89-112			
Calcium, dissolved	7.60	0.20	mg/L	7.72		98	85-120			
Chromium, dissolved	0.435	0.00050	mg/L	0.434		100	87-113			
Cobalt, dissolved	0.123	0.00010	mg/L	0.124		99	90-117			
Copper, dissolved	0.799	0.00040	mg/L	0.815		98	90-115			
Iron, dissolved	1.26	0.010	mg/L	1.27		99	86-112			
Lead, dissolved	0.118	0.00020	mg/L	0.110		107	90-113			
Magnesium, dissolved	6.60	0.010	mg/L	6.59		100	84-116			
Manganese, dissolved	0.349	0.00020	mg/L	0.342		102	85-113			
Molybdenum, dissolved	0.411	0.00010	mg/L	0.404		102	87-112			
Nickel, dissolved	0.907	0.00040	mg/L	0.835		109	90-114			
Phosphorus, dissolved	0.484	0.050	mg/L	0.499		97	74-119			
Potassium, dissolved	2.84	0.10	mg/L	2.88		98	78-119			
Selenium, dissolved	0.0332	0.00050	mg/L	0.0324		103	89-123			
Sodium, dissolved	17.7	0.10	mg/L	18.0		98	81-117			
Strontium, dissolved	0.943	0.0010	mg/L	0.935		101	82-111			
Thallium, dissolved	0.0431	0.000020	mg/L	0.0385		112	90-113			
Uranium, dissolved	0.251	0.000020	mg/L	0.258		97	87-113			
Vanadium, dissolved	0.890	0.0010	mg/L	0.873		102	85-110			
Zinc, dissolved	0.917	0.0040	mg/L	0.848		108	88-114			
General Parameters, Batch B0B1967										

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B0B1967, Continued										
Blank (B0B1967-BLK1)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B0B1967-BS1)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Solids, Total Suspended	90.0	10.0	mg/L	100		90	85-115			
General Parameters, Batch B0B1986										
Blank (B0B1986-BLK2)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L							
LCS (B0B1986-BS2)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Phosphorus, Total Dissolved	0.107	0.0020	mg/L	0.100		107	85-115			
Total Metals, Batch B0B2023										
Blank (B0B2023-BLK1)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Mercury, total	< 0.000010	0.000010	mg/L							
Reference (B0B2023-SRM1)				Prepared: 2020-02-25, Analyzed: 2020-02-25						
Mercury, total	0.00469	0.000010	mg/L	0.00489		96	80-120			
Total Metals, Batch B0B2197										
Blank (B0B2197-BLK1)				Prepared: 2020-02-27, Analyzed: 2020-02-28						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0B2197, Continued										
Blank (B0B2197-BLK1), Continued				Prepared: 2020-02-27, Analyzed: 2020-02-28						
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B0B2197-BS1)				Prepared: 2020-02-27, Analyzed: 2020-02-28						
Aluminum, total	0.0186	0.0050	mg/L	0.0199		93	80-120			
Antimony, total	0.0207	0.00020	mg/L	0.0200		103	80-120			
Arsenic, total	0.0198	0.00050	mg/L	0.0200		99	80-120			
Barium, total	0.0203	0.0050	mg/L	0.0198		103	80-120			
Beryllium, total	0.0204	0.00010	mg/L	0.0198		103	80-120			
Bismuth, total	0.0218	0.00010	mg/L	0.0200		109	80-120			
Boron, total	0.0202	0.0050	mg/L	0.0200		101	80-120			
Cadmium, total	0.0201	0.000010	mg/L	0.0199		101	80-120			
Calcium, total	2.18	0.20	mg/L	2.02		108	80-120			
Chromium, total	0.0201	0.00050	mg/L	0.0198		102	80-120			
Cobalt, total	0.0210	0.00010	mg/L	0.0199		105	80-120			
Copper, total	0.0212	0.00040	mg/L	0.0200		106	80-120			
Iron, total	1.88	0.010	mg/L	2.02		93	80-120			
Lead, total	0.0215	0.00020	mg/L	0.0199		108	80-120			
Lithium, total	0.0209	0.00010	mg/L	0.0200		105	80-120			
Magnesium, total	1.96	0.010	mg/L	2.02		97	80-120			
Manganese, total	0.0202	0.00020	mg/L	0.0199		101	80-120			
Molybdenum, total	0.0206	0.00010	mg/L	0.0200		103	80-120			
Nickel, total	0.0205	0.00040	mg/L	0.0200		102	80-120			
Phosphorus, total	1.98	0.050	mg/L	2.00		99	80-120			
Potassium, total	1.98	0.10	mg/L	2.02		98	80-120			
Selenium, total	0.0210	0.00050	mg/L	0.0200		105	80-120			
Silicon, total	2.2	1.0	mg/L	2.00		111	80-120			
Silver, total	0.0209	0.000050	mg/L	0.0200		104	80-120			
Sodium, total	2.04	0.10	mg/L	2.02		101	80-120			
Strontium, total	0.0203	0.0010	mg/L	0.0200		102	80-120			
Sulfur, total	4.8	3.0	mg/L	5.00		97	80-120			
Tellurium, total	0.0192	0.00050	mg/L	0.0200		96	80-120			
Thallium, total	0.0218	0.000020	mg/L	0.0199		110	80-120			
Thorium, total	0.0219	0.00010	mg/L	0.0200		109	80-120			
Tin, total	0.0206	0.00020	mg/L	0.0200		103	80-120			
Titanium, total	0.0203	0.0050	mg/L	0.0200		101	80-120			
Tungsten, total	0.0211	0.0010	mg/L	0.0200		106	80-120			
Uranium, total	0.0223	0.000020	mg/L	0.0200		112	80-120			
Vanadium, total	0.0207	0.0010	mg/L	0.0200		104	80-120			
Zinc, total	0.0205	0.0040	mg/L	0.0200		102	80-120			
Zirconium, total	0.0203	0.00010	mg/L	0.0200		102	80-120			
Duplicate (B0B2197-DUP1)		**Source: 0021754-05**		Prepared: 2020-02-27, Analyzed: 2020-02-28						
Aluminum, total	0.0215	0.0050	mg/L		0.0219				20	
Antimony, total	< 0.00020	0.00020	mg/L		< 0.00020				20	
Arsenic, total	< 0.00050	0.00050	mg/L		< 0.00050				15	
Barium, total	0.150	0.0050	mg/L		0.146			3	9	
Beryllium, total	< 0.00010	0.00010	mg/L		< 0.00010				16	
Bismuth, total	< 0.00010	0.00010	mg/L		< 0.00010				20	
Boron, total	0.0110	0.0050	mg/L		0.0121				20	
Cadmium, total	0.000045	0.000010	mg/L		0.000044				20	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0B2197, Continued										
Duplicate (B0B2197-DUP1), Continued		**Source: 0021754-05**		Prepared: 2020-02-27, Analyzed: 2020-02-28						
Calcium, total	173	0.20	mg/L		168			3	12	
Chromium, total	< 0.00050	0.00050	mg/L		< 0.00050				12	
Cobalt, total	0.00027	0.00010	mg/L		0.00027				13	
Copper, total	0.00241	0.00040	mg/L		0.00229			5	20	
Iron, total	0.056	0.010	mg/L		0.054			5	18	
Lead, total	0.00040	0.00020	mg/L		0.00039				20	
Lithium, total	0.0247	0.00010	mg/L		0.0244			1	19	
Magnesium, total	45.6	0.010	mg/L		45.5			< 1	10	
Manganese, total	0.0593	0.00020	mg/L		0.0590			< 1	13	
Molybdenum, total	0.00121	0.00010	mg/L		0.00121			< 1	20	
Nickel, total	0.00214	0.00040	mg/L		0.00217			2	20	
Phosphorus, total	< 0.050	0.050	mg/L		< 0.050				20	
Potassium, total	7.34	0.10	mg/L		7.37			< 1	13	
Selenium, total	0.00605	0.00050	mg/L		0.00577			5	20	
Silicon, total	11.0	1.0	mg/L		11.1			1	11	
Silver, total	< 0.000050	0.000050	mg/L		< 0.000050				18	
Sodium, total	34.6	0.10	mg/L		34.4			< 1	10	
Strontium, total	2.41	0.0010	mg/L		2.35			2	9	
Sulfur, total	54.1	3.0	mg/L		54.0			< 1	20	
Tellurium, total	< 0.00050	0.00050	mg/L		< 0.00050				20	
Thallium, total	< 0.000020	0.000020	mg/L		< 0.000020				20	
Thorium, total	< 0.00010	0.00010	mg/L		< 0.00010				18	
Tin, total	< 0.00020	0.00020	mg/L		< 0.00020				20	
Titanium, total	< 0.0050	0.0050	mg/L		< 0.0050				20	
Tungsten, total	< 0.0010	0.0010	mg/L		< 0.0010				20	
Uranium, total	0.0171	0.000020	mg/L		0.0167			3	14	
Vanadium, total	0.0011	0.0010	mg/L		0.0010				17	
Zinc, total	< 0.0040	0.0040	mg/L		< 0.0040				8	
Zirconium, total	< 0.00010	0.00010	mg/L		< 0.00010				20	
Reference (B0B2197-SRM1)				Prepared: 2020-02-27, Analyzed: 2020-02-28						
Aluminum, total	0.287	0.0050	mg/L	0.303		95	82-114			
Antimony, total	0.0512	0.00020	mg/L	0.0511		100	88-115			
Arsenic, total	0.119	0.00050	mg/L	0.118		101	88-111			
Barium, total	0.821	0.0050	mg/L	0.823		100	83-110			
Beryllium, total	0.0506	0.00010	mg/L	0.0496		102	80-119			
Boron, total	3.44	0.0050	mg/L	3.45		100	80-118			
Cadmium, total	0.0500	0.000010	mg/L	0.0495		101	90-110			
Calcium, total	11.3	0.20	mg/L	11.6		98	85-113			
Chromium, total	0.253	0.00050	mg/L	0.250		101	88-111			
Cobalt, total	0.0406	0.00010	mg/L	0.0377		108	90-114			
Copper, total	0.521	0.00040	mg/L	0.486		107	90-117			
Iron, total	0.479	0.010	mg/L	0.488		98	90-116			
Lead, total	0.208	0.00020	mg/L	0.204		102	90-110			
Lithium, total	0.406	0.00010	mg/L	0.403		101	79-118			
Magnesium, total	3.78	0.010	mg/L	3.79		100	88-116			
Manganese, total	0.109	0.00020	mg/L	0.109		100	88-108			
Molybdenum, total	0.201	0.00010	mg/L	0.198		102	88-110			
Nickel, total	0.255	0.00040	mg/L	0.249		102	90-112			
Phosphorus, total	0.217	0.050	mg/L	0.227		96	72-118			
Potassium, total	7.25	0.10	mg/L	7.21		100	87-116			
Selenium, total	0.126	0.00050	mg/L	0.121		104	90-122			
Sodium, total	7.51	0.10	mg/L	7.54		100	86-118			
Strontium, total	0.389	0.0010	mg/L	0.375		104	86-110			
Thallium, total	0.0852	0.000020	mg/L	0.0805		106	90-113			
Uranium, total	0.0317	0.000020	mg/L	0.0306		104	88-112			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	**WORK ORDER**	0021754
PROJECT	2020-8527.000.001	**REPORTED**	2020-02-28 12:20

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B0B2197, Continued										
Reference (B0B2197-SRM1), Continued				Prepared: 2020-02-27, Analyzed: 2020-02-28						
Vanadium, total	0.384	0.0010	mg/L	0.386		100	87-110			
Zinc, total	2.48	0.0040	mg/L	2.49		100	90-113			

CARO ANALYTICAL SERVICES
Caring About Results... Obviously

☐ 110-4011 Viking Way, Richmond, BC V6V 2K9
Tel: (604) 279-1499 Fax: (604) 279-1599

☒ 102-3677 Highway 97N, Kelowna, BC V1X 5C3
Tel: (250) 765-9646 Fax: (250) 765-3893

☐ 17225 109 Avenue NW, Edmonton, AB T5S 1H7
Tel: (780) 489-9100 Fax: (780) 489-9700

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CHAIN OF CUSTODY RECORD

COC# _____ PAGE _____ OF _____

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

PROJECT: 2020-8527.000.001

PROJECT INFO: Hullcar Well Installations

REPORT TO:
COMPANY: Associated Environmental
ADDRESS: 200, 2800 29th Street
Vernon, BC V1T 9P9
CONTACT: Nicole Penner
TEL/FAX: 250-938-5537 250-545-3672
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
DATA FORMAT: EXCEL ☒ WATERTRAX ☐ ESdat ☐ EQuIS ☐ BC EMS ☐ OTHER* ☐
EMAIL 1: pennern@ae.ca
EMAIL 2: friesent@ae.ca
EMAIL 3:

INVOICE TO: SAME AS REPORT TO ☒
COMPANY:
ADDRESS:
CONTACT:
TEL/FAX:
DELIVERY METHOD: EMAIL ☐ MAIL ☐ OTHER* ☐
EMAIL 1:
EMAIL 2:
EMAIL 3:
PO #:

TURNAROUND TIME REQUESTED:
Routine: (5-7 Days) ☒
Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
Other* ☐
*Contact Lab To Confirm. Surcharge May Apply

REGULATORY APPLICATION:
Canadian Drinking Water Quality Guidelines ☒ Regs on Report? ☐
BC Drinking Water Protection Act / Reg. ☐
BC CSR ☐ AB TIER 1 ☐ CCME ☐ OTHER* ☐
AL ☐ PL ☐ RL ☐ CL ☐ IL ☐ AW ☐ IW ☐ LW ☐

** NEW ** If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, check here: ☐

SAMPLED BY: Tony Friesen

ANALYSES REQUESTED:

	CLIENT SAMPLE ID:	MATRIX: DRINKING WATER	OTHER WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (DD-MMM-YY)	TIME (HH:MM)	COMMENTS: CHLORINATED	FILTERED	PRESERVED	(e.g. flow/volume media ID/notes)	BTEX ☐ VPH ☐ PHC F1 ☐	VOC ☐ VPH ☐	EPH ☐ PHC F2-F4 ☐	PAH ☐ L/HEPH ☐	PHENOLS Chlorinated ☐ Non-Chlor. ☐	PCB ☐ GLYCOLS ☐ HAA ☐	PESTICIDES ☐ ACID HERBICIDES ☐	METALS - WATER TOTAL ☒ Hg	METALS - WATER DISSOLVED ☒ Hg	METALS - SOIL (SALM) ☐ inc. pH	pH ☐ EC ☐ ALK ☐	TSS ☒ VSS ☐ TDS ☐	BOD ☐ COD ☐	TOG ☐ MOG ☐	FECAL COLIFORMS ☐ HPC ☐	TOTAL COLIFORMS ☐ *E. coli* ☐	ASBESTOS	Chloride	Nitrate, nitrite	Sulphate	Dissolved phosphorus				HOLD
	MW-19-1A-R		✔				19-Feb-20	10:00		✔	✔									✔	✔			✔						✔	✔	✔	✔				
	MW-20-1B		✔				19-Feb-20	13:00		✔	✔									✔	✔			✔						✔	✔	✔	✔				
	MW-20-2B						19-Feb-20	17:00		✔	✔									✔	✔			✔						✔	✔	✔	✔				
	MW-19-2A						20-Feb-20	9:30		✔	✔									✔	✔			✔						✔	✔	✔	✔				
	MW-20-4A						20-Feb-20	13:20		✔	✔									✔	✔			✔						✔	✔	✔	✔				
	MW-19-3A						20-Feb-20	16:00		✔	✔									✔	✔			✔						✔	✔	✔	✔				

SHIPPING INSTRUCTIONS: Return Cooler(s) ☐
Supplies Needed:

SAMPLE RETENTION INSTRUCTIONS (Discarded 30 days after Report unless otherwise specified):
60 Days ☐ 90 Days ☐ Longer Date (Surcharges will Apply): _____
*** OTHER INSTRUCTIONS:**

PAYMENT:
CHEQUE ☐
CREDIT ☐
DEBIT ☐
CASH ☐
INVOICE ☐

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): _____ ICE: Y ☐ N ☐
COOLER 2 (°C): _____ ICE: Y ☐ N ☐
COOLER 3 (°C): _____ ICE: Y ☐ N ☐
CUSTODY SEALS INTACT: NA ☐ Y ☐ N ☐