



**SOLID WASTE MANAGEMENT
Annual Operations and Monitoring Report
Golden Refuse Disposal Site MR-17006
2019**



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Executive Summary

The Golden Refuse Disposal Site (Site) is located at 350 Golden-Donald Upper Road, Golden, BC approximately 2 km northeast from the core of Golden. The legal description of the property is Subdivision 12 of Section 18, Township 27, Range 21, West of the 5th Meridian, Kootenay District. The Site is approximately 1.2 km north of the Kicking Horse River, the nearest major surface water body.

The Site has been in operation since the early 1970's as a natural attenuation landfill. In the late 1970's the permit was transferred from the Town of Golden to the Columbia Shuswap Regional District (CSRD). The property is leased to the CSRD by the Crown and covers an area of approximately 17 ha. The waste footprint currently covers an area approximately 4.4 ha. The Site was operated by Pet Eagle Holdings Ltd. under contract with the CSRD.

The Site provides solid waste disposal and residual processing services to residents, businesses, and institutions located within the municipality of Golden and the CSRD's Electoral Area A. A CSRD transfer station in Parson and a transfer station located in Field (owned and operated by Parks Canada) deliver solid wastes to the site in 50 yd containers on a regular frequency. The site is operated under an approved Design and Operations Plan (D&O Plan), in accordance with Operational Certificate 17006, issued by the Ministry of Environment on May 5, 2003 and amended on August 29, 2012.

Environmental Monitoring at the site includes groundwater sampling, analysis and reporting. All environmental monitoring and reporting is performed by contracted professionals. Data collected from the groundwater monitoring program is compared to the historical records to determine whether the site has adversely affected groundwater quality and, if so, to what extent. The qualified professional's report is included as an appendix in this report.

In 2019, the CSRD submitted a Conformance Review and Landfill Monitoring program update to the MoE via their central authorizations reporting portal. In addition, a draft updated Design, Operating, and Closure Plan (DOCP) was submitted in December 2019.

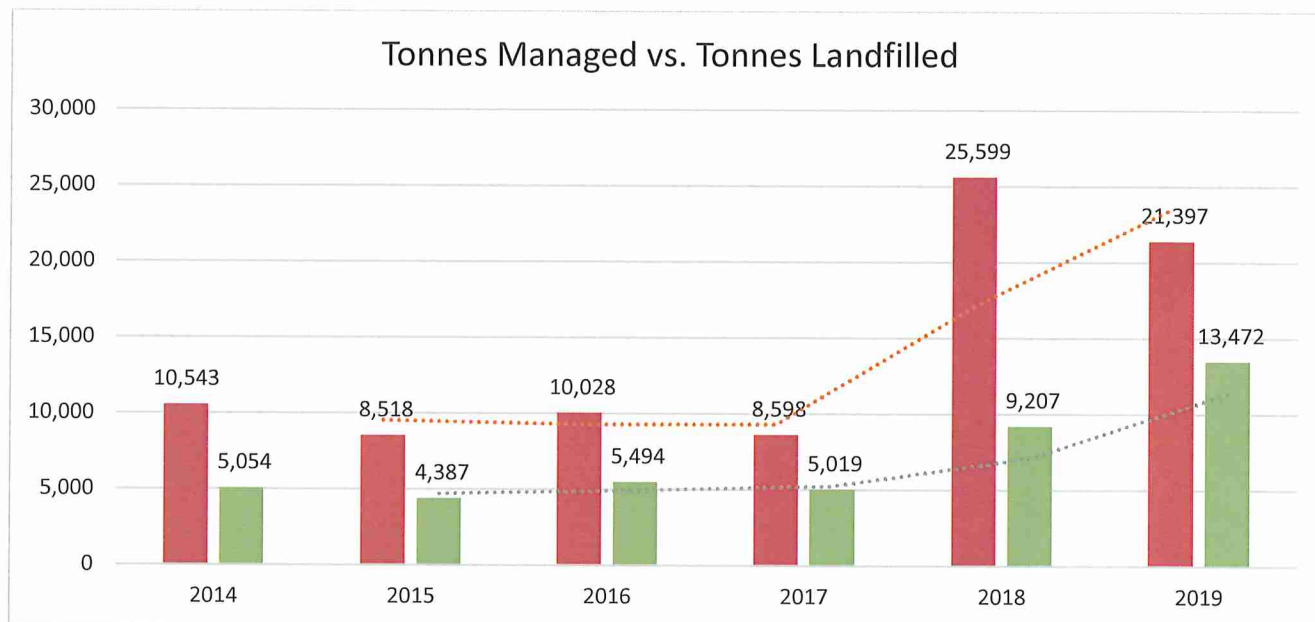
This annual report includes airspace mapping, financial reporting, capacity tables and detailed diversion quantities and has been prepared to comply with Section 5.1 Annual Report of Operation Certificate No. 17006. This report will be made available to the public via the CSRD's webpage upon submission to the Ministry of Environment.

Wastes Received, Recycled and Landfilled

In 2019, approximately 21,397 tonnes of refuse and recoverable wastes were managed at the Site. The quantity of municipal solid waste landfilled at the Site in 2019 was 13,472 tonnes, which represents a 31% increase over 2018. Using the most recent census date (2016) the per capita disposal rate for 2019 was 1.96 tonnes/person/year, based on a population of 6,856 for the service area. In 2018 and 2019, large scale clean-up projects associated with rail derailments resulted in a significant increase in landfilled waste compared to previous years. It should be noted that in 2019, 8,040 tonnes of the 13,472 tonnes landfilled was attributed to a CP grain spill clean up. Subtracting the CP project from the total would show that 5,432 tonnes was landfilled in 2019, which is more representative of historical averages for this Site.

7,925 tonnes of wastes were diverted to marshaling areas for recovery. The majority of diverted material was clean soil from clean-up projects in and around the Golden area. Existing diversion programs include; hazardous waste, mattresses, asphalt shingles, concrete, contaminated soil, clean soil, wood waste, yard and

garden waste, metal and reusable items. The following graph below identifies tonnes of waste managed (red) and tonnes of waste landfilled (green) between 2014 and 2019:



Design and Operation Plan (DCOP) and the Environmental Monitoring Program (EMP)

In 2019 the Golden landfill's Design and Operation Plan and the Environmental Monitoring Program was reviewed and updated by Golder & Associates, a reputable landfill engineering firm. Both reports have been submitted to the Ministry of Environment for approval and have been posted to the CSRD's website. Both documents are intended to help the CSRD develop the Site in a manner that protects the environment, supports changes to the Operational Certificate update process, and provides residents in Golden and surrounding area with a properly managed and operated municipal landfill. Highlights from the reports include the following:

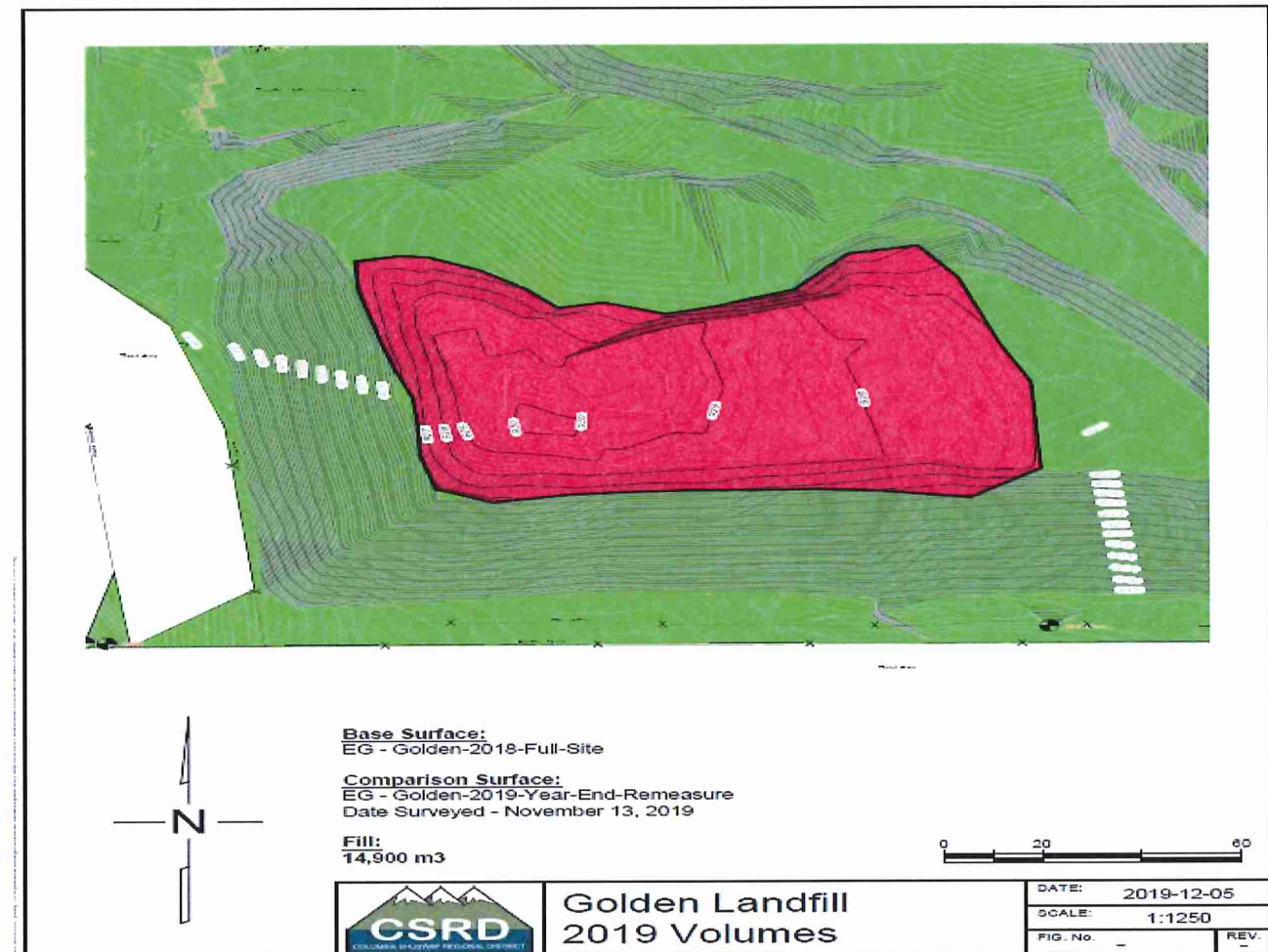
- the development of an engineered landfill (liner and leachate collection system) for all future phases of landfill development;
- increased monitoring frequency of groundwater wells at the landfill; and
- installation of additional gas monitoring wells at the landfill.

All reports, plan updates and reviews have been submitted to the Ministry of Environment for approval and have been posted separately on the CSRD's website (www.csr.bc.ca).

Current Topographic Map

The CSRD conducts a survey of the airspace consumed on an annual basis. The survey information is used to determine the amount of airspace consumed over a given year, project the amount of airspace available for future landfilling and estimate timelines for preparing closure plans. According to the results of the 2019 survey, the Site consumed 14,900 m³ of airspace, which represents an 18% increase over 2018. This significant increase is associated with large scale CP Rail spills of grain and soil landfilled in 2019.

The following details the 2019 filling of the Site:



Updated Capacity and Phase Estimates

The following table was provided by Golder Associates, through their 2019 DOCP review work, to estimate landfill capacity:

Table 2: Projected Filling Sequence from 2019 to Closure

Phase	Projected Completion Year	Approximate Available Airspace (m ³)	Approximate Available Capacity (tonnes)	Progressive Closure Area (m ²)	Closure Cost (2019\$)
1	2027	103,000	52,900	17,600	\$1,280,800
2	2039	147,000	75,700	8,000	\$582,200
3	2045	85,000	43,600	4,500	\$327,500
4	2067	300,000	154,000	6,300	\$458,500
5	2080	200,000	102,000	36,600	\$2,663,500

Financial Statement Closure Fund Value

The CSRD manages municipal landfills in each of its four-member municipalities of the CSRD. Landfill DOCP's are developed with recommendations to develop and close/cap landfills in a phased approach and to fund closure for each of those phases. As such the CSRD does not budget for the complete closure of all landfill phases, rather, reserves are funded to ensure money is available to close phases of the landfills as they are completed.

The CSRD's 2019 Financial Statement includes the information related to the closure and post closure liability of the Site:

COLUMBIA SHUSWAP REGIONAL DISTRICT**Notes to Consolidated Financial Statements**

December 31, 2019

6. Solid Waste Landfill Closure and Post-Closure Liability

DRAFT

The Environmental Management Act of B.C. and the Ministry of Environment of B.C. set out the landfill criteria to properly close and maintain all active and inactive landfill sites. Under the guidelines, there is a requirement for closure and post-closure care of solid waste landfill sites. Provisions are therefore made over the estimated remaining life of the Regional District landfill sites based on scalehouse records and through tipping fees.

The main components of the landfill closure plans are: final capping using an engineered cap design and the implementation of a drainage and gas management plan. The post-closure care requirements may involve: cap maintenance; groundwater monitoring; gas management system operation and maintenance; inspections; leachate treatment and monitoring; and annual reports. Post-closure care activities begin once the entire landfill site no longer accepts waste and continues on for a period of one hundred years. As the date of the site closure is unknown, management estimates the liability to begin after the closure of the current active phase, assuming another phase will not be opened. In the event another phase is opened, the start date for the liability will be adjusted to begin upon closure of the newly opened phase.

The total liability recorded for the estimated landfill closure and post-closure costs of \$32,000,000 (2018 - \$30,000,000) is \$8,281,000 (2018 - \$7,000,000). The estimated liability for the costs is based on the cumulative capacity used to date multiplied by the estimated total expenditures, expressed as discounted present values, assuming 1.57% (2018 - 1.35%) inflation and 3.64% (2018 - 3.83%) weighted-average cost of capital discount rate. The amount remaining to be recognized in future years is \$24,000,000 (2018 - \$23,000,000). The annual provision is reported as an Operating Fund expense and the accumulated provision is reported as a liability on the Consolidated Statement of Financial Position. Reserve funds totalling \$1,766,196 (2018 - \$1,682,170) have been established to provide for this liability in the Landfill Closure Special Reserve Fund.

Future events may result in significant changes to the estimated remaining useful life, estimated total expenses, total or used capacity and the estimated liability. These would be recognized prospectively as a change in estimate when applicable.

The table indicates the remaining landfill life in years and remaining capacity in cubic meters.

	Estimated Remaining Life (Years)	Total estimated Closure & post-closure care	Cumulative Capacity Used (m ³)	Total Estimated Capacity (m ³)	Used (%)	Remaining Capacity on December 31, 2019
Salmon Arm	76	\$ 9,391,000	623,000	3,764,000	16.552	\$ 3,141,000
Golden	62	11,505,000	628,000	1,448,000	43.370	820,000
Revelstoke	20	8,030,000	91,000	429,000	21.212	338,000
Sicamous	15	\$ 3,024,000	\$ 27,000	\$ 163,000	\$ 16.564	\$ 136,000

Operational Update

The Site continues to be developed in phases, and landfilling is occurring in phase 1 as per the Design and Operation Plan. In 2019, the CSRD continued to work towards reducing offsite litter issues by installing an additional 200 feet of 30-foot-high litter fencing along the southern boundary of the landfill. Furthermore,

over \$10,000 was spent on contractors to conduct litter pick up on the property so the south of the landfill in 2019.

The Site was inspected four times in 2019 by CSRD staff and the Site contractor was directed to make a number of improvements to ensure the Site was being managed in accordance with the design and operation plan and the operational certificate. Sloping and drainage management and improvements are ongoing activities at the Site.

Plans for 2020

The CSRD intended to host an open house with MoE representatives in 2020 in order for residents of the Town of Golden to receive information regarding the updated Design, Operation and Closure Plan. The MoE indicated its willingness to participate in the open house to respond to questions regarding the approval process. Due to the Covid-19 global pandemic, this event has been postponed.

Due to pressures received from the community to close the existing landfill, the CSRD has budgeted funds to conduct a study on the options and associated costs for disposal alternatives to the existing Site. Options to be considered include but are not limited to; closing the landfill and converting it to a transfer station and hauling waste to an existing alternate CSRD refuse disposal site, siting a new landfill in Area A, and exploring alternatives to landfilling such as waste incineration. Results of this study will be shared with the community at a future Town of Golden council meeting upon completion and posted to the CSRD's website for the public to review.

Based on the five-year review of landfill monitoring at the Site, the CSRD's qualified professional has recommended that the CSRD increase frequency of groundwater monitoring. Although the CSRD has not received approval from the MoE to carry out additional groundwater monitoring, the CSRD is advancing these recommendations to improve environmental monitoring.

Wildlife

The Site continues to be an attractant to wildlife, given the nature of the material being managed at the site. The CSRD's contractor does attempt to prevent wildlife from accessing garbage at the site by using alternative daily cover (metal plates) and soil cover. The CSRD has installed thirty-foot-tall netting along the southern portion of the landfill to reduce offsite litter and to deter deer from entering the site. The CSRD continues to monitor and maintain electric fencing around the perimeter of the site in order to deter bears from accessing the site. In 2019 there were no recorded observations of medium or large carnivores at the site.

Solid Waste Stream Reduction

The CSRD has a number of programs which are aimed at reducing the regional solid waste stream being landfilled. The main objective of the Regional Solid Waste Management Plan is to work towards Zero Waste and to make efforts to turn waste into resources. The CSRD has introduced a number of programs to meet this objective over the years, including diverting materials from the landfill such as wood waste, yard and garden waste, metal, appliances, propane cylinders, concrete, mattresses, and asphalt shingles.

The CSRD supports provincial Extended Producer recycling programs at the site such as; printed paper and packaging, batteries, thermostats, refrigeration units, and appliances. In the fall of 2018, the CSRD constructed a hazardous waste storage facility to accept and store used oil, paints, and general household hazardous waste.

The following table provides an annual summary of materials received and separated for recycling or reused on the site for operational purposes:

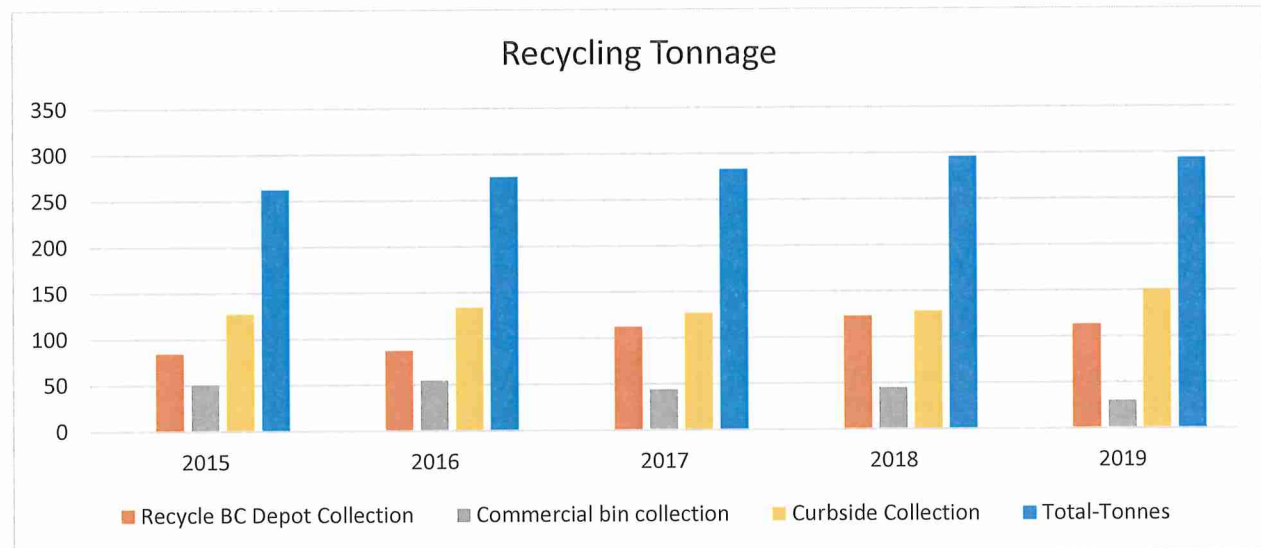
Golden Landfill - Resource Recovery					
Recoverable Resource	2015	2016	2017	2018	2019
Wood Waste - Received (MT)	479	292	399	835	466
Wood Waste - Processed (m³)	1193	2949	6262	8907	4710
Yard & Garden Waste - Received (MT)	313	349	725	N/T	N/T
Yard & Garden Waste - Processed (m³)	1072	1155	incl. WW	incl. WW	incl. WW
Metal Waste - Received (MT)	212	127	187	N/T	N/T
Metal waste - Salvaged (MT)	196	171	126	385	252
Gypsum Drywall - Received (MT)	48	56	57	25	Refuse
Gypsum Drywall - Salvaged (MT)	51	75	130	Refuse	Refuse
Asphalt Shingles - Received (MT)	112	146	121	85	152
Asphalt Shingles - Salvaged (MT)	24	105	308	83	124
Concrete/Brick/Porcelain - Received (MT)	733	318	394	577	615
ODS Units - Received	190	172	181	300	195
ODS Units - Processed	260	165	216	271	398
Propane Tanks - Salvaged	141	281	202		
1 lb					1500
5-100lb					625
Auto Batteries - Salvaged	112	159	135	211	0
Mattresses - Received	584	501	585	654	794
Mattresses - Salvaged	451	524	371	124	1582
Contaminated Soil Received (MT)	1118	1914	906	13126	1002
Clean Soil Received (MT)	1020	1317	790	784	4231
Wood Waste Chipped Received (MT)	29	3	0	1	5
Land Clearing Waste (MT)	0	0	1	2	5
CESA** (MT)	-	-	-	-	2.4
MT - Metric Tonne	N/A - Not Accepted				
m³ - Cubic Metre	N/T - Not Tracked				
**CESA Canadian Electrical Stewardship Association					

Recycling - Commercial and Residential Programs

In January of 2015, the residential recycling collection changed to the MMBC (now Recycle BC) Packaging and Printed Paper collection Extended Producer Responsibility (EPR) program. Prior to the MMBC program the depot recycling program was not fully monitored which contributed to illegal dumping and inflated tonnage results.

The CSRD maintains a recycling program for commercial users, which is tracked separately. In addition, the CSRD has been working to add other stewardship materials, such as power tools and electronics, where there is a lack of program accessibility and partnerships with stewardship groups can be achieved.

The following table is an overview of tonnage collected in Golden since 2015:



Recycling – Household Hazardous Waste

In 2019, the CSRD partnered with the BC Used Oil Recycling Association and constructed a permanent used oil and hazardous waste drop off facility at the Site. The depot is open on Saturdays and accepts residential materials at no charge. Materials are collected, safely packed and consolidated in either drums or pails.

HHW Depot GO	Quantity
Paint related material	24 drums
Flammable liquids	3 drums
Toxic liquids	1 drum
Flammable adhesives	0
Non-regulated liquids	0
Non-regulated solids	760 kg
Fire extinguishers	37
Mercury debris	0
Used Oil	1460
Antifreeze	0

Environmental Monitoring Program

Environmental Monitoring in 2019 included groundwater sampling, analysis and reporting and data collected from the groundwater monitoring program has been compared to the historical record to determine whether the site has affected groundwater quality and, if so, to what extent. The 2019 Environmental Monitoring Report includes a summary of results collected from the newly installed monitoring wells at the Site. The qualified professional's report is included in this report as Appendix A.

The Site contains two soil gas monitoring probes situated around the landfill property. Gas probe 6 is located on the west side of the property and gas probe 7 is located in the south west corner of the property.

Each monitoring probe has two nested gas sampling probes for shallow and deep sampling indicated by an S or D in the tag. Each probe has three metres of screened pipe and nested probes are isolated by a one metre bentonite plug. Shallow probes are screened from approximately one to four metres depth and deep probes are screened approximately five to eight metres depth. The CSRD began monitoring these gas probes in 2013.

Sampling is done annually by CSRD staff using a Landtec GEM2000 portable gas analyzer. Each gas probe is purged for 10 minutes before the sample is taken. No evidence of landfill gas (methane and/or hydrogen sulphide gas) was present in either gas probe during 2019 sampling events. There are plans in 2020 to increase the gas monitoring network.

All structures on site are elevated on skids or are well vented to prevent the accumulation of migrating landfill gas. The scale house has a methane/carbon monoxide alarm. No landfill gas has been identified in any on-site buildings.

Operator Training

The current landfill contractor, who is responsible for the landfill operators and operations/maintenance of the Site, completed the Ministry of Environment's approved Landfill Operation Basics, facilitated by the Solid Waste Association of North America (SWANA). The SWANA course was delivered to landfill operators, inspectors, government staff and contractors in Kelowna and Williams Lake in the fall of 2019.

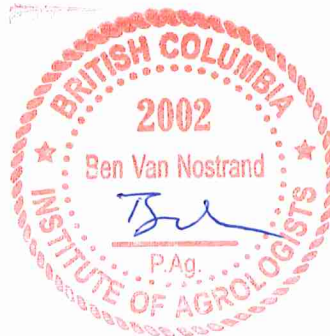
In addition, CSRD staff conducted a review of the CSRD's Operations and Maintenance Manual with the site contractor in 2019.

Qualified Professionals

This report was prepared by and is certified by a qualified professional.



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Team Leader, Environmental Health Services



Reviewed by:



Darcy Mooney, P.Ag
Manager of Operations, Operations Management

APPENDIX A

2019 Environmental Monitoring Report – Golden Refuse Disposal Facility (MR-17006)

2019 ENVIRONMENTAL MONITORING REPORT

GOLDEN REFUSE DISPOSAL FACILITY (OC -17006)

350 GOLDEN-DONALD UPPER ROAD, GOLDEN, BC



Prepared By:
Ecoscape Environmental Consultants Ltd.

Prepared For:
Columbia Shuswap Regional District
April 2020

2019 ENVIRONMENTAL MONITORING REPORT

GOLDEN REFUSE DISPOSAL FACILITY (OC -17006)
350 GOLDEN-DONALD UPPER ROAD, GOLDEN, BC

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April 2020



Project No. 19-2850

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APPENDIX

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ACRONYMS AND ABBREVIATIONS

BCAWQG	BC Approved Water Quality Guidelines
BC GWPR	BC Groundwater Protection Regulation
BCWWQG	BC Working Water Quality Guidelines
CALA	Canadian Association for Laboratory Accreditation
CARO	Caro Analytical Services, Kelowna, BC
CaCO ₃	Calcium Carbonate
CCME	Canadian Council of Ministers of the Environment
CFU	Colony Forming Unit
CSR	BC Contaminated Sites Regulation
CSR AW CSR	Freshwater Aquatic Water numerical standard
CSR DW CSR	Drinking Water numerical standard
CSR IW	CSR Irrigation Water numerical standard
CSRD	Columbia Shuswap Regional District
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DW	Drinking Water numerical standard
EC	Electrical Conductivity
EMA	Environmental Management Act
EMP	Environmental Management Plan
ENV	BC Ministry of Environment and Climate Change Strategy
GCDWQ AO	Guideline for Canadian Drinking Water Quality Aesthetic Objective
GCDWQ MAC	Guideline for Canadian Drinking Water Quality Maximum Acceptable Concentration
GSC	Geological Survey of Canada
IDF	Interior Douglas Fir
LWMP	Liquid Waste Management Plan
m asl	Meters Above Sea Level
m bgs	Meters Below Ground Surface
m btoc	Meters Below Top of Casing
mg/L	Milligrams per Litre
MPN	Most Probable Number
N	Nitrogen
OC	Operational Certificate
ORP	Oxidation-reduction Potential
QA/QC	Quality Assurance/Quality Control
PAH	Polycyclic Aromatic Hydrocarbon
RDF	Refuse Disposal Facility
RPD	Relative Percent Difference
SD	Standard Deviation
SHA	Sperling Hansen Associates
STN ID	Climate Station ID
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
US GPM	US Gallons Per Minute
VOC	Volatile Organic Compound
WRA	Water Resource Atlas
WTN	Well Tag Number
WWAL	Western Water Associates Ltd.

1.0 INTRODUCTION

Ecoscape Environmental Consultants Ltd. (Ecoscape) was retained by the Columbia Shuswap Regional District (CSRD) to carry out environmental monitoring and sampling at the Golden Refuse Disposal Facility (RDF) (the Site), and prepare this annual monitoring report per the Site's Ministry of Environment and Climate Change Strategy (ENV) Operational Certificate (OC-17006) monitoring requirements.

This report presents a summary and analysis of groundwater monitoring data collected by Ecoscape from January 1 to December 31, 2019, and includes a discussion of the applicable regulatory context, field procedures, quality assurance/quality control measures, and recommendations for future Site monitoring. This report has been prepared for inclusion in the annual report that is submitted by the CSRD to ENV for the Site

1.1 Background

The Golden RDF currently provides solid waste disposal services to businesses, institutions and residents within for the municipality of Golden and CSRD Electoral Area A.

The Site has operated as a natural attenuation landfill since the early 1970s. The operating permit was transferred to the CSRD in the late 1970s, and the Site now operates under Operational Certificate (OC) 17006, issued by ENV on May 5, 2003, and most recently amended on October 31, 2019. A copy of the OC is provided in Appendix A.

Previous annual environmental monitoring reports were completed by Western Water Associates Limited (WWAL), from 2014 through 2018, Summit Environmental Consultants Inc. (now Associated Environmental) from 2009 through 2013, and Sperling Hansen Associates (SHA) in 2008.

2.0 OBJECTIVE AND WORK SCOPE

The objective of this work program was to satisfy annual monitoring reporting requirements stipulated in OC 17006 by providing an evaluation of spatial and temporal trends in groundwater quality and identifying locations where water quality exceeds applicable guidelines and standards.

Key water quality questions answered in this report are:

- Does groundwater quality meet applicable guidelines and standards at and beyond the Site boundary?

- Does groundwater quality at and near the Site vary spatially between sample locations and temporally between seasons and years as a result of ongoing landfilling at the Site, and if so, describe the variances?
- If spatial and temporal trends in groundwater chemistry exists, do these trends suggest adverse effects, and is this linked to historical permitted landfill operations?

In meeting these objectives and answering these questions, Ecoscape undertook the following tasks:

- Representative groundwater samples were collected from select monitoring locations on and near the Site (Figure 2) on a tri-annual basis, as summarized in Section 4.2;
- Samples were submitted to Caro Analytical Services (CARO), which is accredited by the Canadian Association for Laboratory Accreditation (CALA) for analyses;
- Water quality data was entered into a database (tabulated) and compared to applicable federal and provincial guidelines and standards to determine if exceedances were observed;
- Temporal and spatial groundwater quality trends were analyzed to evaluate the potential for landfill leachate impacts on water quality;
- An annual environmental monitoring report was prepared.

3.0 SITE DESCRIPTION

The Site is located approximately 2 km northeast and upslope of Golden's city centre (Figure 1). A Site description is provided in Table 1.

Table 1: Site Description	
Topic	Details
Civic Address	350 Golden-Donald Upper Road, Golden, BC
Legal Description	Subdivision 12 of Section 18, Township 27, Range 21, West of the 5 th Meridian, Kootenay District
Registered Site Owner	The Province of British Columbia
Latitude and Longitude (of Site centre)	51° 18' 31.0" N and 116° 57' 15.1" W
Approximate Site Area	17 hectares
Current Land Use	Natural Attenuation Landfill

The Site is mainly surrounded by undeveloped, forested land to the north, west and south with several rural residences to the east on Hietala Road. The nearest privately-owned residence is within 100 m of the landfill boundary to the east at a higher elevation of 964 m above sea level (m asl). The nearest residence downslope of the landfill is situated approximately 220 m southwest, at an elevation of 915 masl.

3.1 Climate and Biogeoclimatic Zones

The Site is located within the Engelmann Spruce – Subalpine Fir dry cool woodland (ESSFdkw) forest subzone, where winters are typically long and cold and the summers cool and short (temperatures are above 10°C for only 0 – 2 months of the year) (Meidinger and Pojar, 1991).

Climate normal data from Environment Canada was used to complete this assessment. Based on data collected from the Golden Airport station (STN ID 1173210) between 1981 and 2010 the average annual total precipitation (rain and snow) is 466.8 mm with an average rainfall of 325.2 mm, suggesting the Site climate is relatively dry. The highest precipitation typically occurs between June and August (as rain), and again in November – January (as snow). The daily average temperatures for January and July were -7.9 °C and 17.3 °C, respectively.

3.2 Topography, Drainage and Nearby Watercourses

The portion of the Site east of the active landfill area slopes southeast from a topographic high of approximately 955 masl, and levels out at approximately 925 m above sea level (m asl) for the remainder of the Site. The nearby surrounding area generally slopes southwest, and surface drainage at and near the Site is expected to mimic topography with flow towards the southwest. During freshet and heavy precipitation events, a gulley near the northeast boundary diverts surface runoff away from the landfill area, and no known surface water drainages lead away from the Site.

An unnamed provincially mapped watercourse traverses the Site from the northeast to the southwest; however, this watercourse is ephemeral, and only contains water during freshet and following heavy precipitation events (WWAL, 2019b). A drainage ditch has been constructed along the southern Site boundary at the toe of the active landfill face to collect and direct this watercourse to high permeability soils at the southwest Site corner, allowing discharge water to seep into the ground (WWAL, 2019b).

An unnamed provincially mapped watercourse occurs approximately 180 m south of the site. This watercourse flows southwest and discharges to a catch basin near Station Avenue, approximately 850 m southwest of the Site.

Hospital Creek is situated approximately 1.2 km north to northwest of the Site and flows southwest towards the Columbia River. The Kicking Horse River is approximately 1.3 km south to southwest and downslope of the Site, at an elevation of approximately 800 masl, and flows northwest into the Columbia River. The Columbia River flows northwest, and at its nearest point is approximately 3 km from the Site.

Nearby watercourse locations with respect to the Site are shown on Figure 2.

3.3 Regional and Local Geology and Hydrogeology

According to Geological Survey of Canada (GSC) mapping, bedrock beneath the Site is comprised of metamorphosed limestone, limestone conglomerates and slate of the McKay Group, formed during the Cambrian to Ordovician periods (GSC, 1980). Bedrock outcrops are present near the northeast Site corner, and was encountered in previously drilled boreholes at the following depths:

- MW09-6D (northwest Site corner) –34 m below ground surface (m bgs)
- MW10-08 (northwest of Site) – 15 m bgs
- MW18-10 (southern Site boundary) – 24 m bgs
- MW18-11 (southwest Site corner) – 116 m bgs

Based on this, the underlying bedrock surface steeply dips towards the southwest Site corner. Monitoring well locations are shown on Figure 2.

The Golden area is underlain by thick continuous glacial till blanket (GSC, 2014). Previous subsurface investigations at the Site (Kala 1995; SHA 2008, Summit, 2010b and 2011, and WWAL 2019a) identified dense gravelly sand and silty ablation till along the sloped area to the east, with clean bedded sand and gravel alluvial deposits in the south central and western portions of the Site, and within the trench at the southwest Site corner. Overburden becomes increasingly thick towards the southwest, where the bedrock surface is over 115 m bgs. Exposed sediments along the west side of Golden-Donald Road (immediately west of the Site) are comprised of dense, well-sorted sand and gravel with traces of silt and clay, and intermittent bedding.

Overburden permeability at the Site ranges from low to moderate. Low permeability silt-dominated deposits near the eastern side of the landfill are prohibitive to surface water infiltration and groundwater recharge while silty sand and gravel located in the south-central section of the landfill is generally moderately permeable (SHA 2008).

The BC ENV's Water Resources Atlas (WRA) suggests that the Site is not underlain by a mapped aquifer. Sand and gravel Aquifer 456 IIB is mapped approximately 50 m southwest of the Site, and extends along the east side of the Columbia River generally spanning the Town of Golden (Figure 2). The aquifer is unconfined to semi-confined, and was classified as highly productive, moderately vulnerable to contamination from surface sources and under moderate demand from local groundwater users at time of mapping. Based on available well records, the geometric mean static water level is 4.8 m bgs. The aquifer is likely recharged via mountain block recharge from surrounding upland areas, in which groundwater infiltrates bedrock, migrates downward, and then flows laterally through bedrock fractures into the overburden deposits occurring along the Columbia River valley; however, some flows may also occur above and along the overburden-bedrock interface. Based on the above, regional groundwater flow direction is expected to be laterally from the valley walls towards the valley centre, and then parallel to the Kicking Horse and

Columbia Rivers, towards the west and northwest. Localized groundwater flow gradients contrary to that described above may be induced by well pumping and variability in the permeability and orientation of sand and gravel deposits and bedrock fractures.

WWAL completed a hydrogeological characterization study at the Site in 2018 to provide a better understanding of Site and nearby surrounding area geology, hydrogeology, and hydrology (WWAL 2019a). Their findings are summarized below.

An unmapped bedrock aquifer is present near and below the Site, based on the presence of groundwater in the existing monitoring wells and nearby domestic supply wells. Available well logs suggest overburden is generally unsaturated at and near the Site and that no sand and gravel aquifers underlay the Site; however, some localized pockets of perched groundwater may occur in overburden as observed in MW09-06. Potentiometric surface contours generated from static water level and well elevation data from four bedrock monitoring wells (MW09-6D, MW10-8, MW18-10 and MW18-11) suggests groundwater flows towards the southwest from the uplands to the Kicking Horse River. WWAL inferred that groundwater recharge is controlled by precipitation which migrates downward into bedrock fractures.

Single well response hydraulic tests were performed on MW18-10, located on the southern Site boundary, to estimate the bedrock aquifer hydraulic conductivity near the well. Test results suggest the bedrock aquifer's hydraulic conductivity is approximately 2×10^{-6} m/sec.

4.0 2019 ENVIRONMENTAL MONITORING PROGRAM

4.1 Historical Groundwater Monitoring and Sampling

Kala drilled and installed four (4) monitoring wells (MW95-01 through MW95-04) in 1995 to depths ranging from 18.3 to 30.5 m bgs. No groundwater was encountered during drilling, and these wells have since been decommissioned.

Three (3) on-site monitoring wells were installed in 2009 by Summit: MW09-6S (shallow), MW09-6D (deep), and MW09-7 to replace decommissioned wells MW95-4 and MW95-3, respectively. MW09-7 has remained dry since installation and has thus never been sampled. Nested wells MW09-6S and MW09-6D are situated near the western Site boundary north of the site access. MW09-6S and MW09-6D repeatedly showed similar water chemistry, and MW09-6D sampling was discontinued in 2011 due to redundancy.

Monitoring well MW10-8 was installed by WWAL in 2010, approximately 150 m northwest and cross-gradient of the Site to evaluate potential offsite leachate migration. MW10-8 was sampled for the first time since 2015 during the Summer and Fall 2018 sampling events.

Two (2) additional on-site wells were drilled by WWAL in 2018; MW18-10 and MW18-11. MW18-10 was installed on the southern Site boundary to replace MW95-02 (TH-2), which

has been dry since it was installed in 1995. MW18-11 was installed immediately southwest of the Site to provide additional monitoring coverage along the Site boundary.

Domestic well DMW-1b, situated east of the Site, was introduced to the monitoring network in 2011 to replace upgradient monitoring location DMW-1, which was precluded from the monitoring network because filtration systems were installed prior to all the water outlets. DMW-4, situated east of the Site, was introduced to monitoring network in 2013, and along with DMW-1b, provides background water quality data for the Site. Domestic well DMW-5 (approximately 740 m north of the Site) was introduced to the monitoring program in 2018; however, the well owners opted not to include their well in the 2019 program.

Town Wells #4 and #6 comprise two (2) of Golden's five (5) municipal water supply wells and are situated approximately 1.5 km and 2 km north west of the Site. Town Well #6 has not operated since the summer of 2018 at which time work was completed to in attempt to increase the well's yield. However, turbidity levels have remained elevated in the well since then. As such, the town removed the well's pump in the fall of 2019 and deemed the Town Well #6 inoperable.

Landfill gas monitoring probes GP-6S/GP-6D and GP-7S/GP-7D were installed in 2009 and are currently being monitored by CSRD personnel. Gas monitoring results are not included in this report.

Well logs for current and past monitoring wells are provided in Appendix B.

4.2 Current Monitoring Program

The current monitoring network consists of four (4) groundwater monitoring wells, two (2) domestic supply wells and two (2) Town of Golden supply wells, as follows:

- Monitoring wells MW09-6S, MW10-8, MW18-10 and MW18-11
- Domestic supply wells DMW-1b and DMW-4; and
- Town Well #4 (TW #4) and Town Well #6 (TW #6).

Although not part of the monitoring program, Ecoscape collected and analyzed water quality results from the Town of Golden's supply well MW15-01. This well serves as a sentry well for the Town of Golden Town Well #4 (TW-#4), and the Town of Golden has permitted the use of its water quality data.

Table 2 below summarizes the monitoring network, and monitoring locations are shown on Figure 2.

Table 2: Summary of Golden RDF Monitoring Network

Monitoring ID	Location	Rationale	Well Depth (m btoc)	Approximate Ground Surface Elevation (masl) ¹	Lithology
Landfill Monitoring Wells					
MW09-6S	West Site boundary, downgradient of the landfill.	Monitor potential offsite migration of leachate to the west	35.3	920	Gravel
MW10-08	300 m northwest and cross- to upgradient of the landfill	Monitor potential offsite migration of leachate to the northwest	26.3	921	Bedrock
MW18-10	South Site boundary, cross- to downgradient of the landfill	Monitor potential offsite migration of leachate to the south	35.6	920	Bedrock
MW18-11	20 m southwest and downgradient of the Site	Monitor potential offsite migration of leachate to the southwest	146.3	915	Bedrock
Private Domestic Wells					
DMW-1b	Located approximately 200 m east and upgradient of the Site	Monitor background water quality	60	975	Bedrock
DMW-4	130 m east and upgradient of the Site.	Monitor background water quality	120	Unknown	Presumably bedrock
Town of Golden Supply Wells					
Town Well #4	1.5 km northwest and downgradient of the Site	Monitor general downgradient impacts	Unknown	790	Unknown – presumably overburden
Town Well #6	2 km northwest and downgradient of the Site	Monitor general downgradient impacts	Unknown	Unknown	Unknown – presumably overburden

Notes:

m btoc = below top of casing

masl = meters above sea level

WTN= Well Tag Number

1 = Elevations of the top of monitoring well casings were previously measured by Summit with a vertical accuracy of ± 0.3 m.

Water at the DWM-4 residence was shut-off during the Fall sampling event, and a sample was not collected at that time. Town Well #6 was only sampled during the May and August 2019 sampling events, as the pump was pulled from the well prior to the Fall 2019 sampling event.

Ongoing BC Contaminated Sites Regulation (CSR) Schedule 2 activities, including but not limited to welding and machine shops (C.6), appliance, equipment or engine repair (E.1), road salt storage (Activity E.7), petroleum product storage in above ground or underground tanks (Activity F.7), automotive, truck or other motor vehicle repair, salvage or wrecking (Activity G.2), and wood, pulp and paper products and related industries and activities (Activity I), likely occur near and in some cases upgradient of the Town of Golden supply wells. This potential should be considered when evaluating groundwater chemistry at and near the Site.

4.3 Field Observations

Monitoring well conditions and accessibility of sample locations were documented during each sampling event.

Ecoscape also observed vegetation near each sampling location for signs of abnormal stress (e.g., discolouration or mortality) or abundance potentially linked to landfill leachate, and for signs of liquid flowing from or along the site surface, which could indicate leachate breakout.

4.4 Groundwater Sampling Methodology

Groundwater samples were collected in general accordance with ENV's British Columbia Field Sampling Manual (2013) and ENV Technical Guidance on Contaminated Sites 8 (ENV 2017), and meet the intent of the OC.

The following procedures were followed during each groundwater sampling event:

- Measured static water level off a permanent marking on the top of each well riser using a decontaminated electric water level meter;
- Purged monitoring wells using a submersible well pump or Waterra™ Hydrolift II pump connected to dedicated high-density polyethylene (HDPE) Waterra™ tubing outfitted with an inertia foot valve until temperature, pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), and electrical conductivity readings were stabilized (+/-10%)
 - Three (3) to five (5) well volumes typically purged from each well, unless purged dry. Wells purged dry were left to recover to half its pre-purging level prior to sampling;
- Domestic wells were purged using a hydrogen peroxide rinsed hose to direct purge water away from the water outlet/sampling port;
- Visual and olfactory groundwater observations were noted, including sheen, colour, turbidity and odour;

- Groundwater samples were collected directly into clean, new laboratory-supplied containers, and were field filtered (0.45 µm) and preserved as required for each analytical parameter;
- Sample bottles were stored in ice-chilled coolers and transported samples to CARO for chemical analysis.

Proper chain-of-custody procedures were followed during sample transport, and regular communication was maintained between Ecoscape and CARO personnel.

5.0 REGULATORY FRAMEWORK

The Site currently operates under OC MR-17006 issued by ENV under the provisions of the *Environmental Management Act* (EMA; SBC 2003, Chapter 53 assented October 23, 2003, current to October 30, 2019).

The CSR is the primary regulatory document that describes the EMA's requirements for contaminated sites management in BC. The CSR first came into effect in 1997 and was amended most recently in January 2019 (includes amendments up to B.C. Reg. 13/2019, January 24, 2019). Schedule 3.2 of the CSR provides numerical standards for various contaminant concentrations in water for the following uses: aquatic life (AW), irrigation (IW), livestock watering (LW), and drinking water (DW).

Section 4 of the OC states that the MOE *Landfill Criteria for Municipal Solid Waste, Second Edition* (2016) also provides guidance for Site monitoring and water quality data interpretation. A Design, Operations, and Closure Plan Update (DOCP) was developed following this guidance by Golder Associates Ltd. in 2019 (Golder 2019a), which includes groundwater monitoring requirements for the Site.. Golder also prepared an Environmental Monitoring Plan (EMP) for the Site (Golder 2019b) (Appendix F), which is further discussed in Section 8.0. Although not yet approved by ENV at this time, the monitoring requirements in the 2019 DOCP EMP documents will be followed as they reflect the most current environmental standards. Golder recommended that the EMP be reviewed and updated every five (5) years, as applicable. The CSRD currently has an environmental monitoring program in place at the Golden Landfill that is updated annually and as required. The CSRD continues to meet the monitoring requirements of the OC, the DOCP and EMP, and has engaged Ecoscape to execute the monitoring program recommended in the 2018 Environmental Monitoring Report (WWAL, 2019) and prepare this annual monitoring report. Monitoring in 2020 will be completed following the recommendations in Golder's EMP (2019) and those provided in this report.

BC ENV has established regional background groundwater concentrations for select inorganic substances (arsenic, cobalt, lithium, selenium, vanadium and uranium) for three regions in British Columbia, the details of which are presented in BC ENV Technical Bulletin 3 for Contaminated Sites – Regional Background Concentrations for Select Inorganic Substances in Groundwater (2019a). Groundwater that contains a substance at

concentrations above the applicable numerical water standard at a site but below the local background concentration for that substance, as determined under this technical bulletin or Protocol 9 – Determining Background Groundwater Quality (Protocol 9), would not be considered contaminated under the CSR. The Site falls outside of ENV's background groundwater quality study area boundaries, and as such, these background concentrations cannot be applied to the Site; however, they are still useful in evaluating groundwater chemistry with respect to potential leachate impacts. The province-wide cobalt interim background groundwater concentration of 20 µg/L has been applied to this assessment.

The Federal-Provincial-Territorial Committee on Drinking Water has established Guidelines for Canadian Drinking Water Quality (GCDWQ), most recently updated in 2019 (Health Canada 2019), to protect drinking water quality.

The following standards and guidelines are being applied to protect current and potential future nearby domestic water supply sources:

- Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration (health-based guideline) (GCDWQ MAC) and Aesthetic Objective (based on aesthetic considerations) (GCDWQ AO); and
- BC CSR Drinking Water (CSR DW) numerical standards.

6.0 MONITORING PROGRAM RESULTS

The 2019 Site observations, water level measurements, groundwater quality exceedances, and water quality trends are discussed in this section. The 2019 water quality results are summarized in Appendix C, and historical water quality data is provided in Appendix D. Laboratory certificates of analysis are attached in Appendix E.

6.1 Site Observations

Monitoring well locations were readily accessible and in good condition in 2019. All wells exhibited reasonably good recharge rates and provided sufficient water to sample.

In May 2019, Mr. Glen Furey of Kicking Horse Water Services installed a permanent pump in the newly drilled MW18-11 to facilitate sampling. According to Mr. Furey MW18-11 was not properly developed after it was drilled and installed in 2018, and the December 2018 sample was collected from a slurry of drill cuttings. The purpose of well development is to purge the well of residual fines and materials left in the well following drilling, and to restore natural groundwater flow and chemistry in and around the well. Based on this, the 2018 sample collected from MW18-11 was likely not representative of actual groundwater conditions near the well.

Ecoscape endeavoured to develop the MW18-11 during the 2019 sampling events; however, the well routinely ran dry after approximately one (1) well volume of water was

purged. Water samples were collected after the well recovered to half a well volume, and we expect any residual fines and drilling-related materials to be removed from the well with continued purging during future sampling events.

No signs of stressed vegetation, leachate breakout or ponding water were observed at or near any of the monitoring locations.

6.2 Water Levels and Groundwater Flow Direction

Static water levels were recorded within each monitoring well on May 22, August 13 and October 29, 2019, and are summarized in Appendix C - Table C1 and shown on Figure 3.

In 2019, water levels remained relatively consistent with previous years, with minimal (<0.1 m) seasonal fluctuations observed at MW09-06S, MW18-10 and MW18-11. Water levels at MW10-08 were stable between May and August, and then dropped 0.78 m between August and October 2019, consistent with typical precipitation and snowmelt patterns observed in the area. Groundwater flow direction has not been fully characterized at the Site because monitoring well elevations have not been accurately surveyed; however, based on groundwater elevation estimates and observed topography in the area, flow is expected to be towards the southwest.

Historical water levels measured between 2003 and 2019 are graphed on Figure 3 and are provided in Appendix C.

6.3 2019 Analytical Results Relative to Applicable Standards and Guidelines

Ecoscape collected groundwater and surface water samples on May 29-30, August 13-14 and October 29-30, 2019.

During each sampling event, samples were collected from wells sufficient water for sampling and submitted to Caro in Kelowna, BC for chemical analysis.

Groundwater samples were analyzed for the following parameters:

- Total Alkalinity (total as CaCO₃);
- Anions (chloride, fluoride and sulphate);
- Electrical conductivity and pH;
- Dissolved Metals;
- Hardness (as CaCO₃);
- Nutrients (Nitrate (as N), Nitrite (as N), and Ammonia (as N));
- Total Suspended Solids (TSS);
- Turbidity; and
- Volatile Organic Compounds (VOCs) (May and October 2019 only)

In addition, field parameters pH, temperature, DO, ORP and specific conductance were recorded.

2019 groundwater and surface water chemistry results are provided in detail in Appendix C following the text, with exceedances from the tri-annual sampling events summarized in Table 3 below.

Table 3: Summary of 2019 Groundwater Quality Exceedances		
Monitoring Location	Guideline or Standard	Exceeding Parameters
MW09-6S	CSR DW	Chloride, Nitrate, Dissolved Lithium, Dissolved Sodium, Sulphate
	GDWQG AO	Chloride, Sulphate, Dissolved Manganese, Dissolved Sodium, pH (field) (May and August only)
	GDWQG MAC	Nitrate
MW10-08	CSR DW	Chloride, Dissolved Lithium, Dissolved Sodium, Dissolved Tungsten (May and August only)
	GDWQG AO	Chloride, Dissolved Sodium
MW18-10	CSR DW	Chloride, Nitrate, Dissolved Lithium, Dissolved Sodium (October only)
	GDWQG AO	Chloride, Dissolved Manganese, Dissolved Sodium (October only)
	GDWQG MAC	Nitrate, Dissolved Manganese
MW18-11	CSR DW	Dissolved Lithium, Toluene (May only)
	GDWQG AO	Dissolved Manganese, Dissolved Iron (August and October only), Toluene (May only)
	GDWQG MAC	Dissolved Manganese (August and October), Toluene (May only)
DMW-1b	CSR DW	Dissolved Lithium, Dissolved Strontium
DMW-4	CSR DW	Fluoride (May only), Dissolved Arsenic (May and August only), Dissolved Lithium (May and August only)
	GDWQG AO	Dissolved Iron (May and August only)
	GDWQG MAC	Fluoride (May), Dissolved Arsenic (May and August only)

All other parameters analyzed by the laboratory were found at concentrations less than applicable guidelines and standards for the Site.

Background Water Quality

Background groundwater quality at the Site is represented by samples collected from domestic wells DMW-1b and DMW-4.

Consistent with previous years, dissolved arsenic exceeded the GCDWQ MAC guideline and CSR DW standard of 0.01 mg/L at DMW-4 during the May and August 2019 sampling events, with concentrations of 0.0633 mg/L and 0.0414 mg/L respectively. Dissolved arsenic concentrations are orders of magnitude lower at remaining monitoring locations, with many concentrations at or below the laboratory detection limit.

Similarly, dissolved strontium concentrations at DMW-1b once again exceeded the CSR DW standard of 2.5 mg/L, ranging from 3.11 mg/L (October 2019) to 4.26 mg/L (May 2019). Dissolved strontium has also historically exceeded at DMW-4.

Fluoride at DMW-4 exceeded the GCDWQ MAC guideline and CSR DW standard of 1.5 mg/L during the May 2019 sampling event, and dissolved lithium exceeded the CSR DW standard of 0.008 mg/L at both DMW-1b and DMW-4 during all 2019 sampling events.

Finally, dissolved iron (Figure 7) was detected above GCDWQ AO guideline of 0.3 mg/L at DMW-4 in both May and August 2019, which may be attributable to erosion and weathering of soil and minerals near the well.

Based on the above, elevated fluoride, arsenic, iron, lithium and strontium concentrations likely occur naturally in groundwater at and near the Site, and are not necessarily attributable to ongoing landfilling activities.

Onsite and Near Site Monitoring Wells

Monitoring wells MW09-6S, MW18-10 and MW18-11 are situated on or immediately adjacent to the Site, cross- to downgradient of the landfill, and are thus used to monitor potential offsite migration of leachate-impacted groundwater.

Similar to 2018, the following parameters exceeded one or more applicable guidelines or standards on and immediately adjacent to Site in 2019: chloride (Figure 4) dissolved sodium (Figure 4), sulphate (Figure 5), nitrate (Figure 6), dissolved iron (Figure 7), dissolved lithium, dissolved manganese (Figure 7), toluene, and field measured pH. As discussed above dissolved iron and lithium may be naturally occurring in the area, based on measured background groundwater chemistry.

Downgradient well MW09-6S continues to exhibit the greatest number of exceedances compared to remaining monitoring locations, suggesting ongoing leachate impacts at the western Site boundary. Chloride, nitrate, sulphate, dissolved lithium, dissolved manganese and dissolved sodium exceeded federal guidelines and/or provincial standards in 2019, with nitrate and sulphate at MW09-06 being the highest observed concentrations on and near the Site in 2019.

Groundwater at cross- to downgradient monitoring well MW18-10 exceeded applicable guidelines and/or standards for chloride, nitrate, dissolved lithium and dissolved manganese, while dissolved lithium, dissolved manganese, and toluene (May 2019 only) exceeded at downgradient monitoring well MW18-11.

Offsite Monitoring Wells

Monitoring well MW10-08 and Town Wells #4 and #6 are situated well beyond the Site boundary.

Groundwater at cross- to upgradient monitoring well MW10-08 exceeded applicable guidelines and/or standards for chloride (Figure 4) , dissolved lithium, dissolved sodium (Figure 4), and dissolved tungsten during two or more sampling events, with chloride and sodium concentrations being the highest measured concentrations at any well in 2019. Dissolved tungsten has never exceeded at any well on and near the Site, and was below laboratory detection limits at remaining monitoring locations in 2019. Nonetheless, waste household items such as incandescent lightbulbs may be the cause of elevated tungsten.

Concentrations of all analyzed parameters were less than applicable guidelines and standards in groundwater collected from Town Wells #4 and #6 in 2019.

6.4 Water Quality Trend Analysis from 2002 to 2019

Analyses and discussion of spatial and temporal trends in landfill leachate indicator parameter concentrations at and near the Site are discussed in this section.

Landfill leachate indicator parameters are those which are typically present at concentrations above natural, background concentrations in leachate-impacted groundwater. The chemical composition of landfill leachate can vary, and largely depends on waste composition, climatic conditions, and the age and degradation rate of the solid waste (Bulc 2006); however, indicator parameters generally include, but are not limited to alkalinity, chloride, electrical conductivity, sulphate, sodium, ammonia, iron, manganese, and heavy metals cadmium, chromium, copper, nickel and zinc (Christensen et al. 2001). Furthermore, calcium and hardness are often elevated the leading edge of a leachate-impacted groundwater plume, a phenomenon sometimes referred to as a hardness halo (Griffen et al. 1976), as a result of ion exchange between calcium and/or magnesium ions bound to sediments and various cations present in the leachate.

Consistent with previous monitoring reports, time-series graphs of select leachate indicator parameters, displaying change in concentration over time between 2002 and 2019, are shown in Figures 4 through 7 as follows:

- Chloride and Dissolved Sodium (Figure 4);
- Electrical Conductivity and Sulphate (Figure 5);
- Nitrate (Figure 6); and
- Dissolved Iron and Dissolved Manganese (Figure 7)

Like previous years, leachate parameter concentrations, including chloride, nitrate, ammonia, sodium, sulphate, hardness, alkalinity, select dissolved metals, including boron,

calcium, magnesium, potassium, and sulfur and electrical conductivity are generally highest at MW09-6S compared to remaining monitoring locations; however, most of these parameters appear to be stable or decreasing with time. Some indicator parameters were also elevated at MW18-10, MW18-11 and MW10-08, but to a lesser degree than MW09-6S, except for sodium and chloride at MW10-08.

Remaining monitoring locations exhibit similar groundwater chemistry to that observed at background monitoring locations DMW-1b and DMW-4.

Individual discussions for select parameters follows.

6.4.1 Chloride

Chloride concentrations are typically elevated in leachate due to degradation of food waste and paper products; however, chloride also naturally occurs in groundwater, and may come from external sources such as road salt. Because chloride is conservative (non-reactive) in the environment, it is often found at the leading edge of a landfill leachate plume and is thus useful in evaluating the plume's extent.

Like previous years, chloride concentrations remain above the CSR DW standard and GCDWQ AO guideline of 250 mg/L at MW09-6S, MW10-08, and MW18-10. Concentrations at remaining monitoring locations were below applicable guidelines and standards in 2019.

Concentrations continue to be highest at cross- to upgradient well MW10-08, increasing from 509 mg/L in September 2018 to 736 mg/L in October 2019 (Figure 4). MW10-08 was not sampled between 2015 and 2017; prior to then concentrations nearly doubled from just over 500 mg/L in 2010 to almost 1,000 mg/L in 2012, and then decreased to 666 mg/L by May 2015.

Chloride concentrations at MW09-6S also continue to be elevated above background, but have shown a steady decrease since 2012, stabilizing just below 400 mg/L in 2019.

MW18-10 was drilled in June 2018 and has only been sampled six (6) times since then. Based on limited data, chloride concentrations appear to have stabilized between 300 and 350 mg/L. MW18-11 was also drilled in 2018, and as only been sampled four (4) times since then. Chloride concentrations increased from 23.2 mg/L in December 2018 to 105 mg/L in October 2019

Background chloride concentrations measured at DMW-1b and DMW-4 have been historically stable with concentrations generally less than 50 mg/L. Concentrations at Town Wells #4 were slightly above background in 2019, ranging from 90 to 100 mg/L, while concentrations at Town Well #6 were near or below background.

No observable seasonal trends are noted in chloride concentrations, with annual maximum concentrations varying between spring, summer and fall from year to year.

6.4.2 Sodium

Sodium is often the dominant cation in leachate; however, various geochemical processes, including dissolution, precipitation, and cation exchange may affect concentrations during groundwater transport.

Sodium concentrations continued to exceed the CSR DW standard and GCDWQ AO guideline of 200 mg/L at MW09-6S and MW10-08, while concentrations at MW18-10 exceeded for the first time in October 2019. Remaining monitoring locations were below applicable guidelines and standards in 2019.

Like chloride, sodium concentrations are highest at MW09-06S and MW10-08. Concentrations at both locations have followed a similar trend in the past, with sodium increasing from approximately 300 mg/L in 2011 to about 450 mg/L sometime between 2012 (MW10-08) and 2013 (MW09-6S). Concentrations dropped to 297 mg/L in October 2018 at MW09-6S and 370 mg/L in December 2018 at MW10-08. Concentrations stabilized around 300 mg/L at MW09-6S in 2019 but rebounded to 431 mg/L at MW10-08 in October 2019 (Figure 4).

Sodium is also elevated at newly drilled monitoring wells MW18-10 and MW18-11. Concentrations at MW18-10 have increased from 168 mg/L in June 2018 to 206 mg/L in October 2019. Conversely, concentrations at MW18-11 dropped from 270 mg/L in December 2018 to 81.1 mg/L in May 2019, followed by a slight increase to 110 mg/L in October 2019.

Concentrations at remaining monitoring locations continue to be remain low a stable, generally below 50 mg/L.

No observable seasonal trends are noted in sodium, with annual maximum values varying between spring, summer and fall from year to year.

6.4.3 Electrical Conductivity

There are no applicable guidelines or standards for electrical conductivity; however, being a measure of total dissolved minerals in groundwater, electrical conductivity is useful in monitoring landfill leachate impacts.

Similar to sodium and chloride, electrical conductivity remains highest at MW09-6S, followed by MW10-08 (Figure 5). Conductivity at MW09-6S has historically fluctuated between 4,000 and 5,200 $\mu\text{S}/\text{cm}$, and has been decreasing since November 2013, reaching a historical low of 3,920 $\mu\text{S}/\text{cm}$ in October 2019. Values recorded at MW10-08 ranged from

2,670 to 3,160 $\mu\text{S}/\text{cm}$ in 2019, and are consistent with historical values, which have varied between approximately 2,500 and 3,500 $\mu\text{S}/\text{cm}$ since 2010.

Electrical conductivity was also elevated above background levels at MW18-10, with values slightly increasing from 2,390 $\mu\text{S}/\text{cm}$ in June 2018 to 2,650 $\mu\text{S}/\text{cm}$ in October 2019.

Background electrical conductivity is quite high at the Site compared to other CSRD landfill sites, likely due to dissolution of bedrock minerals during groundwater transport. Values have been stable at DMW-1b and DMW-4, ranging from 982 to 1,160 $\mu\text{S}/\text{cm}$ at both locations in 2019. Values at remaining monitoring locations are at or below background.

No observable seasonal trends were noted in electrical conductivity, with annual maximum values varying between spring, summer and fall from year to year.

6.4.4 Sulphate

Sulphate is often generated in landfill leachate during the decomposition of organic matter and soluble waste.

Sulphate concentrations were below the CSR DW standard and GCDWQ AO guideline of 500 mg/L at all monitoring locations in 2020 but MW09-6S, which has exceeded the guideline/standard since 2009 (Figure 5).

Sulphate concentrations in groundwater continue to be highest at MW09-6S, ranging from 698 mg/L (May 2019) to 721 mg/L (August 2019). Concentrations at MW09-6S have been historically variable since it was first sampled in 2009, showing no obvious seasonal or long-term trends.

Concentrations at background wells DMW-1b and DMW-4 were the second and third highest concentrations measured in 2019, with concentrations at both locations ranging from 122 mg/L (DMW-4, August 2019) to 246 mg/L (DMW-1, May 2019). Concentrations at DMW-1b were very stable until 2017, and have since fluctuated between 130 mg/L and 250 mg/L. Concentrations at DMW-4 have been historically variable but stable, showing no obvious seasonal or and long-term trends.

Sulphate concentrations at remaining monitoring locations continue to be well below background (i.e., less than half). No observable seasonal trends are noted in sulphate, with annual maximum values varying between spring, summer and fall from year to year.

6.4.5 Nitrogen Compounds

Garden waste, food waste, and biosolids generally contribute to organic nitrogen within the landfill mass. Over time, waste decomposition can deplete oxygen, resulting in anaerobic conditions favourable for ammonification, during which nitrogen is converted to ammonia

by heterotrophic bacteria. When ammonia in groundwater encounters appropriate aerobic conditions, ammonium is oxidized by microorganisms to nitrate (i.e., nitrification), with nitrite as an intermediary product.

Nitrate concentrations once again exceeded the GCDWQ MAC guideline and CSR DW standard of 10 mg/L at MW09-6S and MW18-10, while remaining concentrations were below 2 mg/L.

Like recent years, nitrate concentrations were highest at MW09-6S in 2019, ranging from 31 mg/L (October 2019) to 33.8 mg/L (May 2019); however, concentrations have been steadily decreasing from over 60 mg/L measured in 2009 (Figure 6). MW09-6D (not included in the current monitoring program) was sampled in December 2018 and resulted in a nitrate concentration of 27.2 mg/L, slightly less than the 31.3 mg/L measured in MW09-6S at the time.

The second highest concentrations were observed at MW18-10, which has shown a steady increase from 12.9 mg/L in June 2018, when the well was installed, to 34.7 mg/L in November 2018.

Background nitrate concentrations measured at DMW-1b and DMW-4 remained below 1 mg/L, ranging from <0.10 mg/L at DMW-4 (all three sampling events) to 0.756 mg/L at DMW-1b (October 2019). Concentrations at DMW-1b were generally <0.10 mg/L prior to 2018 and have since increased, while concentrations at DMW-4 have been highly variable, but consistently less than 1 mg/L.

Nitrate concentrations at Town Wells #4 and #6 remain slightly above background. Concentrations have been gradually increasing at both wells since 2012, ranging from 1.65 mg/L (August 2019) and 1.76 mg/L (October 2019) at Town Well #4 and between 1.32 mg/L (August 2019) and 1.72 mg/L (May 2019) at Town Well #6.

Ammonia concentrations are slightly elevated at MW09-6S and MW18-10 compared to other monitoring wells, with maximum concentrations of 1.42 mg/L (May 2019) and 1.63 mg/L (August 2019), respectively.

6.4.6 Iron and Manganese

Decomposition of organic matter in leachate can deplete oxygen, creating reducing conditions. When conditions are reducing, iron and manganese oxides (both naturally occurring and from anthropogenic sources) are generally reduced to more soluble forms, mobilizing dissolved iron and manganese in groundwater.

Dissolved iron exceeded one or more applicable guideline and standard at background monitoring well DMW-4 and newly installed monitoring well MW18-11. Concentrations at remaining monitoring wells met applicable guidelines and standards.

Dissolved iron concentrations were highly variable at MW18-11 spiking to 2.05 mg/L in August 2019 from 0.115 mg/L in May 2019 (Figure 7). Concentrations then dropped to 0.495 mg/L in October 2019. Concentrations at background well DMW-4 were at or near laboratory detection limits (<0.010 mg/L) prior to 2017 but have since fluctuated between 0.010 mg/L (September 2018) and 0.672 mg/L (May 2019). Conversely, dissolved iron was historically elevated above 0.3 mg/L at background well DMW-1b but decreased from 0.122 mg/L in May 2019 to 0.01 mg/L in October 2019.

Consistent with most previous sampling events, iron concentrations at remaining monitoring locations were near or below the laboratory's detection limit in 2019. Concentrations have intermittently spiked in the past at MW09-06S, MW10-08 and Town Well #4; however, given the typically low concentrations at leachate-impacted monitoring well MW09-6S, iron concentrations are likely naturally elevated at DMW-4 and MW18-11.

Dissolved manganese exceeded one or more applicable guideline at downgradient monitoring wells MW09-6S, MW18-10 and MW18-11 during all three 2019 sampling events. This phenomenon is consistent with manganese being mobilized due to anaerobic and reducing conditions in leachate impacted groundwater below and near the landfill, with concentrations being lower in more oxidizing conditions upgradient, cross-gradient and further downgradient of the Site.

Concentrations have been consistently highest at MW18-10 since it was first sampled in June 2018, fluctuating between 0.126 mg/L (September 2018) and 0.231 mg/L (October 2019). Manganese concentrations at MW18-11 ranged from 0.106 mg/L (May 2019) to 0.152 mg/L (August 2019), while concentrations at MW09-6S were first measured at 0.518 mg/L in 2009 followed by a decrease to 0.0882 mg/L in 2012 (Figure 7). Since then, concentrations have generally stabilized around 0.08 to 0.1 mg/L, with 2019 concentrations at MW09-6S ranging from 0.0826 mg/L (May 2019) to 0.0868 mg/L (August 2019).

Manganese concentrations at remaining monitoring locations have remained stable and near or below measured background concentrations since 2015.

6.4.7 Volatile Organic Compounds

Samples collected in May and October 2019 were analyzed for volatile organic compounds (VOCs).

Toluene exceeded the GCDWQ guideline and CSR DW standard of 60 µg/L at MW18-11 with a concentration of 150 mg/L in May 2019; however, toluene concentrations decreased by an order of magnitude to 12.8 µg/L in October 2019.

Toluene historically exceeded the 60 mg/L GCDWQ guideline and CSR DW standard at cross-to upgradient MW10-08 with a concentration of 60.2 mg/L (September 2018). Toluene

concentrations have also been detected at MW09-6S (6.6 µg/L in April 2017) and MW18-10 (10.8 to 16.2 µg/L in 2018), which were below the standards. Persistently elevated toluene concentrations have not been observed at any monitoring location.

Consistent with previous years, remaining VOC concentrations were below laboratory detection limits at all monitoring locations in 2019.

We understand that Section 3.4 of the OC was recently amended (October 2019) by ENV such that the Golden RDF can no longer accept hydrocarbon-impacted soil (concentrations of substances less than “hazardous waste” but exceeding the CSR Industrial (IL) numerical standards). Although not explicitly stated in the OC amendment, we understand this decision was largely based on elevated toluene concentrations in groundwater at downgradient monitoring well MW18-11.

Toluene is added to gasoline along with benzene and xylene and is often present in hydrocarbon-impacted soil. Considering the Site’s high-volume and ongoing acceptance of hydrocarbon-impacted soil, we would expect persistently elevated toluene concentrations in groundwater if this were a concern, particularly at leachate impacted monitoring well MW09-06S. However, toluene concentrations have varied both spatially and temporally, with no obvious long-term trends. Furthermore, we would expect to see detectable concentrations of benzene, ethylbenzene and xylenes (i.e., remaining BTEX parameters typically included in gasoline mixtures) in downgradient monitoring wells. However, these parameters have not been detected in downgradient groundwater to date. Toluene may have been introduced due to the well during drilling activities in 2018. It is also important to note that other sources of toluene, including paints, paint thinners, fingernail polish, lacquers, adhesives, and other solvents are likely present in the landfill waste. Therefore, although previously accepted hydrocarbon-impacted soils may have contributed to detectable toluene concentrations in MW18-11, the presence of additional toluene contributors make it challenging to ascertain the cause of elevated toluene in downgradient groundwater. Groundwater samples collected in 2020 will be analyzed for volatile and light and heavy extractable petroleum hydrocarbons (VPH and L/HEPH) to help better understand whether hydrocarbon-impacted soil is impacting nearby groundwater.

6.4.8 Remaining Leachate Indicator Parameters

Similar to the above-discussed leachate indicator parameters, alkalinity, hardness, and some dissolved metals, including boron, calcium, potassium and sulfur are elevated at MW09-6S and to a lesser degree MW18-10 compared to the other monitoring locations and are likely associated with leachate impacts; however, these parameters remain below applicable guidelines and standards for the Site.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

A standardized Quality Assurance/Quality Control (QA/QC) program was implemented during this assessment to ensure representative samples were collected and that representative analytical data were reported by the laboratory. The following outlines the procedures and results of the QA/QC program:

- Field notes were recorded during all stages of the investigation, together with a photographic record;
- Clean, new nitrile gloves were donned at each sampling location;
- Samples were collected using dedicated plastic bailers or tubing to preclude cross-contamination;
- Non-dedicated sampling equipment (e.g., electric water level) was cleaned by washing with an Alconox™ (or equivalent)/potable water mixture before initial use and between uses to minimize the potential for cross-contamination; and
- One (1) field duplicate was submitted for laboratory analysis during each sampling event.

The duplicate sample analysis ensures laboratory quality control as well as reproducibility of field sampling procedures. Duplicates and their associated sample location are summarized in Table 4.

Table 4: Field Duplicate Samples		
Date	Sample ID	Duplicate ID
May 2019	MW09-6S	DUP A
August 2019	MW09-6S	DUP A
October 2019	MW09-6S	DUP

The reproducibility of field sampling techniques is quantified by a parameter referred to as the relative percent difference (RPD). RPD is calculated using the following formula:

$$RPD = \frac{S - D}{0.5(S + D)} \times 100\%$$

Where: RPD= relative percent difference

S = sample value

D = duplicate value

RPD values greater than 25% generally suggest further review is required. However, analytical error generally increases near the method reporting limit (MRL); therefore, the RPD calculation should not be applied unless the concentration of both samples is greater than 5 times the reported detection limit.

RPD values were less than 25% or were not calculable (due to concentrations less than 5 times the detection limit), except for ammonia in May 2019, which had an RPD of 29%; however, given that only one RPD value was greater than 25%, this RPD is likely an anomaly suggesting that the sample and duplicate results are reproducible and reliable.

As a conservative measure, the highest concentration of a given parameter in field duplicate sample set is used for comparison against the applicable standard or guideline.

Samples submitted to CARO are subject to five laboratory QA/QC procedures (i.e., method blanks, laboratory control samples, lab duplicates, surrogate recoveries, and reference materials), which are documented in the laboratory certificates of analysis provided in Appendix E.

8.0 DISCUSSION

We understand that ENV raised concerns in November 2019 regarding the location and depth of newly installed monitoring wells MW18-10 and MW18-11, fearing that these wells may not provide a definitive understanding of the magnitude and potential risk that landfill leachate might pose to nearby aquifers by 2021.

The CSRD retained Golder Associates Ltd. (Golder) to prepare an EMP (Appendix F) per the OC. The intent of this EMP was to design a monitoring program that assesses Site compliance with respect to groundwater quality. This EMP expands on recommendations made in previous annual monitoring reports and proposes the following changes from the existing monitoring program:

- Increase sampling frequency from tri-annual to quarterly to better understand seasonal effects on groundwater chemistry, if any;
- Reduce sampling at the Town Wells to annually;
- Reintroduce bedrock monitoring well MW09-6D (nested with MW09-6S) to the monitoring program;
- Add total dissolved solids, biological oxygen demand, chemical oxygen demand, and petroleum hydrocarbons (annual only) to the analytical suite;
- Analyze groundwater samples for select isotopes on an annual basis to better understand groundwater origin and chemistry;
- Compare groundwater data from monitoring wells to CSR DW standards only;
- Complete a high-accuracy geodetic elevation survey of existing monitoring wells to better characterize groundwater flow patterns at and near the Site;
- Increase water level measurement frequency if quarterly measurements are insufficient in characterizing seasonal water level fluctuations/trends. Installing level loggers at each monitoring well may facilitate this recommendation; and

- Complete single-well response tests (e.g. rising and falling head slug tests) at monitoring wells not yet tested to evaluate heterogeneities in hydraulic conductivity across Site, if any.

9.0 SUMMARY AND CONCLUSIONS

In accordance with the OC requirements, groundwater sampling events were conducted in the spring, summer and fall of 2019. The samples were analyzed for analytical parameters intended to illustrate potential groundwater effects from landfilling activities. Based on the sampling and analytical program findings, the following conclusions are made:

- Leachate indicator parameters, including but not limited to nitrate, sulphate, chloride, sodium, conductivity, alkalinity, hardness, and dissolved boron are elevated at MW09-6S and to a lesser degree MW18-10 compared to other monitoring locations, suggesting leachate-impacted groundwater at and beyond the west and south Site boundaries.

Nitrate concentrations at MW09-6S have been steadily trending downward, with 2019 concentrations (31 to 33 mg/L) measured at nearly half of those recorded in 2009 (>60 mg/L). Chloride and sodium concentrations have also been decreasing over the last 5-7 years at MW09-06, suggesting some natural attenuation is occurring

- Chloride, sodium, tungsten and conductivity concentrations/values were also elevated at cross- to upgradient well MW10-08. Given the well's adjacency to a roadway, some of these elevated parameters may be due to road salting; however, they may also be attributable to a complex fracture pattern and geometry that facilitates preferential flow of leachate-impacted groundwater from the Site. Waste household items such as incandescent lightbulbs may be the cause of elevated tungsten.

Unlike leachate impacted monitoring well MW09-6s, nitrate, sulphate and other leachate indicator parameters were at or near background concentrations at MW10-08.

- Fluoride, arsenic, iron, lithium and strontium concentrations are likely naturally elevated at and near the Site based on groundwater data collected from background well DMW-1b and DMW-4.
- Representative groundwater samples were collected from downgradient monitoring well MW18-11 for the first time in 2019. Toluene and manganese exceeded applicable guidelines and/or standards at MW18-11 in 2019, suggesting possible leachate impacts at this well; however, these parameters (particularly toluene) may have been introduced during the drilling process. As such, more data

is required to assess whether these parameters remain elevated due to ongoing leachate loading.

Note that chloride, sulphate, nitrate, and other leachate indicator parameters were at or near background concentrations at MW18-11 in 2019.

10.0 RECOMMENDATIONS

Based on the annual monitoring program results and conclusions, the following recommendations are provided:

- Although not yet approved by ENV, the environmental monitoring program should be advanced in 2020 per recommendations made in Golder's EMP (Appendix F). More specifically, monitoring frequency will be increased to quarterly, and landfill gas monitoring infrastructure will be improved for the protection of potential residential receptors to the east.
- At least one more year of groundwater quality data should be collected from newly installed monitoring wells MW18-10 and MW18-11 to better understand temporal water quality trends. If leachate indicator parameters persist at these monitoring wells, an additional downgradient bedrock monitoring well may be necessary to help delineate the extent of the leachate plume. The drilling location previously recommended by WWAL (2019) at Pine Road and Golden Donald Upper Road would meet this objective, if permission is granted.

Exploring and delineating the extent of impacted groundwater contained in overburden (i.e., at MW09-6S) may also be necessary if saturated overburden is identified in future drilling efforts; however, available hydrostratigraphic data suggests groundwater primarily flows through bedrock at and near the Site, with a localized overburden water-bearing unit perched above bedrock along the western Site boundary (i.e., near MW09-6S).

Any recommendations for future monitoring well installations, including target stratigraphic units and location, will be established based on consultation with ENV.

- The CSRD should request ENV to amend and update the OC such that it reflects current-day groundwater standards, consistent with those applied in this report and recommended in Golder's EMP. The BC Approved and Working Water Quality Guidelines stipulated in the OC are overly conservative and generally apply to surface water and groundwater within 10 m of a waterbody and are therefore not applicable to groundwater at the Site. Instead, the OC should require that groundwater quality be compared to applicable CSR standards outlined in this report. Groundwater collected from potable water wells should continue to be compared to the GCDWQ.

11.0 LIMITATIONS

This report has been prepared by Ecoscape Environmental Consultants Ltd. (Ecoscape) for Columbia Shuswap Regional District (CSRD) and is intended for the sole and exclusive use of the CSRD. With the exception of the CSRD, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Ecoscape.

Nothing in this report is intended to constitute or provide a legal opinion. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

This report has been prepared for specific application to the Site and Site conditions present at the time work was completed. The conclusions and recommendations provided herein are based solely upon our professional judgment and the availability of information pertaining to environmental conditions and historic and present land use at the site with time available to consider data. Ecoscape has relied fully upon information provided or collected by other parties, and does not warranty data collected from third party sources used in this report.

This report has been prepared with the understanding that all available information on the past, present, and proposed conditions of the Site have been disclosed. If additional information becomes available that is inconsistent with the information provided herein Ecoscape should be contacted to reassess the conclusions provided in this report.

12.0 CLOSURE

We trust that this report satisfies your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted
Ecoscape Environmental Consultants Ltd.,

Written By:



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Reviewed By:



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Environmental Scientist
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Attachments: Figures
Appendix

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FIGURES



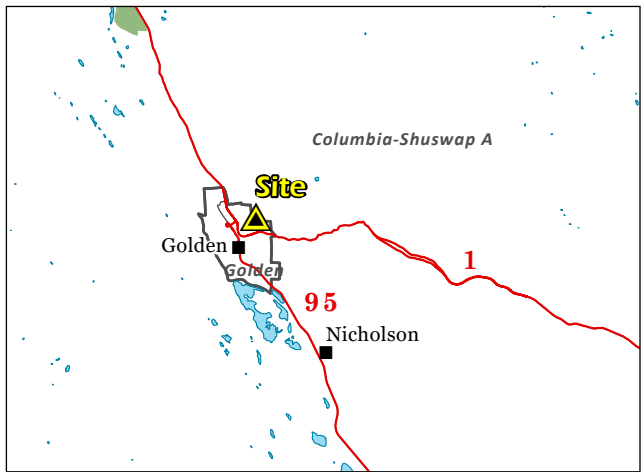
FIGURE 1
Site Location

Project:	Annual Monitoring Report
Location:	CSRD
Project No.:	19-2850
Prepared for:	CSRD
Prepared by:	Ecoscape Environmental Consultants Ltd. Mike Schutten, M.A.Sc
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	March 19, 2020

LEGEND

-  ENV-Mapped Aquifer
-  Approximate RDF Boundary

Regional Location of Site



DISCLAIMER
The data displayed is for conceptual purposes only and should not be interpreted as a legal survey or for legal purposes. If discrepancies are found between the data portrayed in this report and that of a legal survey, the legal survey will supersede any data presented herein.



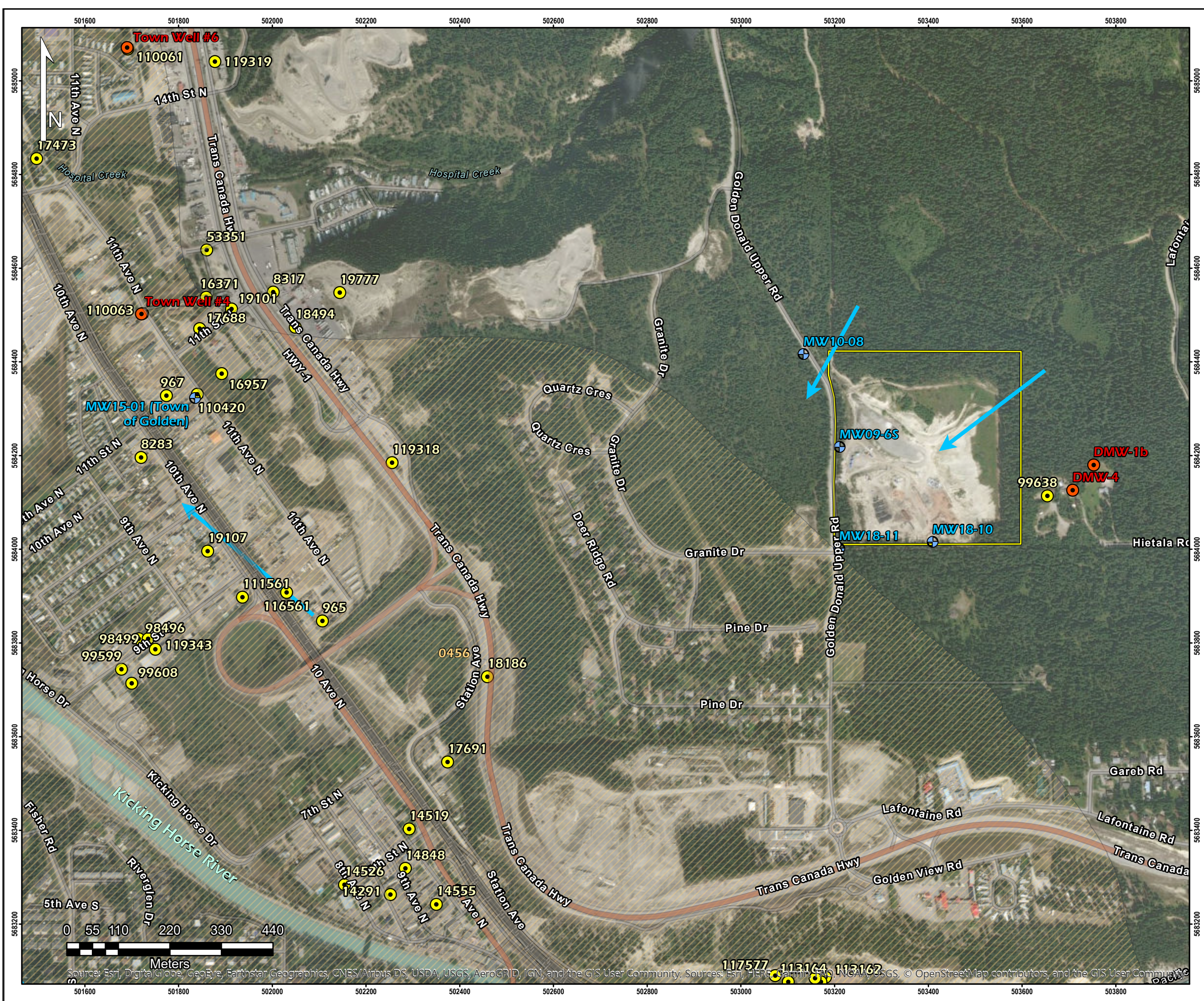


FIGURE 2
Site Plan and Sample Locations

Project:	Annual Monitoring Report
Location:	CSRD
Project No.:	19-2850
Prepared for:	CSRD
Prepared by:	Ecoscape Environmental Consultants Ltd. Mike Schutten, M.A.Sc
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	March 13, 2020

- LEGEND**
- Monitoring Well
 - Domestic Well
 - BC Well Database (WTN)
 - Inferred GW Flow Direction
 - ENV Mapped Aquifer
 - RDF Boundary (Approximate)

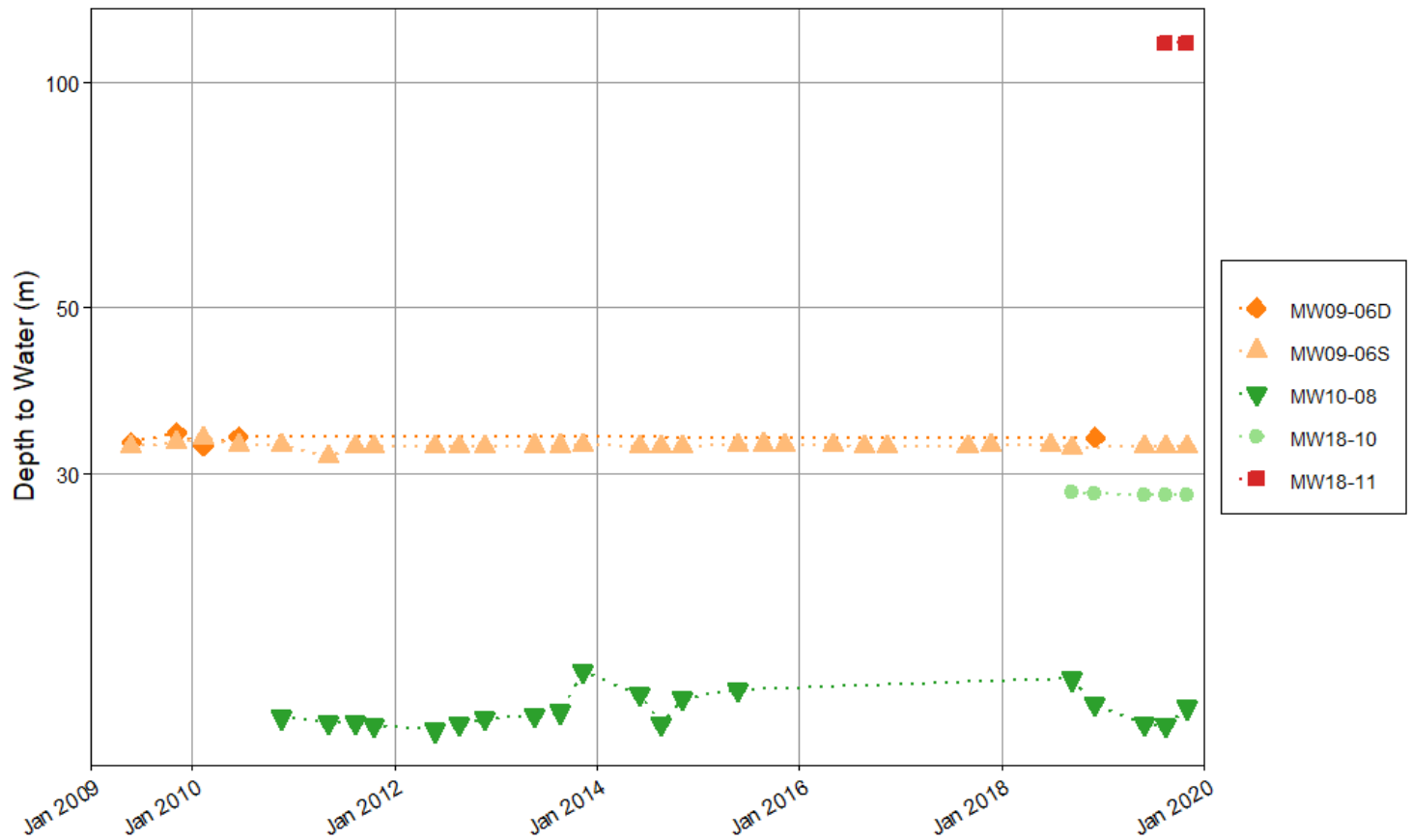


Figure 3: Depth to Water Time Series Plot

Project: 2019 Environmental Monitoring Report

Client: Columbia Shuswap Regional District

Location: Golden RDF

File No: 19-2850

Date: February 7, 2020

Dwn by: MPS

Ckd by: JS

Scale: N/A

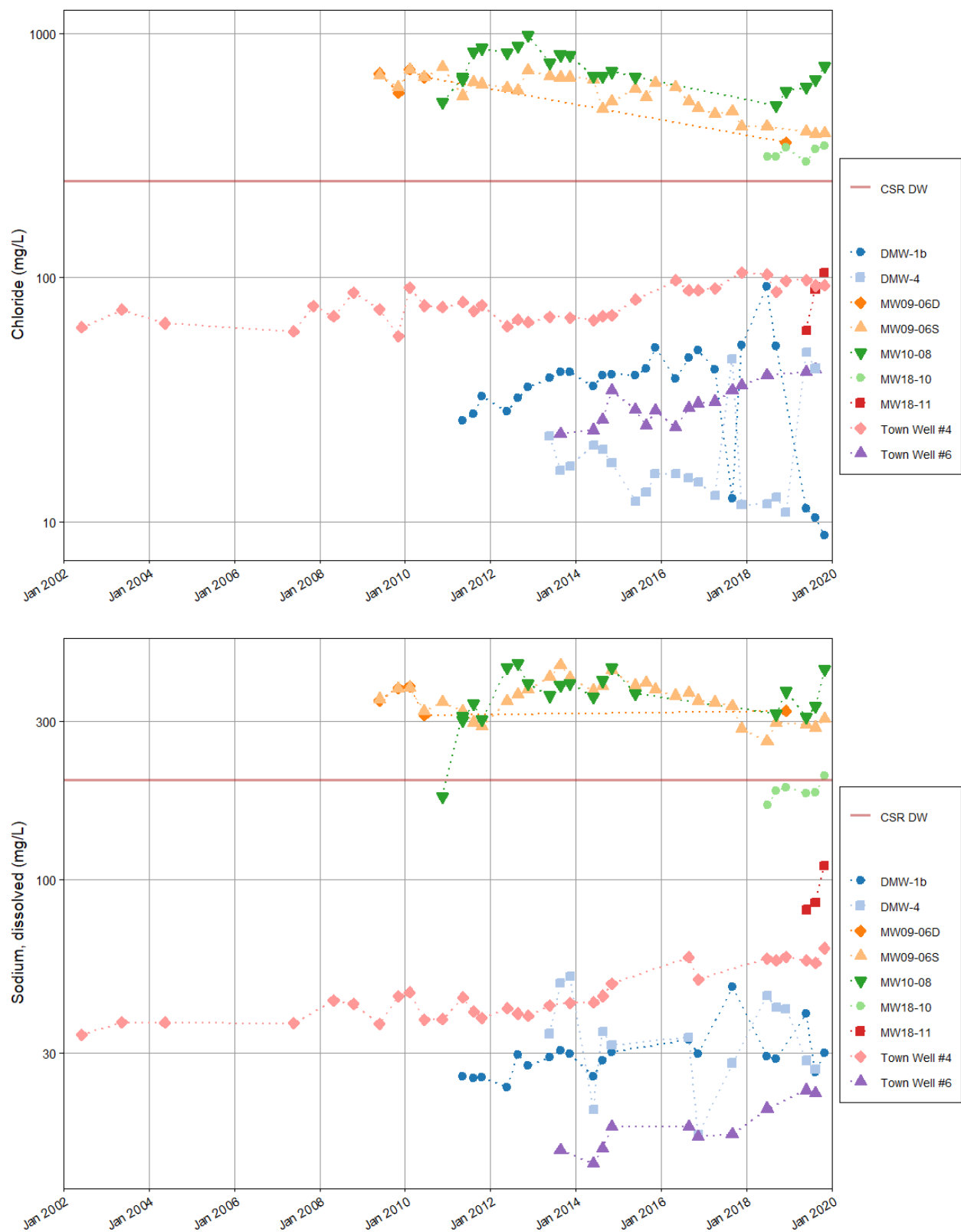


Figure 4: Chloride and Dissolved Sodium in Groundwater Time Series Plot

Project: 2019 Environmental Monitoring Report

Client: Columbia Shuswap Regional District

Location: Golden RDF

File No: 19-2850

Date: February 7, 2020

Dwn by: MPS

Ckd by: JS

Scale: N/A

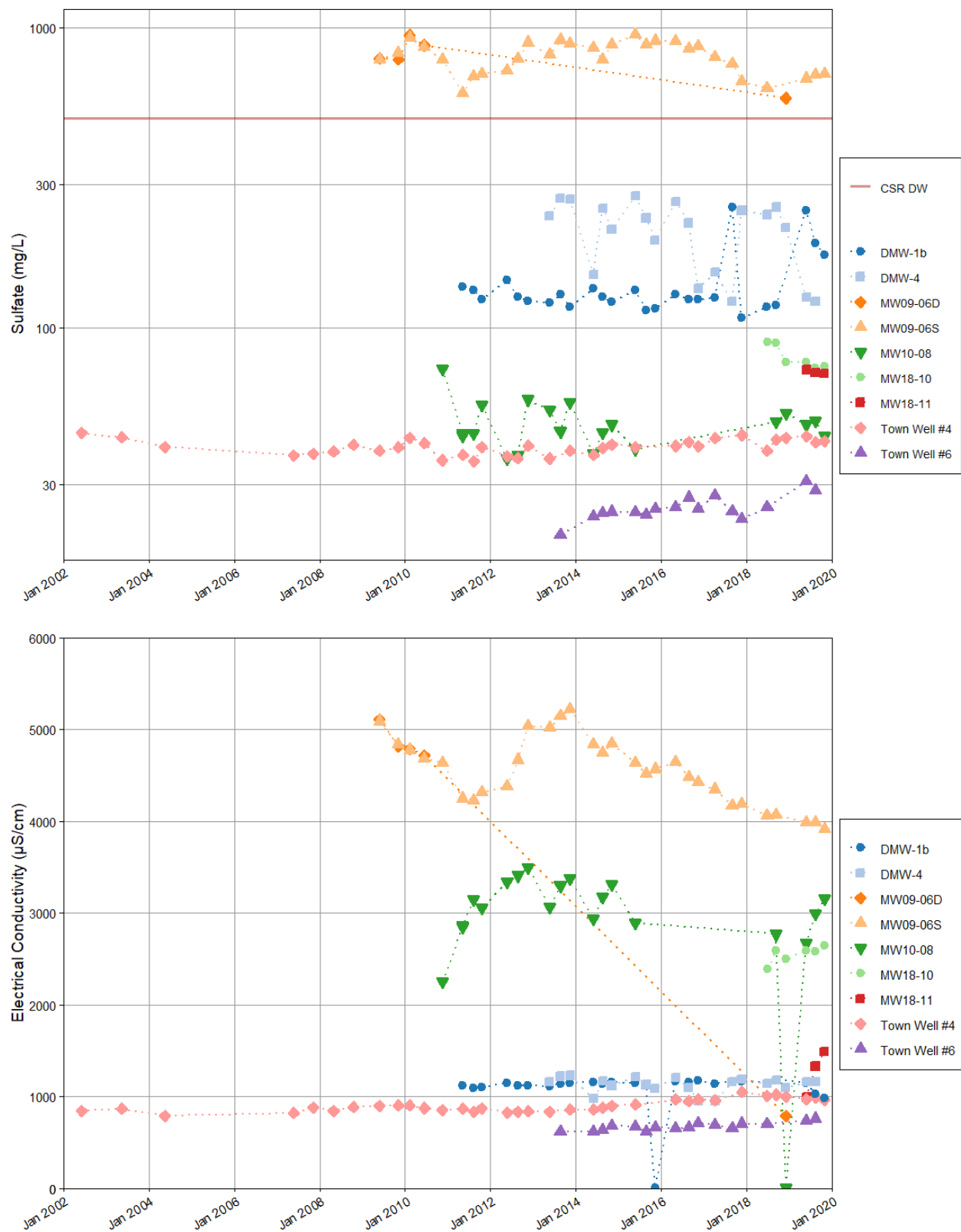


Figure 5: Sulphate and Electrical Conductivity in Groundwater Time Series Plot

Project: 2019 Environmental Monitoring Report

Client: Columbia Shuswap Regional District

Location: Golden RDF

File No: 19-2850

Date: February 7, 2020

Dwn by: MPS

Ckd by: JS

Scale: N/A

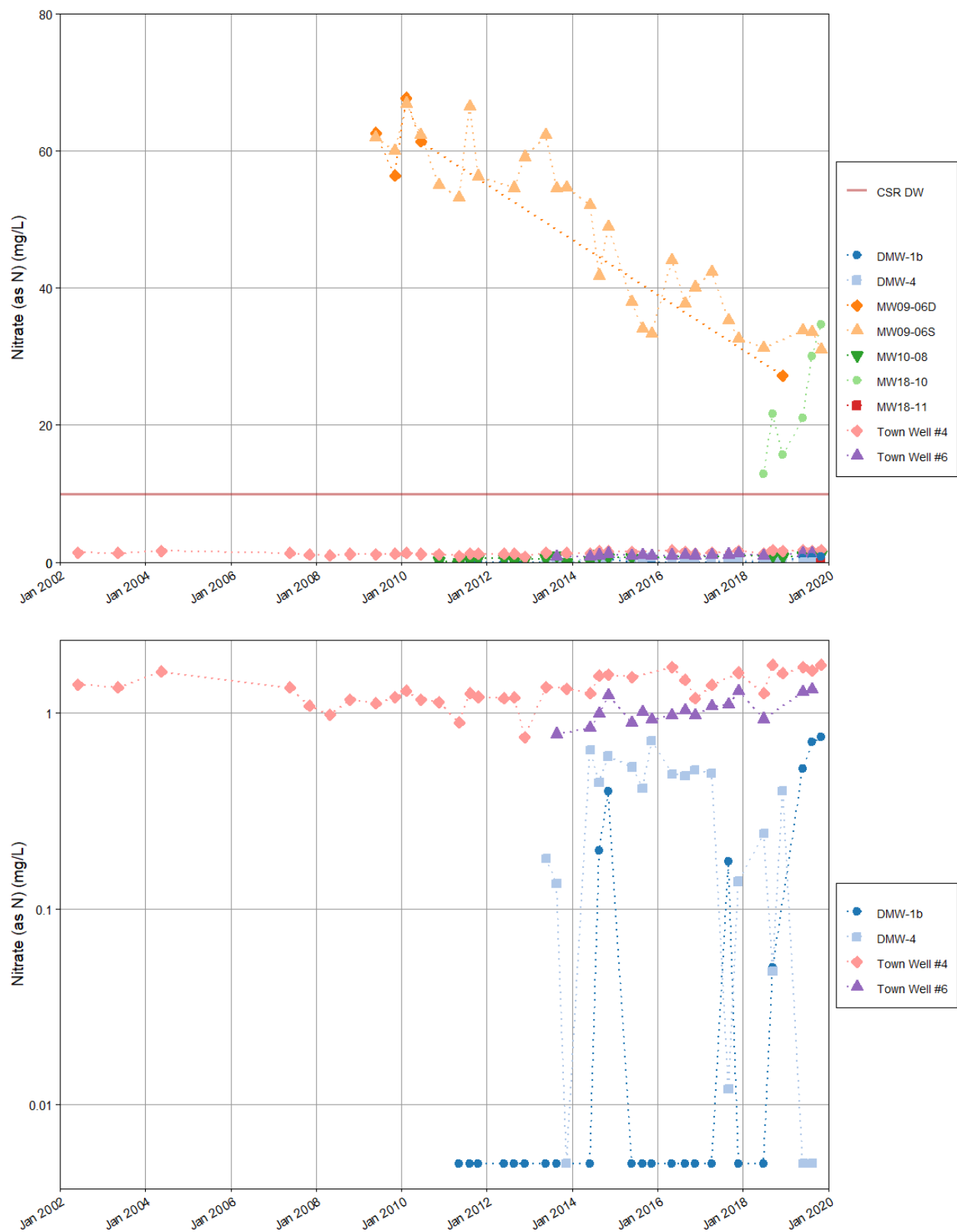


Figure 6: Nitrate in Groundwater Time Series Plot

Project: 2019 Environmental Monitoring Report

Client: Columbia Shuswap Regional District

Location: Golden RDF

File No: 19-2850

Date: February 7, 2020

Dwn by: MPS

Ckd by: JS

Scale: N/A

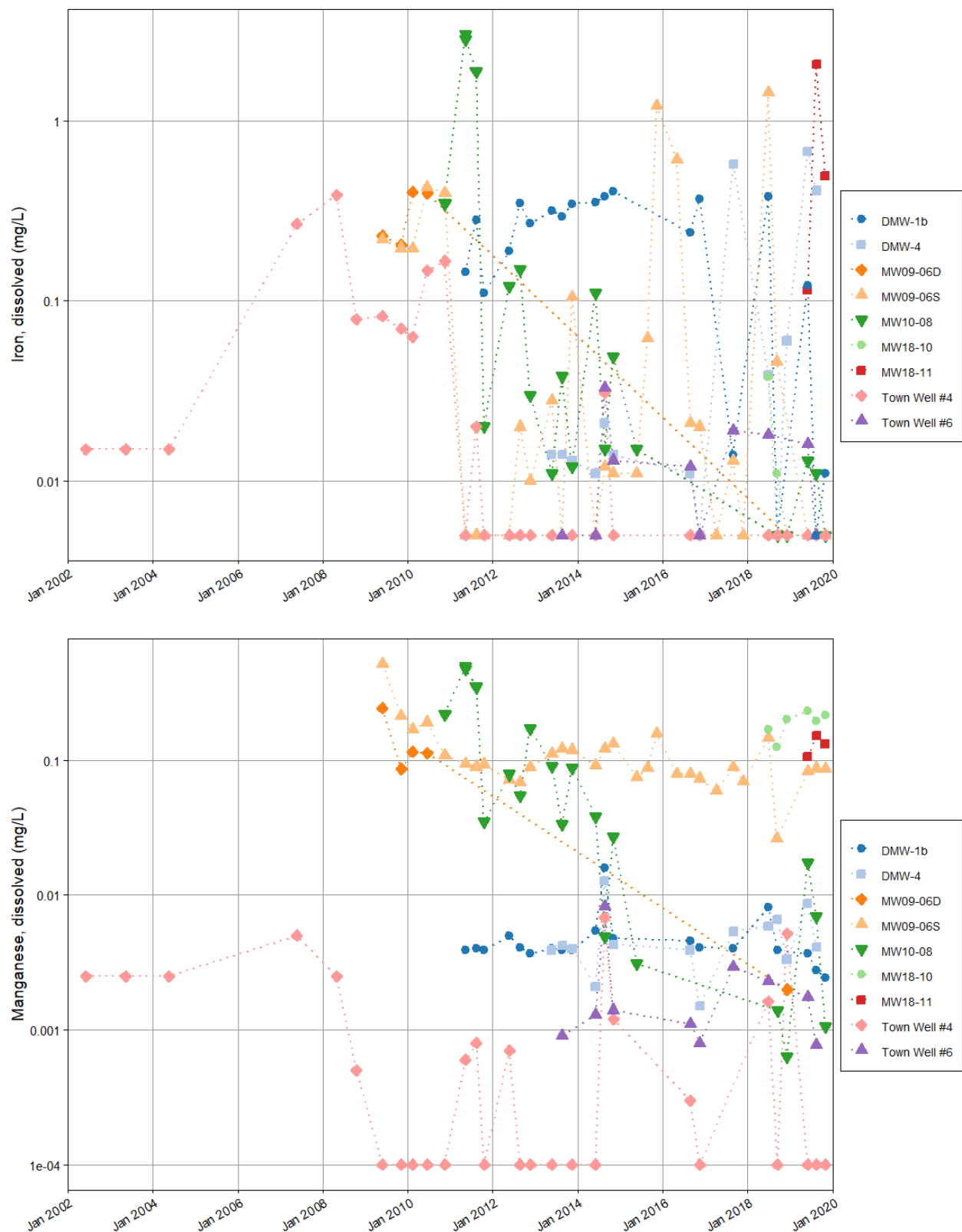


Figure 7: Dissolved Iron and Dissolved Manganese in Groundwater Time Series Plot

Project: 2019 Environmental Monitoring Report

Client: Columbia Shuswap Regional District

Location: Golden RDF

File No: 19-2850

Date: February 7, 2020

Dwn by: MPS

Ckd by: JS

Scale: N/A

APPENDIX A OPERATIONAL CERTIFICATE

October 31, 2019

Tracking Number: n/a
Authorization Number: 17006

Columbia Shuswap Regional District
Box 978
555 Harbourfront Drive NE
Salmon Arm, BC V1E 4P1

Dear Operational Certificate Holder,

Operational Certificate 17006 Amendment, Section 3.4 Contaminated Soils, under the
Environmental Management Act

Further to the discussion with the Columbia Shuswap Regional District (CSRD) Team Leader, Environmental Health Services, Ben Van Nostrand, and considering technical information available to me including recent compliance inspections conducted at the site, and pursuant to Section 16 of the *Environmental Management Act*, effective November 18, 2019, operational certificate 17006, dated August 29, 2012, is hereby amended as follows:

Subsection 3.4 – Contaminated Soil is amended from:

Soil that contains contaminants in concentrations less than "hazardous waste" as defined by the Hazardous Waste Regulation may be disposed of at the landfill site. Disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal does not include use as final cover material.

to:

Soil in which the concentrations of all substances are less than the lowest applicable industrial land use standard specified for those substances in

- (i) the generic numerical soil standards,
- (ii) the matrix numerical soil standards, or
- (iii) a director's interim standard for soil, referred to in section 41(1)(a) of the Contaminated Sites Regulation, B.C. Reg. 375/96

may be disposed of at the landfill site. Disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal does not include use as final cover material.

This amendment acknowledges that the CSRD is currently preparing a Design, Operational and Closure Plan update for review and approval by the ministry. It also acknowledges that the ministry is currently reviewing the 2018 Hydrogeology Characterization Report, dated April 2019, prepared by Western Water Associates Ltd. for the CSRD and that preliminary review information suggests that the receipt of

contaminated soils at the landfill, as previously authorized under Section 3.4 of the operational certificate, needs to be carefully re-evaluated to ensure the ongoing protection of human health and the environment.

All other terms and conditions of the operational certificate remain in full force and effect.

Please note that although a revised operational certificate document has not been produced at this time a copy of this letter is being placed on the operational certificate file, as an addendum to the operational certificate, to formally reflect the amendments.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. This operational certificate is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this operational certificate will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Documents pertinent to the operational certificate are to be submitted by email or electronic transfer to the Director, in accordance with the ministry Data & Report Submissions website at: <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions>, or as further instructed. If you have any questions or concerns, please contact Authorizations - South at Authorizations.South@gov.bc.ca.

Yours truly,

Luc Lachance, P.Eng
for Director, *Environmental Management Act*

ENCL: Operational Certificate 17006, dated August 29, 2012



August 29, 2012

Tracking Number: 243578
Authorization Number: 17006

REGISTERED MAIL

**Columbia Shuswap Regional District
Box 978
781 Marine Park Drive NE
Salmon Arm, BC V1E 4P1**

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 17006 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

...2

Administration of this operational certificate will be carried out by staff from the Southern Interior Region - Kootenay. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Southern Interior Region - Kootenay, 401 - 333 Victoria St., Nelson, BC V1L 4K3.

Yours truly,

A handwritten signature in dark ink, appearing to read 'Chris Stroich', with a stylized, flowing script.

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

Enclosure

cc: Environment Canada



**MINISTRY OF
ENVIRONMENT**

OPERATIONAL CERTIFICATE

17006

Under the Provisions of the Environmental Management Act

Columbia Shuswap Regional District

**Box 978
781 Marine Park Drive NE
Salmon Arm, BC V1E 4P1**

is authorized to manage waste and recyclable material from the Columbia Shuswap Regional District and environs at the Columbia Shuswap Regional District in Golden landfill located near Golden, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution.

This Operational Certificate supersedes all previous versions of the Operational Certificate MR-17006 issued under the authority of the *Environmental Management Act*.

1. AUTHORIZED DISCHARGE

This section applies to the discharge of refuse from municipal, commercial and light industrial sources to a sanitary landfill known as the GOLDEN LANDFILL. The site reference number for this discharge is E246600.

- 1.1 The authorized works are a sanitary landfill and related appurtenances approximately located as shown on the attached location map.

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(most recent)

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for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

- 1.2 The maximum quantity of waste discharges must not exceed the design capacity of the landfill as specified in the approved Design and Operations Plan. The final footprint and profile of the discharged waste must be within that specified in the Design and Operations Plan, and approximately as shown on the attached location map.
- 1.3 The authorized discharge is municipal solid waste as defined in the *Environmental Management Act* and other waste as may be authorized by the Director.
- 1.4 The legal description of the location of the authorized landfill facility is Subdivision 12 of Section 18, Township 27, Range 21, West of the 5th Meridian, Kootenay District.
- 1.5 The site is located approximately 2 kilometres travelling northeast on Highway 1 as shown on the location map.

2. **DESIGN AND PERFORMANCE REQUIREMENTS**

2.1 **Design and Operating Plan**

The Operational Certificate holder must prepare and maintain a current Design and Operations Plan prepared by a qualified professional. The Plan must be reviewed and updated as needed at least once every five years. The next update must be undertaken and completed in 2013. The Plan must address, but not be limited to, each of the subsections in the Landfill Criteria for Municipal Solid Waste including performance, siting, design, operational, closure and post-closure criteria. The facilities must be developed, operated and closed in accordance with the Plan. Should there be any inconsistency between this Operational Certificate and the Plan, this Operational Certificate must take precedence.

Written authorization from the Director must be obtained prior to implementing any changes to the approved plans. Based on any information obtained in connection with this facility, the Director may require revision of, or addition to, the design, operating and closure plans.

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2.2 **Qualified Professionals**

All facilities and information, including works, plans, assessments, monitoring, investigations, surveys, programs and reports, must be certified by Qualified Professionals.

2.3 **Maintenance of Works and Emergency Procedures**

The authorized works must be inspected regularly and maintained in good working order. In the event of an emergency or condition beyond the control of the Columbia Shuswap Regional District including, but not limited to, unauthorized fires arising from spontaneous combustion or other causes, or detection of surfacing leachate on the property, the Columbia Shuswap Regional District must take appropriate remedial action and notify the Regional Office. The Director may reduce or suspend operations to protect the environment until the authorized works has been restored, and/or corrective steps taken to prevent unauthorized discharges.

2.4 **Additional Facilities or Works**

The Director may require investigations, surveys, and the construction of additional facilities or works. The Director may also amend any information requirements of this Operational Certificate including plans, programs, monitoring, assessments and reports.

2.5 **Public Health, Safety and Nuisance**

The landfill must be operated in a manner such that it will not create a public nuisance or become a significant threat to public health or safety with respect to landfill gas, unauthorized access, roads, traffic, airport activity, noise, dust, litter, vectors, or wildlife attraction.

2.6 **Ground and Surface Water Quality Impairment**

The landfill must be operated in a manner such that ground or surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines, or other appropriate criteria as may be specified by the Director, at or beyond the landfill property boundary.

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The certificate holder must take all reasonable measures to ensure that BCWQG are met at or beyond the property boundary. These measures include but are not limited to:

- a) Prohibiting the discharge of municipal solid waste into water.
- b) Ensuring that no new waste is landfilled within 1.2 m of the highest groundwater level.
- c) Ensuring that adequate surface water and groundwater diversion works are constructed and maintained to minimize surface water run-off and groundwater seepage from entering the landfill.
- d) Ensuring that the management systems for surface water that has not come in contact with waste are hydraulically separate from those for managing impacted surface water.
- e) Ensuring that the landfill is operated in a manner that prevents the exceedance in surface water and groundwater of anticipated leachate indicators or parameters distinctive of leachate or those specified by the Director at the landfill boundary.
- f) Ensuring that the indicators in e) above, at specified groundwater monitoring wells within the property boundary are in accordance with those predicted by design and that suitable measures are taken to address the cause of any exceedances above the trigger levels identified in the most current Design and Operations Plan.
- g) Ensuring that the landfill is operated in accordance with a Design & Operations Plan which specifies measures to prevent decreases in groundwater and surface water quality at and beyond the property boundary.

If exceedances to the specified water quality criteria occur as a result of landfill operations, the Director may require that leachate management control measures or works be undertaken. Terms of reference for any leachate management study and/or design work must be submitted to the Director for review prior to conducting the work.

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2.7 **Landfill Gas Management**

The Landfill must not cause combustible gas concentrations to exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit at or in on-site or off-site structures.

The Operational Certificate holder must ensure that the facility is in compliance with the requirements of the Landfill Gas Management Regulation under the *Greenhouse Gas Reduction (Emissions Standards) Statutes Amendment Act*, 2008 on or before applicable dates specified in the regulation. The requirements of the regulation and its guideline documents must be incorporated by the Operational Certificate holder into the Design and Operation Plan revisions as they come into effect and as applicable.

2.8 **Buffer Zone**

No material must be landfilled within 50 metres of the property boundary.

3. **OPERATIONAL REQUIREMENTS**

3.1 **Waste Compaction and Coverage**

The Operational Certificate holder must ensure that waste deposition and compaction meets or exceeds the requirements of the BC Landfill Criteria or its most current version for daily, intermediate and final cover. Control must be exercised to ensure keeping freshly deposited refuse in a well defined and small / manageable working face.

3.2 **Prohibited Wastes**

The disposal of the following types of wastes is strictly prohibited:

- (a) Hazardous Wastes other than those specifically approved for disposal to authorized landfills in the Hazardous Waste Regulation under the *Environmental Management Act*.
- (b) Biomedical wastes as defined in the Guidelines for the Management of Biomedical Wastes in Canada (Canadian Council of Ministers of the Environment, February 1992),

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- (c) Bulk liquids and semi-solid wastes, which contain free liquids, as determined by US EPA Method 90954 Paint Filter Liquids Test, Test Methods for Evaluating Solid Wastes-Physical/Chemical Methods (EPA Publication No. Sw-846),
- (d) Release of ozone depleting substances from the storage, handling and disposal of used appliances, equipment, or any material containing ozone depleting substances is prohibited in accordance with the requirements of the Ozone Depleting Substances Regulation. Onsite removal or evacuation of Ozone Depleting Substances (ODS) from appliances and the subsequent storage of appliances on site is permitted subject to both activities being in compliance with the Ozone Depleting Substances Regulation.

3.3 **Waste Asbestos**

Waste asbestos is authorized for disposal subject to compliance with the requirements of section 40 of the Hazardous Waste Regulation and the following conditions:

- (a) The asbestos waste may not be mixed with any other hazardous waste.
- (b) The Regional District must approve the disposal before disposal takes place.
- (c) All other applicable requirements of the Hazardous Waste Regulation, including but not limited to manifesting and waste record keeping, must also be complied with.

3.4 **Contaminated Soil**

Soil that contains contaminants in concentrations less than "hazardous waste" as defined by the Hazardous Waste Regulation may be disposed of at the landfill site. Disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal does not include use as final cover material.

3.5 **Wildlife and Vector Control**

Vectors (carriers capable of transmitting a pathogen from one organism to another including, but not limited to flies and other insects, rodents, and birds) must be controlled by the application of cover material at the required frequency or by such additional methods as specified by the Director. Wildlife control fencing must be maintained around the perimeter of the landfill site and must be

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electrified for at least the active bear season of each year.

This landfill must be operated so as to minimize the attraction of wildlife such as bears and birds by applying cover at required frequencies and instituting a good housekeeping program.

3.6 **Site Access and Supervision**

A landfill operator that has received BC Qualified Landfill Operator training, is familiar with the requirements of the Operational Certificate and the specifications of the Design and Operations Plan, must be present at all times during operating hours.

Locking gates must be maintained at all access routes to the landfill site. Gates, perimeter fencing and/or barriers must be installed where necessary to prevent unauthorized access to the site by vehicles. Gates must be locked during non-operating hours.

3.7 **Dust Control**

Dust created within the landfill property must be controlled, using methods and materials acceptable to the Director, such that it does not cause a public nuisance.

3.8 **Litter Control**

The best practical means must be used to prevent the scatter of litter. Any litter scattered into the neighbouring property, along access roads, in drainage ditches, along litter-control fences, into surrounding trees or elsewhere on the landfill site must be cleaned up. The frequency of clean up and other additional requirements for refuse scatter control must be determined by the Director.

3.9 **Waste Reduction and Alternate Disposal**

The Provincial Government has developed policies to promote the reduction, reuse and recycling of wastes. The Operational Certificate holder is encouraged to segregate for recycling and reuse, where possible, materials destined for disposal at this site.

Public scavenging must not be permitted at the landfill. The controlled salvaging of waste by the landfill operator or persons authorized by the

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Operational Certificate holder is encouraged if areas or facilities for separation and storage of recyclable or reusable materials are provided.

In certain landfill environments, some construction and demolition debris or other wastes may create specific air and water quality concerns. If problems arise at this site that are attributable to specific wastes, the Director may require that alternate disposal/storage procedures be implemented.

3.10 **Operations and Maintenance Manual**

The Operational Certificate holder must prepare an Operations and Maintenance Manual to be reviewed and updated as necessary on at least an annual basis.

4. **MONITORING AND REPORTING REQUIREMENTS**

4.1 **Landfill Monitoring**

A monitoring program must be developed by a Qualified Professional and identify potential environmental impacts of the authorized facility and must address but not be limited to the Landfill Criteria for Municipal Solid Waste and Guidelines for Environmental Monitoring. The monitoring program must be updated every five years and submitted to the satisfaction of the Director. The next monitoring plan update is required to be undertaken and completed in 2013. Monitoring must be conducted in accordance with the monitoring program.

The program must be designed to assess and identify:

- The design performance of the landfill as per the Design & Operations Plan including but not limited to compliance with water quality performance standards at the landfill boundary.
- Landfill leachate as a contaminant source.
- Residential well water quality.
- Surface water quality.

The monitoring program must address, but not be limited to relevant sections of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. The Environmental Monitoring Program must take into consideration results from previous monitoring programs and any other investigations conducted at the site to ensure that early detection of potential impacts is possible.

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4.2 **Sampling Techniques**

Sampling must be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Gov't., Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

4.3 **Analysis**

Analyses must be carried out in accordance with procedures described in the most recent edition of the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publication Centre.

4.4 **Quality Assurance**

The Operational Certificate holder must produce, within 60 days on the request of the Regional Manager Environmental Protection, 'Field and Laboratory Quality Protocols and Quality Assurance Criteria' acceptable to the Director. The 'Laboratory Quality Protocols' must include the procedures used to assess precision, accuracy and blank quality, including frequency of application of those procedures, the procedures for sampling, handling (e.g. preservation, hold times) and corrective measures to be initiated when deficiencies are indicated. The 'Quality Assurance Criteria' must include the acceptance criteria for accuracy (based on recoveries for reference samples/spikes), for precision (based on deviation in field and lab duplicates) and method blanks (designed to indicate false positives).

5. **LANDFILL REPORTING**

5.1 **Annual Report**

The Operation Certificate Holder must submit an Annual Report to the Director on or before April 30th each year for the previous calendar year. The report must contain at least the following information:

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- (a) an executive summary;
- (b) the type and tonnage of waste received, recycled, stored on-site and discharged / landfilled for the year;
- (c) Any proposed changes to the Design and Operations Plan and the environmental monitoring program (EMP), with rationale for the changes; a description of unanticipated occurrences and any changes to the closure or post-closure plans and funds;
- (d) A review of the preceding year of operation or an operations update which summarizes landfill development work completed in the subject reporting year and work planned for the subsequent year. A summary of any new information or changes to the facilities and plans, assessments, surveys, programs and reports;
- (e) Occurrences or observations of wildlife (medium and large carnivores) at the facility;
- (f) A statement regarding the facility's progress in reducing the regional solid waste stream being landfilled and the objectives of the Regional Solid Waste Management Plan;
- (g) An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis. Trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;
- (h) A list of training programs completed for landfill operators during the previous year; and
- (i) Any additional information requested by the Director.

All reports must be submitted, suitably formatted and tabulated in both print and electronic format (portable document format).

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Southern Interior Region - Kootenay

5.2 **Five Year Report**

The Operation Certificate Holder must submit a Five Year Report to the Director on or before April 30th on the five year anniversary of the last submission. The next report is due by the end of 2013. The report must contain at least the following information:

- (a) An executive summary;
- (b) An updated Design and Operations Plan;
- (c) A detailed hydrogeological assessment;
- (d) The type and tonnage of waste received, recycled, stored on-site and discharged / landfilled for the year;
- (e) A current topographic map detailing airspace consumption, on-site borrow pit changes and future developments;
- (f) Volume and density analysis or an in-place material summary, updated estimates for the remaining capacity, site life, revised closure date for the current phase or sequence and revised closure date for the current landfill footprint;
- (g) An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis. Trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;
- (h) An update on the financial assurance mechanism including a statement of the current dollar value of the Closure Fund and the amount earmarked for the Landfill site; and
- (i) Any additional information requested by the Director.

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6. **LANDFILL CLOSURE PLAN**

6.1 **Closure Plan and Post Closure**

The Operational Certificate holder must perform closure and post-closure care in accordance with all applicable requirements of the BC Landfill Criteria for Municipal Solid Waste. This Operational Certificate is issued on the condition that a Closure Plan and Final Cover Design that meets or exceeds the requirements of the criteria will be submitted to the Director during the operating life of the landfill. The Closure Plan must be reviewed every five years throughout the operating life of the landfill.

A certification by a Qualified Professional attesting that all closure works have been completed in accordance with the Closure Plan and Final Cover Design is to be submitted to the Director no later than 60 days after the implementation of the Final Cover Design.

The Operational Certificate Holder must submit a Post Closure or Aftercare Plan to the Ministry at least two years prior to the anticipated closure date of the landfill.

6.2 **Closure Fund**

The Operational Certificate holder must provide for the funding of progressive closure operations, final closure and operations beyond closure by maintaining a closure fund. The value of the closure fund must meet or exceed the estimated closure and post-closure costs as established in the approved Design and Operations Plan and updated in the annual report, plus a reasonable contingency for any remediation which may be required. Reported costs must be adjusted for inflation annually. Alternately, a closure and post-closure financial security acceptable to the Director may be built over time.

The Operational Certificate holder must determine and ensure that the closure fund is adequate by preparing annually a financial statement of the fund which must be made available to the Director upon request. The financial statement must report the accrued capital, interest and additions to the fund for the previous year and review the sufficiency of the fund and the rate of accrual in consideration of the projected costs of closure and post-closure obligations.

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for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

6.3 **Site Decommissioning**

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate holder must submit a site profile to the manager at least ten days prior to decommissioning the facilities authorized in Section 1.

6.4 **Declaration of Landfill**

Landfills sited on titled land must register a covenant that the property was used for the purpose of waste disposal as a charge against the title to the property as provided for under Section 215.1 of the *Land Title Act*. Landfills located on crown land are to have a “notation on file” registered that the property was used for the purpose of waste disposal.

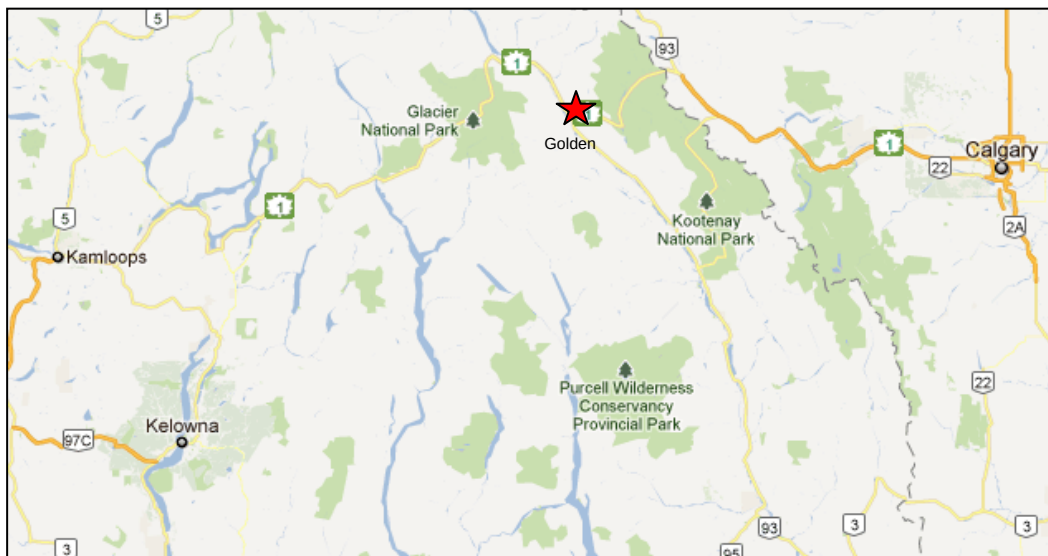
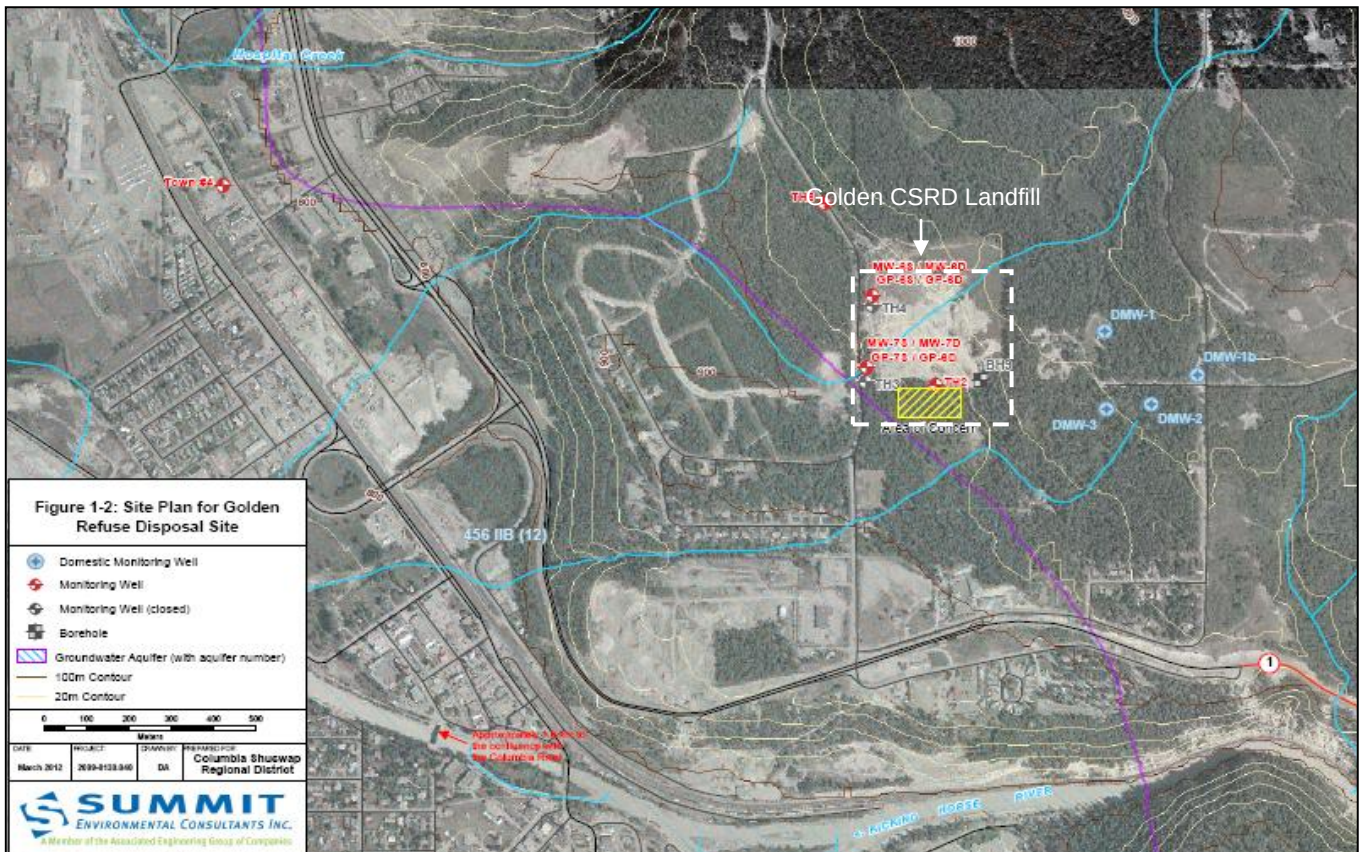
The Operational Certificate holder must, upon closure of the landfill, register a charge against the property title, or provide other legal notification acceptable to the Director that the property described in Section 1 was used for the purpose of waste disposal. The Director must be notified of the charge or legal notification.

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for Director, *Environmental Management Act*
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Location Map



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for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

APPENDIX B WELL LOGS

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION		GROUP SYMBOL	GRAPH SYMBOL	COLOR CODE	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		RED	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
		POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	GP		RED		NOT MEETING ABOVE REQUIREMENTS	
		DIRTY GRAVELS (WITH SOME FINES)	GM		YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	GC		YELLOW			ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
	SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW		RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
		POORLY GRADED SANDS, LITTLE OR NO FINES	SP		RED		NOT MEETING ABOVE REQUIREMENTS	
		DIRTY SANDS (WITH SOME FINES)	SM		YELLOW	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
		CLAYEY SANDS, SAND-CLAY MIXTURES	SC		YELLOW			ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$w_L < 50\%$	ML		GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (See below)	
		$w_L > 50\%$	MH		BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS		
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	$w_L < 30\%$	CL		GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS		
		$30\% < w_L < 50\%$	CI		GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS		
		$w_L > 50\%$	CH		BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
	ORGANIC SILTS & CLAYS BELOW "A" LINE ON CHART	$w_L < 50\%$	OL		GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F". E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY	
		$w_L > 50\%$	OH		BLUE	ORGANIC CLAYS OF HIGH PLASTICITY		
	HIGHLY ORGANIC SOILS		PI		ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE	

SPECIAL SYMBOLS



BEDROCK
(Undifferentiated)



VOLCANIC ASH

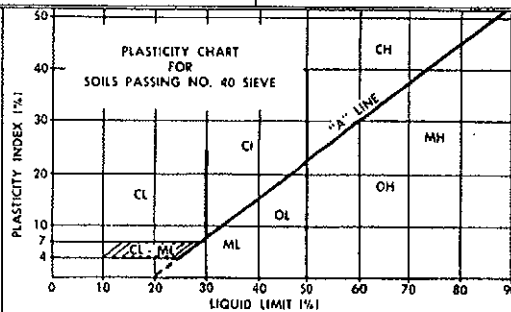
SOIL COMPONENTS

FRACTION	U.S. STANDARD SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS	
	PASSING	RETAINED	PERCENT	DESCRIPTOR
GRAVEL				
	coarse	75 mm	19 mm	
SAND				
	coarse	4.75 mm	2.00 mm	
	medium	2.00 mm	425 μ m	
	fine	425 μ m	75 μ m	
SILT (non plastic)		75 μ m		
CLAY (plastic)				

OVERSIZE MATERIAL

Rounded or subrounded
COBBLES 75 mm to 203 mm
BOULDERS > 203 mm

Not rounded
ROCK FRAGMENTS > 75 mm
ROCKS > 0.76 cubic metre
in volume



- ALL SIEVE SIZES MENTIONED ON THIS CHART ARE U.S. STANDARD, A.S.T.M. E.11.
- BOUNDARY CLASSIFICATIONS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN COMBINED GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL SAND MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%.

Kala Groundwater Consulting Ltd.
Vernon Kamloops

Testhole Log - TH95-01	
Depth (m)	Soil Description
0-5.8	Silt-and fine sand, little gravel fine to coarse, iso. cobbles, non-plastic, dense, yellow/brown, moist.
5.8-6.71	Silt-and sand fine to medium, some gravel fine to coarse, non-plastic, hard, grey, moist.
6.71-8.54	Silt-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, grey/brown, hard, moist.
8.54-11.3	Silt-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist.
11.3-14.9	Silt-some fine sand, trace gravel, fine to coarse, occ. cobbles, non-plastic, red/brown, hard, damp.
14.9-18.9	Clay-and silt, trace fine sand, trace fine gravel, iso. cobbles, low to none plastic, grey, hard, moist.
End of TH95-01 at 18.9m - No groundwater seepage - Monitoring Well installed	

Testhole Log - TH95-02	
Depth (m)	Soil Description
0-9.76	Sand-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp. Upper 0.3m fill
9.76-12.8	Sand-fine and silt, some gravel fine to coarse, iso. cobbles, dense, red/brown, moist.
12.8-15.5	Sand-fine, some silt, some gravel fine to coarse, occ. cobbles, dense, red/brown, moist.
15.5-16.5	Silt-some fine sand, trace gravel, fine to coarse, non-plastic, iso. grey/brown, cobbles, stiff, moist.
16.5-20.1	Silt-little fine sand, trace clay, trace gravel, fine to coarse, occ. cobbles, non-plastic, red/brown, hard, damp.
20.1-22.9	Silt - some sand, fine to coarse, trace gravel fine to coarse, iso. cobbles, grey, very hard, non-plastic.
End of TH95-02 at 22.9m - No groundwater seepage - Monitoring Well installed	

Testhole Log - TH95-03	
Depth (m)	Soil Description
0-8.54	Silt-some fine sand, some gravel, fine to coarse, iso. cobbles, non-plastic, red/brown, dense, damp
8.54-11.3	Silt-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist
11.3-15.5	Silt-some fine sand, trace gravel, fine to coarse, non-plastic, grey/brown, hard, moist
15.5-18.3	Sand-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp.
End of TH95-03 at 18.3m - No groundwater seepage - Monitoring Well installed	

Testhole Log - TH95-04	
Depth (m)	Soil Description
0-3.35	Silt-and fine sand, trace gravel fine to coarse, occ. cobbles, non-plastic, dense, yellow/brown, damp.
3.35-5.49	Gravel-fine to coarse, and silt, trace sand fine to coarse, occ. cobbles, light brown, moist.
5.49-11.0	Silt-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, grey/brown, hard, moist.
11.0-12.8	Sand-fine to medium, and gravel, fine to coarse, iso. cobbles, trace silt, dense, red/brown, moist.
12.8-17.7	Sand- fine to medium, and silt, little gravel fine to coarse, iso. cobbles, brown, hard, moist.
17.7-30.48	Sand - fine and silt, trace gravel, fine to coarse, brown, hard, moist.
End of TH95-04 at 26.2m - No groundwater seepage - Monitoring Well installed	

Testhole Log - TH95-05	
Depth (m)	Soil Description
0-1.3	Silt-and fine sand, little gravel fine to coarse, iso. cobbles, non-plastic, dense, yellow/brown, moist.
1.3-3.1	Waste-municipal debris, paper, tin plastics, mixed with soil, damp.
3.1-3.4	Sand-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
3.4-5.1	Waste-municipal debris, paper, tin plastics, mixed with soil, damp.
5.1-5.4	Sand-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
5.4-6.2	Waste-municipal debris, paper, tin plastics, mixed with soil, damp.
6.2-7.1	Sand-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
End of TH5 at 7.1m no groundwater-temporary installation	

CLIENT: RCP	PROJECT: Hydrogeological	TESTHOLE: BH95-02
LOCATION: Golden Landfill	Assessment - Golden BC	PROJECT NO: KE95-057
DRILL RIG: Becker Hammer	SURF ELV: 914.0m ASL	CO-ORDINATES:

DEPTH (m) ELV. (m)	INDEX:	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES	COMPLETION DETAILS
Grass	0 20 40 60 80 100 120 140					
2.0 912	0-9.76		Sand-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp. <i>Upper 0.3m fill</i>		AR1 1.5	Stickup 1.2m 50mm dia. Solid pipe
4.0 910					AR2 3.0	Bentonite Grout
6.0 908					AR3 4.5	Top 6.0m
8.0 906					AR4 6.0 D1 6.5/6.95	50
10.0 904	9.76-12.8		Sand-fine and silt, some gravel fine to coarse, iso. cobbles, dense, grey, moist.		AR5 7.5	Sand
12.0 902					AR6 10.0	
14.0 900	12.8-15.5		Sand-fine, some silt, some gravel fine to coarse, occ. cobbles, dense, red/brown, moist.		AR7 11.5	
16.0 898	15.5-16.5		Silt-some fine sand, trace gravel, fine to coarse, non-plastic, iso. grey/brown, cobbles, stiff, moist.		AR8 13.0 D2 13.5/13.9 AR9 14.0	50 0.010" slotted pipe
18.0 896	16.5-20.1		Silt-little fine sand, trace clay, trace gravel, fine to coarse, occ. cobbles, non-plastic, red/brown, hard, damp		AR10 15.0	
20.0 894					AR11 16.5 AR12 18.0	
22.0 892	20.1-22.9		Silt - some sand, fine to coarse, trace gravel fine to coarse, iso. cobbles, grey, very hard, non-plastic, moist. <i>End of TH95-01 at 18.9m - No groundwater seepage Well installed</i>		D3 20/20.45	80 Well base 22.9m
Prepared by: Paul Blackett			Reviewed by:		Figure:	
Groundwater Depth: no groundwater			Borehole Depth: 22.9m below surface		Date: 10/9/95	

CLIENT: RCP	PROJECT: Hydrogeological	TESTHOLE: BH95-03
LOCATION: Golden Landfill	Assessment - Golden BC	PROJECT NO: KE95-057
DRILL RIG: Becker Hammer	SURF ELV: 908.5m ASL	CO-ORDINATES:

DEPTH (m) ELV. (m)	INDEX: METHANE %	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES	COMPLETION DETAILS
0	5	10	15	20		
Gravel					Depth (m)	N
	0-8.54		Silt-some fine sand, some gravel, fine to coarse, iso. cobbles, non-plastic, red/brown, dense, damp		AR1 1.5	Stickup 1.2m
2.0 906.5						50mm dia. Solid pipe
4.0 904.5					AR2 3.0 D1 3.5/3.95	Bentonite Grout
6.0 902.5					AR3 4.5	
8.0 900.2					AR4 6.0 D2 6.5/6.95	Top 6.0m
10.0 898.2	8.54-11.3		Silt-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist.		AR5 7.5	
12.0 896.2	11.3-15.5		Silt-some fine sand, trace gravel, fine to coarse, non-plastic, grey/brown, hard, moist		AR6 10.0	Sand
14.0 894.2					AR7 11.5	
16.0 892.2	15.5-18.3		Sand-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp.		AR8 13.0 D3 13.5/13.9 AR9 14.0	0.010" slotted pipe
18.0 890.2					AR10 15.0 D4 16/16.45	
20.0 888.2					AR11 16.5	
22.0					AR12 18.0	18.3m
			End of TH95-01 at 18.3m - No groundwater seepage Monitoring Well installed			
Prepared by: Paul Blackett			Reviewed by:		Figure: 3	
Groundwater Depth: no groundwater			Borehole Depth: 18.3m below surface		Date: 10/9/95	

TESTHOLE LOG

CLIENT: RCP	PROJECT: Hydrogeological	TESTHOLE: BH95-04
LOCATION: Golden Landfill	Assessment - Golden BC	PROJECT NO: KE95-057
DRILL RIG: Becker Hammer	SURF ELV: 916.9m ASL	CO-ORDINATES:

DEPTH (m) ELV. (m)		INDEX: METHANE %	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES	COMPLETION DETAILS
Grass							
		0 5 10 15 20					
						Depth (m) N Stickup 1.2m	
		0-3.35		Silt-and fine sand, trace gravel fine to coarse, occ. cobbles, non-plastic, dense, yellow/brown, damp.		AR1 1.5	50mm dia. Solid pipe
2.0	914.9					AR2 3.0 D1 3.5/3.95	Bentonite Grout & backfill
4.0	912.9	3.35-5.49		Gravel-fine to coarse, and silt, trace sand fine to coarse, occ. cobbles, light brown, moist.		AR3 4.5	
6.0	910.9					AR4 6.0 D2 6.5/6.95	
8.0	908.9	5.49-11.0		Silt-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, grey/brown, hard, moist.		AR5 7.5	
10.0	906.9					AR6 10.0 D3 10/10.45	Sand
12.0	904.9	11.0-12.8		Sand-fine to medium, and gravel, fine to coarse, iso. cobbles, trace silt, dense, red/brown, moist.		AR7 11.5	
14.0	902.9					AR8 13.0 D2 13.5/13.9 AR9 14.0	0.010" slotted pipe
16.0	900.2	12.8-17.7		Sand-fine to medium, and silt, little gravel fine to coarse, iso. cobbles, brown, hard, moist.		AR10 15.0 D4 15/15.45	
18.0	898.2					AR11 16.5	
20.0	896.2	17.7-30.48		Sand-fine and silt, trace gravel, fine to coarse, brown, hard, moist.		AR12 18.0 AR13 22.0 AR 14 25.0 AR15 27.5 AR 16 30.0	Top 20.0m Bot 30.5m
30.0	894.2			End of TH95-01 at 30.48m - No groundwater seepage Monitoring Well installed			
Prepared by: Paul Blackett				Reviewed by:		Figure:	
Groundwater Depth: no groundwater				Borehole Depth: 30.5m below surface		Date: 10/9/95	

Symbol Legend

Common Symbols

	Sand		Silty Sand		Sandy Silt		Clayey Sand
	Sand and Gravel		Gravel		Silt		Clayey Silt
	Clay		Silty Clay		Sandy Silty Clay		Silty Sand and Gravel
	Silty Gravel		Silty Clay and Gravel		Topsoil		Peat
	Limestone		Shale				

Well Symbols

Pipe and Screen

	None		Pipe		Double Walled Pipe		Sealed Pipe
	Fine Screen		Coarse Screen		Slotted Screen		Slotted Screen

Top Fittings

	None		Cap		Flush-mounted Cap		Above-ground Cap
	Connector		Reducer		Pipe Break		Packer

Bottom Fittings

	None		Cap		Cone		Screw-on Cap
	Connector		Enlarger		Pipe Break		Packer

Packing and Backfill

	None		Bentonite		Clay		Silt
	Cement		Sand		Sand and Gravel		Gravel

Project No: 7130-010.01

Test Hole / Borehole I.D.: TH3

Client: CSRD

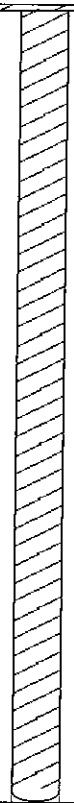
Well I.D.: TH-3 (well closure)

Location: Golden, BC

Location on site: on Golden-Donald Upper Rd

Logged by/ Checked by: BRM/ MG

Northing/ Easting/ Elevation: 0

SUBSURFACE PROFILE			SAMPLE			Well Details	Well Completion Details / Remarks
Depth	Symbol	Description	Type	I.D.	Flag for analysis		
0		Ground Surface					
10						TH-3 was replaced by MW-7. TH-3 was decommissioned according to the Groundwater Protection Regulation. The surface casing was removed, the 2" piezometer was cut approximately 4" below ground surface and bentonite chips were poured into the casing. Bentonite was poured around the outer annulus of the piezometer to bring the hole to ground surface.	
20							
30							
40							
50							
60							
70		End of Borehole					



Contractor: JR Drilling

Date: April 20, 2009

Operator(s): Jerry

Time:

Drill Method:

Temperature: 10 degC

Ground conditions: bare

Sheet: 1 of 1

Project No: 7130-010.01

Client: CSRD

Location: Golden, BC

Logged by/ Checked by: BRM/ MG

Test Hole / Borehole I.D.: TH4

Well I.D.: TH-4 (well closure)

Location on site: near weight scale

Northing/ Easting/ Elevation: 0

SUBSURFACE PROFILE			SAMPLE			Well Details	Well Completion Details / Remarks
Depth	Symbol	Description	Type	I.D.	Flag for analysis		
0 ft m 0		Ground Surface					
10						TH-4 was replaced by MW-6S. TH-4 was decommissioned according to the Groundwater Protection Regulation. The surface casing was removed, the 2" piezometer was cut approximately 4" below ground surface and bentonite chips were poured into the casing. Bentonite was poured around the outer annulus of the piezometer to bring the hole to ground surface.	
20							
30							
40							
50							
60							
70							
80							
90							
100							
110		End of Borehole					



Contractor: JR Drilling

Operator(s): Jerry

Drill Method:

Ground conditions: bare

Date: April 20, 2009

Time:

Temperature: 10 degC

Sheet: 1 of 1

Project No: 7130-010.01

Client: CSRD

Location: Golden, BC

Logged by/ Checked by: BRM/ MG

Test Hole / Borehole I.D.: TH-6 (6")

Well I.D.: MW-6S, MW-6D, GP-6S, GP-6D

Location on site: near weight scale (replaces TH4)

Northing/ Easting/ Elevation: 0

SUBSURFACE PROFILE			SAMPLE			Well Details	Well Completion Details / Remarks
Depth	Symbol	Description	Type	I.D.	Flag for analysis		
0 m		Ground Surface					
10		Light brown, GRAVEL, w. sand, loose, dry				Configuration: - Two groundwater monitoring wells (each 2" diameter) - Two gas monitoring probes (each 1" diameter) - Schedule 40 PVC - Gas piezos. are threaded 20/40 sand pack around each monitoring well Screen Assembly: - No. 10 slot PVC MW6D -Screened in bedrock -Screened btw 59.76 m (196 ft) and 65.85 (216 ft) bgs MW6S -Screened in surficial deposits (overburden) -Screened btw 31.40 m (103 ft) and 34.45 m (113 ft) bgs GP6D -Screened btw 12.20 m (40 ft) and 16.77 m (55 ft) bgs GP6S -Screened btw 7.93 m (26 ft) and 9.45 m (31 ft) bgs	
30		Light brown, SILT w/ sand, trace gravel, loose, dry					
40		Grey, GRAVEL w/ sand and silt, loose, dry					
50		Grey, GRAVEL w/ sand and silt, loose, dry					
60		Note: larger gravel than above					
70		Light brown, (f.) SAND w/ silt and trace gravel, dense, moist					
80		Grey, (m.) SAND, w/ silt and gravel, dense, moist					
90		Grey, cemented GRAVEL, dense, dry					
100		Yellow, SILT w/ some angular gravel and m.-c. sand, dense, moist					
110		Black, Limestone bedrock					
120							
130							
140							
150							
160							
170							
180							
190							
200							
210							
220		End of Borehole				Casing height =	



Contractor: JR Drilling Central Ltd.

Operator(s): Jerry Oppen

Drill Method: Dual Air Rotary

Ground conditions: bare

Date: April 20, 2009

Time:

Temperature: 10 degC

Sheet: 1 of 1

Project No: 7130-010.01

Client: CSRD

Location: Golden, BC

Logged by/ Checked by: BRM/ MG

Test Hole / Borehole I.D.: TH-7 (6")

Well I.D.: MW-7, GP-7S, GP-7D (replaces TH3)

Location on site: Golden-Donald Upper Rd.

Northing/ Easting/ Elevation: 0

SUBSURFACE PROFILE			SAMPLE			Well Details	Well Completion Details / Remarks
Depth	Symbol	Description	Type	I.D.	Flag for analysis		
0		Ground Surface					
10		Yellow/ brown, SILT, loose, damp				<u>Configuration:</u> - One groundwater monitoring well (2" diameter) - Two gas monitoring probes (each 1" diameter) - Schedule 40 PVC - Gas probes are threaded 20/40 sand pack around each monitoring well <u>Screen Assembly:</u> - No. 10 slot PVC MW-7 -Screened in the surficial deposits (overburden) -Screened btw 25.6 m (84 ft) and 31.7 m (104 ft) bgs GP-7D -Screened btw 13.72 m (45 ft) and 15.24 m (50 ft) bgs GP-7S -Screened btw 4.5 m (15 ft) and 6.10 m (20 ft) bgs <u>Casing Height:</u> 1.2 m (3.9 ft)	
20		Grey, SILT and clay, dense, moist					
30		Grey, SILT, dense, moist					
40							
50		Light brown, SILT w/ (f.) sand and gravel, loose, moist, fining upwards					
60		Grey, cemented GRAVEL w/ sand and silt, dense, damp					
70		Grey, SILT trace sand, dense, moist					
80		Grey, GRAVEL w/ (m.) sand and silt, dense, moist					
90		Grey, (f.-m.) SAND w/ silt, dense, moist, coarsening upward					
100							
110		Grey, cemented GRAVEL, dense, dry					
120		Grey, (f.) angular GRAVEL w/ sand and silt, dense, dry,					
130							
140		End of Borehole					



Contractor: JR Drilling Central Ltd.

Operator(s): Jerry Oppen

Drill Method: Dual Air Rotary

Ground conditions: bare

Date: April 23, 2009

Time:

Temperature: 7 deg C

Sheet: 1 of 1

Project No: 2010-8835.010.006

Well I.D.: TH-8

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 915 m asl

Location: Golden Landfill

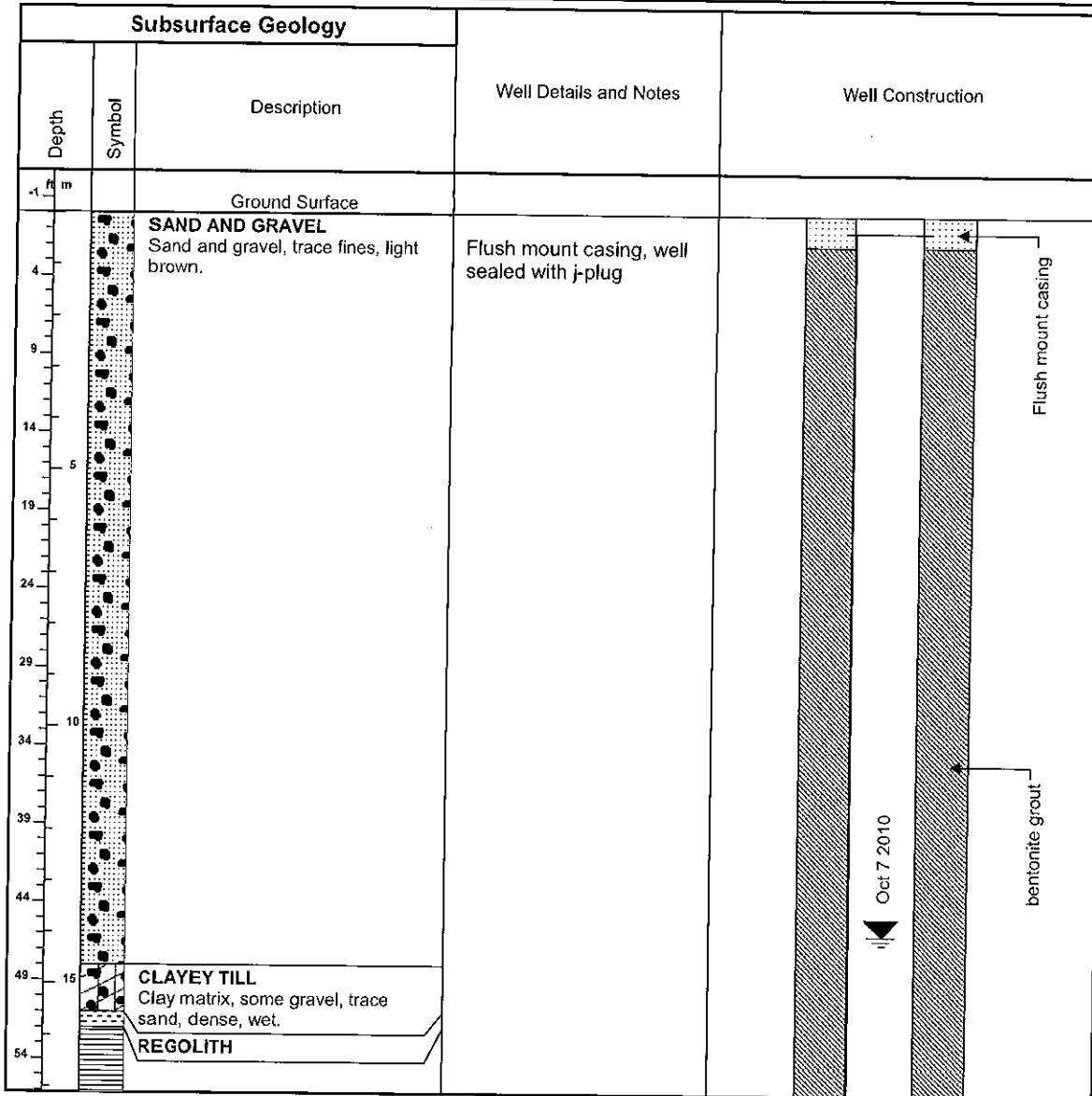
Stabilized Water Level: 14 m btoe

Top of Casing Elevation: flush mount

Location on site: 150 m NW of landfill on Golden Donald Upper Road

Reviewed by: Tilman Roschinski

Logged by: Bryer Marwell



Project No: 2010-8835.010.006

Well I.D.: TH-8

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 915 m asl

Location: Golden Landfill

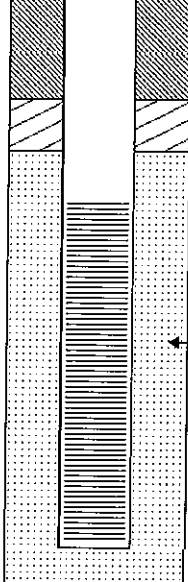
Stabilized Water Level: 14 m btoc

Top of Casing Elevation: flush mount

Location on site: 150 m NW of landfill on Golden Donald Upper Road

Reviewed by: Tilman Roschinski

Logged by: Bryer Manwell

Subsurface Geology			Well Details and Notes	Well Construction
Depth	Symbol	Description		
60		SLATE BEDROCK Slaty bedrock, in places phyllitic, grey, fractured, some fractures filled with clay.	1 m bentonite seal Screen depth: 67-87 ft (20.4 - 26.5 m) Screen details: -10 slot PVC, 2 inch diameter -10/20 sand pack	 Bentonite seal 10/20 sand
65		QUARTZ BEDROCK Quartz, likely a large vein. Fluid mixing with sedimentary deposits on either end.		
70		SLATE BEDROCK Slaty bedrock, as above.		
75		QUARTZ BEDROCK Quartz, as above.		
80		SLATE BEDROCK Slaty bedrock, as above		
85				
90		End of Borehole		
95				
100				
105				
110				

Contractor: Target Drilling Inc.

Operator(s):

Drill Method: Coring

Date: Oct 5-7 2010

Boring Diameter/ Depth: 6 in / 27.3 m

Sheet: 2 of 2

Project No: 2010-8835.010.006

Well I.D.: BH9

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 928 m asl

Location: Golden Landfill

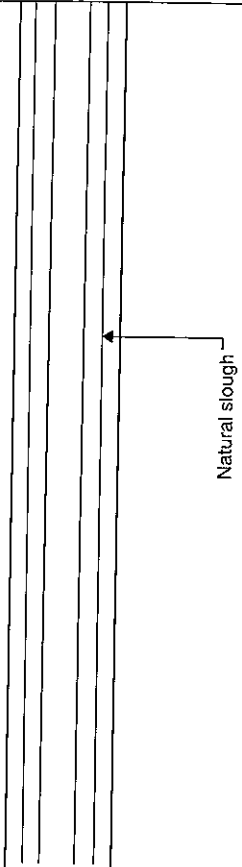
Stabilized Water Level: n/a

Top of Casing Elevation: 0

Location on site: 5 m SE of landfill

Reviewed by: Tilman Roschinski

Logged by: Bryer Manwell

Subsurface Geology			Well Details and Notes	Well Construction
Depth	Symbol	Description		
0 m		Ground Surface	No well installed.	
5		SILT Silt, occasional cobbles, dry to moist, yellowish-grey.		
10				
15				
20				
25				
30				
35				
40				
45				
50				
55		End of Borehole		

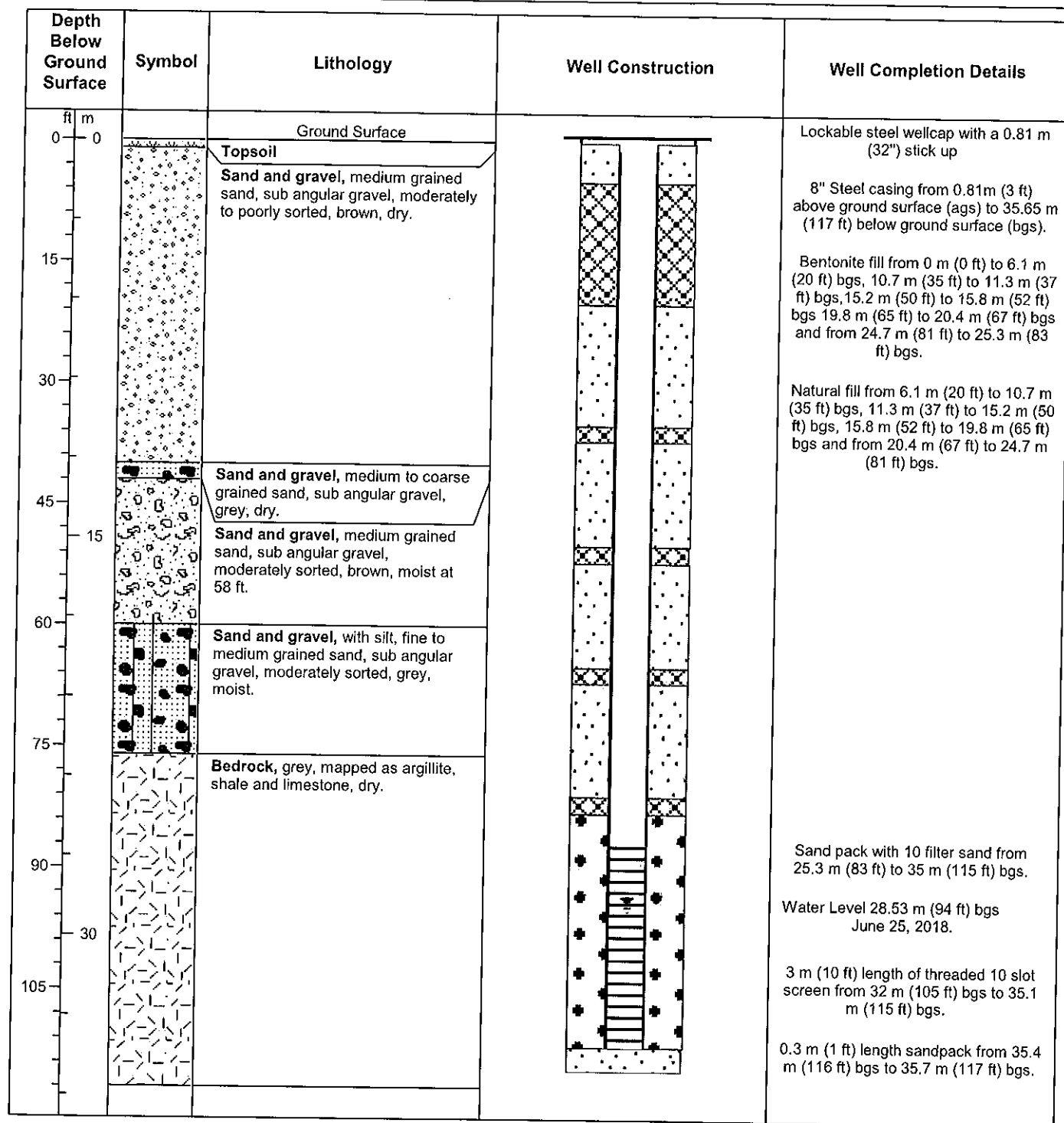
Monitoring Well ID: MW18-10

Project Number: 14-024-21

Client: CSRD

Project: Golden RDF Additional Drilling

Location: Golden, BC



Coordinates: 503411.92 m E 5684049.84 m N 11 U

Static Water Level: 28.53 m June 26, 2018

Ground Elevation: 919 m above sea level (asl)

Total Borehole Depth: 35.65 m (117 ft) bgs

Drawn By: RA

Checked By: BRM

Drilling Contractor: JR Drilling

Drilling Method: Dual Air Rotary

Date of Completion: June 25, 2018

Logged By: RA

Sheet: 1 of 1

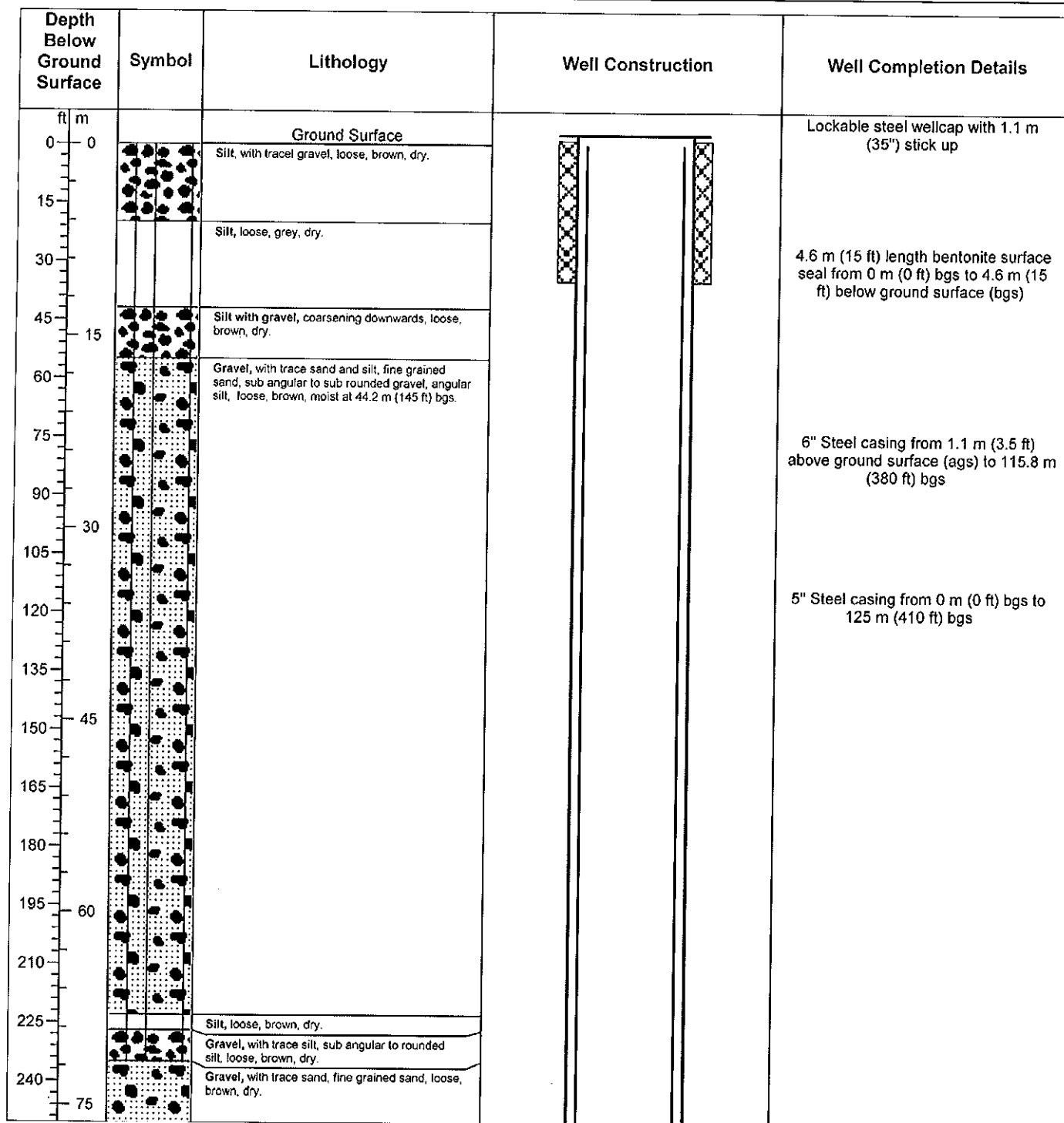
Monitoring Well ID: MW18-11

Project Number: 14-024-21

Client: CSRD

Project: Golden RDF

Location: Golden, BC



Coordinates: 503205.13 m E 5684006.34 m N 11 U
Static Water Level: 114 m (374 ft) December 6, 2018
Ground Elevation: 915 m above sea level (masl)
Total Borehole Depth: 115.8 m (380 ft)
Drawn By: RA

Checked By: BRM

Drilling Contractor: JR Drilling Kamloops
Drilling Method: Dual Air Rotary
Date of Completion: December 3 - 6, 2018

Logged By: RA/BRM**Sheet:** 1 of 2

Monitoring Well ID: MW18-11

Project Number: 14-024-21

Client: CSRD

Project: Golden RDF

Location: Golden, BC



Depth Below Ground Surface m	Symbol	Lithology	Well Construction	Well Completion Details
255		Silt and gravel, layered, loose, brown, dry		
270		Silt, fine grained, loose to compact, brown dry.		
285		Silt, with clay stringers, fine grained, loose to compact, dark grey, moist at 108.2 m (355 ft) bgs to 115.8 m (380 ft) bgs.		
300				
315				
330		Weathered Bedrock, gray, mapped as argillite shale and limestone, loose, dry		Static Water Level 114 m (374 ft) bgs - December 6, 2018
345				
360				
375		Bedrock, grey, mapped as argillite, shale and limestone, moist		4" PVC liner from 125 m (410 ft) bgs to 128 m (421 ft) bgs
390				
405		Depth of Well		4" PVC liner threaded from 127 m (416 ft) bgs to 128 m (421 ft) bgs - 1.5 m (5 ft)
420				
435				
450				
465				
480				
495				

Coordinates: 503205.13 m E 5684006.34 m N 11 U

Static Water Level: 114 m (374 ft) December 6, 2018

Ground Elevation: 915 m above sea level (masl)

Total Borehole Depth: 115.8 m (380 ft)

Drawn By: RA

Checked By: BRM

Drilling Contractor: JR Drilling Kamloops

Drilling Method: Dual Air Rotary

Date of Completion: December 3 - 6, 2018

Logged By: RA/BRM

Sheet: 2 of 2



Report 1 - Detailed Well Record

Well Tag Number: 99638	Construction Date: 2000-10-25 00:00:00.0		
Owner: KATS CONTRACTING	Driller: Owen's Drilling Ltd.		
Address: 532 HIETALA ROAD	Well Identification Plate Number:		
Area: GOLDEN	Plate Attached By:		
WELL LOCATION:	Where Plate Attached:		
KOOTENAY Land District	PRODUCTION DATA AT TIME OF DRILLING:		
District Lot: Plan: Lot:	Well Yield: 6 (Driller's Estimate) U.S. Gallons per Minute		
Township: 27 Section: 18 Range: 21	Development Method: Air lifting		
Indian Reserve: Meridian: W5M Block: A	Pump Test Info Flag: N		
Quarter:	Artesian Flow:		
Island:	Artesian Pressure (ft):		
BCGS Number (NAD 27): 082N036121 Well:	Static Level: 50 feet		
Class of Well: Water supply	WATER QUALITY:		
Subclass of Well: Domestic	Character:		
Orientation of Well: Vertical	Colour:		
Status of Well: New	Odour:		
Well Use: Private Domestic	Well Disinfected: N		
Observation Well Number:	EMS ID:		
Observation Well Status:	Water Chemistry Info Flag: N		
Construction Method:	Field Chemistry Info Flag:		
Diameter: inches	Site Info (SEAM):		
Casing drive shoe: Y N	Water Utility:		
Well Depth: 276 feet	Water Supply System Name:		
Elevation: feet (ASL)	Water Supply System Well Name:		
Final Casing Stick Up: 6 inches	SURFACE SEAL:		
Well Cap Type: PLASTIC CAP	Flag: N		
Bedrock Depth: 18 feet	Material:		
Lithology Info Flag: N	Method:		
File Info Flag: N	Depth (ft):		
Sieve Info Flag: N	Thickness (in):		
Screen Info Flag: N	Liner from To: feet		
Site Info Details:	WELL CLOSURE INFORMATION:		
Other Info Flag:	Reason For Closure:		
Other Info Details:	Method of Closure:		
	Closure Sealant Material:		
	Closure Backfill Material:		
	Details of Closure:		

Screen from	to feet	Type	Slot Size
Casing from	to feet	Diameter	Material
0	36	6	Steel
36	276	5.88	Open hole
			Drive Shoe
			Y
			N

GENERAL REMARKS:

260' OF PVC LINER. BOTTOM 40' PERFORATED. SHOE: 1X6" CARBIDE BOTTON. RECOMMENDED PUMP TYPE: SUB

LITHOLOGY INFORMATION:

From	0 to	18 Ft.	CLAY, GRAVEL, COBBLES
From	18 to	36 Ft.	BEDROCK, BROKEN
From	36 to	150 Ft.	2 Gallons per Minute (U.S./Imperial) bedrock
From	150 to	257 Ft.	2 Gallons per Minute (U.S./Imperial) bedrock
From	256 to	276 Ft.	1 Gallons per Minute (U.S./Imperial) bedrock

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The Province disclaims all responsibility for the accuracy of information provided. Information provided should not be used as a basis for making financial or any other commitments.

APPENDIX C 2019 GROUNDWATER LEVELS AND WATER QUALITY DATA

Notes:	<	Less than reported detection limit
	>	Greater than reported detection limit
	ND	Not detected
		Not guideline or standard
	+	Regional Background Concentration per ENR Technical Bulletin 8
		Standard for Inorganic Chromium
		Standard for Hexavalent Chromium
SGDW MAC		Standard for Inorganic Chromium
SGDW MAC		Guidelines for Canadian Drinking Water Quality - Aesthetic Guidelines
SGDW MAC		Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations
CR DW		BC Contaminated Sites Regulation, Schedule 3 - Domestic Waterworks Water Standards for Drinking Water
20		Highly Degraded Value Exceeds SGDW MAC
20		Highly Degraded Value Exceeds SGDW MAC
20		Highly Degraded Value Exceeds CR DW



APPENDIX D HISTORICAL WATER QUALITY DATA

Sampling Location	Date Sampled	Lab Sample ID	Sample Type	DMW-1	DMW-1	DMW-1	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DM
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[illegible]

	Sampling Location	Date Sampled	MW09-065	MW09-065	MW09-065	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW10-08	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01	MW15-01
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Sampling Location		Town Well #4	Town Well #4	Town Well #4	Town Well #4	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Town Well #5	Well ID 22653
Date Sampled		2017-11-20	2018-06-26	2018-09-11	2018-12-03	2013-08-02	2014-06-02	2014-08-18	2014-11-04	2015-05-25	2015-08-25	2015-11-09	2016-05-03	2016-08-22	2016-11-14	2017-04-05	2017-08-29	2017-11-20	2018-06-26	2018-12-04
Lab Sample ID		7111886-03	8062674-04	8090975-06	8120636-05	3081378-02	4060249-01	4081094-02	4110161-02	5051773-01	5081710-01	5110693-04	6050336-04	6081698-05	6111141-01	7040434-05	7090074-02	7111886-02	8062674-05	8120636-07
Sample Type		Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Analyte		Unit																		
Field Parameters																				
Depth to Water	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.82
Dissolved Oxygen	mg/L	-	-	5.59	5.67	-	8.14	7.68	7.38	6.4	7.04	6.51	5.61	6.13	5.71	-	9.27	9.21	-	2.87
Electrical Conductivity	µS/cm	1050	1055	1043	904	650	577	577	677	587	401	670	693	695	723	635	680	726	727	352
Oxidation reduction potential	mV	-	218	123	102	246	183	172	66	211	46	74	122	234	163	265	31	-	204	-
pH	pH Units	7.2	7.46	7.52	7.26	7.15	7.3	7.9	7.4	7.4	6.6	7.3	7.2	7.3	7.3	-	7.5	7.45	8.65	-
Temperature	°C	8.2	8.3	8.4	8.3	7.9	7.7	8.1	8.1	7.8	10.2	8.2	8.2	8.4	8	7.9	9.5	7.9	8.1	7.8
Anions																				
Chloride	mg/L	105	103	87.4	97	22.9	23.7	26.2	34.5	28.7	24.8	28.6	24.4	29.2	30.5	31	34.4	36.2	39.7	29.4
Fluoride	mg/L	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.18	<0.10	0.13
Nitrate (as N)	mg/L	1.61	1.26	1.76	1.6	0.781	0.839	0.993	1.23	0.89	1.01	0.925	0.978	1.03	0.976	1.09	1.11	1.3	0.933	<0.010
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate	mg/L	43.8	38.8	42.3	42.9	20.4	23.5	24.1	24.3	24.3	23.8	24.8	25.2	27.1	24.9	27.6	24.4	23	25.2	23.5
Dissolved Metals																				
Aluminum, dissolved	mg/L	-	0.0057	<0.0050	<0.0050	<0.0050	<0.005	<0.005	0.011	<0.005	-	-	-	<0.005	<0.005	-	<0.0050	-	0.0069	0.0068
Antimony, dissolved	mg/L	-	<0.00020	<0.00020	<0.00020	0.0005	0.0005	0.0003	0.0002	-	-	-	-	<0.0001	<0.0001	-	<0.00020	-	<0.00020	<0.00020
Arsenic, dissolved	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	<0.0005	<0.0005	-	<0.00050	-	<0.00050	<0.00050
Barium, dissolved	mg/L	-	0.196	0.219	0.214	0.133	0.126	0.136	0.146	-	-	-	-	0.169	0.155	-	0.133	-	0.133	0.0224
Beryllium, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	<0.0001	<0.0001	-	<0.00010	-	<0.00010	<0.00010
Bismuth, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	<0.0001	<0.0001	-	<0.00010	-	<0.00010	<0.00010
Boron, dissolved	mg/L	-	0.0335	0.0357	0.0293	0.05	0.015	0.012	0.006	-	-	-	-	0.014	0.007	-	0.143	-	0.017	0.0156
Cadmium, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	0.00002	<0.00001	0.00002	<0.00001	-	-	-	-	0.00002	<0.00001	-	<0.000010	-	<0.000010	<0.000010
Calcium, dissolved	mg/L	-	93.1	90.1	86.2	81.5	82.8	82.7	84.3	-	-	-	-	96.8	85.7	-	84.4	-	85.5	20.4
Chromium, dissolved	mg/L	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	<0.0005	<0.0005	-	<0.00050	-	<0.00050	<0.00050
Cobalt, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	<0.00005	<0.00005	0.00007	0.00006	-	-	-	-	0.00007	<0.00005	-	<0.00010	-	<0.00010	<0.00010
Copper, dissolved	mg/L	-	0.00099	0.00182	0.00065	0.0008	0.0013	0.0028	0.0024	-	-	-	-	0.0014	0.0008	-	0.00143	-	0.00106	<0.00040
Iron, dissolved	mg/L	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.013	-	-	-	-	0.012	<0.010	-	0.019	-	0.018	1.93
Lead, dissolved	mg/L	-	<0.00020	<0.00020	0.00025	<0.0001	<0.0001	0.0002	<0.0001	-	-	-	-	<0.0001	<0.0001	-	<0.00020	-	<0.00020	<0.00020
Lithium, dissolved	mg/L	-	0.00226	0.00212	0.00231	0.0013	0.0013	0.0014	0.0013	-	-	-	-	0.0012	0.0012	-	0.0014	-	0.00132	0.00204
Magnesium, dissolved	mg/L	-	42.6	42.3	44.1	28.1	28.5	28.7	27.1	-	-	-	-	33.6	28.8	-	28.2	-	27.7	26.2
Manganese, dissolved	mg/L	-	0.00162	<0.00020	0.00517	0.0009	0.0013	0.0082	0.0014	-	-	-	-	0.0011	0.0008	-	0.00294	-	0.00229	0.0986
Mercury, dissolved	mg/L	-	<0.000010	<0.000040	<0.000010	<0.00002	<0.00002	<0.00002	<0.00002	-	-	-	-	<0.00002	<0.00002	-	<0.000010	-	<0.000040	<0.000010
Molybdenum, dissolved	mg/L	-	0.00018	0.00021	0.00023	0.0003	0.0004	0.0004	0.0004	-	-	-	-	0.0003	0.0002	-	0.0003	-	0.00044	0.00025
Nickel, dissolved	mg/L	-	<0.00040	<0.00040	<0.00040	0.0003	<0.0002	0.0012	0.0004	-	-	-	-	0.0002	0.0003	-	<0.00040	-	<0.00040	<0.00040
Phosphorus, dissolved	mg/L	-	<0.050	<0.050	<0.050	<0.02	<0.02	0.07	<0.02	-	-	-	-	<0.02	<0.02	-	<0.050	-	<0.050	<0.050
Potassium, dissolved	mg/L	-	1.95	1.77	2.12	1	0.89	0.95	0.94	-	-	-	-	1.1	0.99	-	0.89	-	1.01	0.95
Selenium, dissolved	mg/L	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	<0.0005	<0.0005	-	<0.00050	-	<0.00050	<0.00050
Silicon, dissolved	mg/L	-	4.9	4.6	4.9	4.1	4	4.4	4.5	-	-	-	-	4.2	4.5	-	4	-	4.3	<1.0
Silver, dissolved	mg/L	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-	<0.00005	<0.00005	-	<0.000050	-	<0.000050	<0.000050
Sodium, dissolved	mg/L	-	57.8	56.9	58.5	15.2	13.9	15.4	17.9	-	-	-	-	17.9	16.7	-	17	-	20.3	14.7
Strontium, dissolved	mg/L	-	0.492	0.46	0.471	0.282	0.269	0.301	0.29	-	-	-	-	0.344	0.312	-	0.258	-	0.281	0.115
Sulfur, dissolved	mg/L	-	16.1	14.3	15	8	10	8	7	-	-	-	-	13	9	-	7.8	-	9.8	7.1
Tellurium, dissolved	mg/L	-	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.0002	<0.0002	-	<0.00050	-	<0.00050	<0.00050
Thallium, dissolved	mg/L	-	<0.000020	<0.000020	<0.000020	<0.00002	<0.00002	<0.00002	<0.00002	-	-	-	-	<0.00002	<0.00002	-	<0.000020	-	<0.000020	<0.000020
Thorium, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	-	<0.00010	-	<0.00010	<0.00010
Tin, dissolved	mg/L	-	<0.00030	<0.00030	0.00022	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.0002	<0.0002	-	<0.00030	-	<0.00030	0.00077
Titanium, dissolved	mg/L	-	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	-	-	-	-	<0.005	<0.005	-	<0.0050	-	<0.0050	<0.0050
Tungsten, dissolved	mg/L	-	<0.0010	<0.0010	<0.0010	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010
Uranium, dissolved	mg/L	-	0.00117	0.00132	0.00133	0.00105	0.00103	0.00114	0.00114	-	-	-	-	0.00117	0.00106	-	0.00109	-	0.001	<0.00020
Vanadium, dissolved	mg/L	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	-	-	-	-	<0.001	<0.001	-	<0.0010	-	<0.0010	<0.0010
Zinc, dissolved	mg/L	-	0.0062	<0.0040	0.0063	<0.004	<0.004	0.01	0.005	-	-	-	-	<0.004	<0.004	-	0.01	-	0.0052	0.0043
Zirconium, dissolved	mg/L	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	-	<0.00010	-	<0.00010	<0.00010
General Parameters																				
Alkalinity, Bicarbonate (as CaCO3)	mg/L	361	336	378	355	-	-	-	-	-	-	-	292	296	308	314	288	304	288	142
Alkalinity, Carbonate (as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	<1.0	<1.0	<1.0	&															

APPENDIX E LABORATORY CERTIFICATE OF ANALYSIS

CERTIFICATE OF ANALYSIS

REPORTED TO Ecoscape Environmental Ltd.
#102 - 450 Neave Court
Kelowna, BC V1V 2M2

ATTENTION Kelsey Tanaka

PO NUMBER 19-2850

PROJECT 19-2850 - Golden

PROJECT INFO Golden

WORK ORDER 9052874

RECEIVED / TEMP 2019-05-30 15:55 / 6°C

REPORTED 2019-06-07 12:08

COC NUMBER No Number

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.

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

Authorized By:

Eilish St.Clair, B.Sc., C.I.T.
Client Service Representative

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#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (9052874-01) Matrix: Water Sampled: 2019-05-29 10:45					
Anions					
Chloride	398	0.10	mg/L	2019-06-02	
Fluoride	0.15	0.10	mg/L	2019-06-01	
Nitrate (as N)	33.8	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	677	1.0	mg/L	2019-06-02	
Calculated Parameters					
Hardness, Total (as CaCO3)	1560	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	0.00042	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.0515	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	1.80	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	170	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00093	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00163	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00252	0.00040	mg/L	2019-06-06	
Iron, dissolved	< 0.010	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0448	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	276	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.0826	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00036	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.0116	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	172	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	11.3	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	294	0.10	mg/L	2019-06-06	
Strontium, dissolved	1.70	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	263	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	0.000061	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	0.00028	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (9052874-01) Matrix: Water Sampled: 2019-05-29 10:45, Continued					
Dissolved Metals, Continued					
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00748	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0048	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	0.00014	0.00010	mg/L	2019-06-06	
General Parameters					
Alkalinity, Total (as CaCO ₃)	963	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	963	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	1180	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.42	0.020	mg/L	2019-06-03	
Conductivity (EC)	3990	2.0	µS/cm	2019-06-04	
pH	7.61	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	282	2.0	mg/L	2019-06-03	
Turbidity	203	0.10	NTU	2019-06-01	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (9052874-01) Matrix: Water Sampled: 2019-05-29 10:45, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	103	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	93	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	85	70-130	%	2019-06-06	

MW10-08 (9052874-02) | Matrix: Water | Sampled: 2019-05-29 14:10

Anions

Chloride	605	0.10	mg/L	2019-06-02	
Fluoride	0.29	0.10	mg/L	2019-06-01	
Nitrate (as N)	0.942	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	47.5	1.0	mg/L	2019-06-01	

Calculated Parameters

Hardness, Total (as CaCO3)	712	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	0.00215	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.190	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.0476	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	94.8	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00104	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00092	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00076	0.00040	mg/L	2019-06-06	
Iron, dissolved	0.013	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW10-08 (9052874-02) | Matrix: Water | Sampled: 2019-05-29 14:10, Continued

Dissolved Metals, Continued

Lithium, dissolved	0.0210	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	115	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.0174	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00053	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.00309	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	5.65	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	8.6	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	310	0.10	mg/L	2019-06-06	
Strontium, dissolved	1.29	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	17.1	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	0.0043	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00230	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	

General Parameters

Alkalinity, Total (as CaCO ₃)	544	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	544	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	663	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.116	0.020	mg/L	2019-06-03	
Conductivity (EC)	2670	2.0	µS/cm	2019-06-04	
pH	8.04	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	361	2.0	mg/L	2019-06-03	
Turbidity	294	0.10	NTU	2019-06-01	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW10-08 (9052874-02) Matrix: Water Sampled: 2019-05-29 14:10, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	97	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	87	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	81	70-130	%	2019-06-06	

MW18-10 (9052874-03) | Matrix: Water | Sampled: 2019-05-29 11:55

Anions

Chloride	299	0.10	mg/L	2019-06-02	
Fluoride	0.14	0.10	mg/L	2019-06-01	
Nitrate (as N)	21.0	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (9052874-03) Matrix: Water Sampled: 2019-05-29 11:55, Continued					
<i>Anions, Continued</i>					
Sulfate	76.9	1.0	mg/L	2019-06-01	
<i>Calculated Parameters</i>					
Hardness, Total (as CaCO ₃)	1030	0.500	mg/L	N/A	
<i>Dissolved Metals</i>					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	0.00030	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	0.00164	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.303	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.418	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	0.000036	0.000010	mg/L	2019-06-06	
Calcium, dissolved	94.5	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00106	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00565	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00190	0.00040	mg/L	2019-06-06	
Iron, dissolved	< 0.010	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0239	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	193	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.231	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00152	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.0442	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	20.3	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	9.5	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	182	0.10	mg/L	2019-06-06	
Strontium, dissolved	1.44	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	29.0	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	0.000099	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00432	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0210	0.0040	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (9052874-03) Matrix: Water Sampled: 2019-05-29 11:55, Continued					
<i>Dissolved Metals, Continued</i>					
Zirconium, dissolved	0.00027	0.00010	mg/L	2019-06-06	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	810	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	810	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	988	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.54	0.020	mg/L	2019-06-03	
Conductivity (EC)	2590	2.0	µS/cm	2019-06-04	
pH	8.11	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	14100	2.0	mg/L	2019-06-03	
Turbidity	>4000	0.10	NTU	2019-06-01	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (9052874-03) Matrix: Water Sampled: 2019-05-29 11:55, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	94	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	81	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	74	70-130	%	2019-06-06	

MW18-11 (9052874-04) | Matrix: Water | Sampled: 2019-05-29 14:40

Anions

Chloride	60.9	0.10	mg/L	2019-06-02	
Fluoride	0.31	0.10	mg/L	2019-06-01	RA5
Nitrate (as N)	0.023	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	72.3	1.0	mg/L	2019-06-01	

Calculated Parameters

Hardness, Total (as CaCO3)	477	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	0.0060	0.0050	mg/L	2019-06-06	
Antimony, dissolved	0.00570	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	0.00373	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.0424	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.153	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	46.1	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00266	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00076	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00044	0.00040	mg/L	2019-06-06	
Iron, dissolved	0.115	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0201	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	87.9	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.106	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-11 (9052874-04) | Matrix: Water | Sampled: 2019-05-29 14:40, Continued

Dissolved Metals, Continued

Molybdenum, dissolved	0.00762	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.0301	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	5.39	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	2.4	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	81.1	0.10	mg/L	2019-06-06	
Strontium, dissolved	0.632	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	27.5	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	0.00022	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.000262	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	

General Parameters

Alkalinity, Total (as CaCO ₃)	431	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	431	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	526	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.607	0.020	mg/L	2019-06-03	
Conductivity (EC)	992	2.0	µS/cm	2019-06-04	
pH	8.18	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	32.8	2.0	mg/L	2019-06-03	
Turbidity	35.8	0.10	NTU	2019-06-01	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-11 (9052874-04) Matrix: Water Sampled: 2019-05-29 14:40, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	150	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	104	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	96	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	83	70-130	%	2019-06-06	

Town Well #4 (9052874-05) | Matrix: Water | Sampled: 2019-05-29 12:25

Anions

Chloride	97.9	0.10	mg/L	2019-06-02	
Fluoride	< 0.10	0.10	mg/L	2019-06-01	
Nitrate (as N)	1.72	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	43.5	1.0	mg/L	2019-06-01	

Calculated Parameters

Hardness, Total (as CaCO3)	406	0.500	mg/L	N/A	
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TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (9052874-05) Matrix: Water Sampled: 2019-05-29 12:25, Continued					
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.217	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.0221	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	93.4	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00085	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00984	0.00040	mg/L	2019-06-06	
Iron, dissolved	< 0.010	0.010	mg/L	2019-06-06	
Lead, dissolved	0.00066	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.00228	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	41.9	0.010	mg/L	2019-06-06	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00021	0.00010	mg/L	2019-06-06	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	1.78	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	4.4	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	56.9	0.10	mg/L	2019-06-06	
Strontium, dissolved	0.459	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	15.7	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00128	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0265	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	

General Parameters

Alkalinity, Total (as CaCO3)	357	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO3)	357	1.0	mg/L	2019-06-04	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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Town Well #4 (9052874-05) | Matrix: Water | Sampled: 2019-05-29 12:25, Continued

General Parameters, Continued

Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	435	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.063	0.020	mg/L	2019-06-03	
Conductivity (EC)	973	2.0	µS/cm	2019-06-04	
pH	7.99	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-06-03	
Turbidity	0.19	0.10	NTU	2019-06-01	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (9052874-05) Matrix: Water Sampled: 2019-05-29 12:25, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	95	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	87	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	77	70-130	%	2019-06-06	

Town Well #6 (9052874-06) | Matrix: Water | Sampled: 2019-05-29 12:40

Anions

Chloride	41.0	0.10	mg/L	2019-06-02	
Fluoride	< 0.10	0.10	mg/L	2019-06-01	
Nitrate (as N)	1.28	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	30.8	1.0	mg/L	2019-06-01	

Calculated Parameters

Hardness, Total (as CaCO3)	378	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.165	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.0099	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	99.2	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00090	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00231	0.00040	mg/L	2019-06-06	
Iron, dissolved	0.016	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.00160	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	31.6	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.00175	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00036	0.00010	mg/L	2019-06-06	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	1.02	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	4.4	1.0	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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Town Well #6 (9052874-06) | Matrix: Water | Sampled: 2019-05-29 12:40, Continued

Dissolved Metals, Continued

Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	23.1	0.10	mg/L	2019-06-06	
Strontium, dissolved	0.328	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	12.0	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00130	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0055	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	

General Parameters

Alkalinity, Total (as CaCO ₃)	331	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	331	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	404	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.089	0.020	mg/L	2019-06-03	
Conductivity (EC)	739	2.0	µS/cm	2019-06-04	
pH	8.02	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	4.8	2.0	mg/L	2019-06-03	
Turbidity	3.63	0.10	NTU	2019-06-01	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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Town Well #6 (9052874-06) | Matrix: Water | Sampled: 2019-05-29 12:40, Continued

Volatile Organic Compounds (VOC), Continued

1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	95	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	89	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	81	70-130	%	2019-06-06	

DMW-1b (9052874-07) | Matrix: Water | Sampled: 2019-05-29 15:35

Anions

Chloride	11.3	0.10	mg/L	2019-06-01	
Fluoride	0.83	0.10	mg/L	2019-06-01	
Nitrate (as N)	0.522	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	246	1.0	mg/L	2019-06-02	

Calculated Parameters

Hardness, Total (as CaCO3)	571	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	0.0141	0.0050	mg/L	2019-06-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	0.00107	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.0167	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-1b (9052874-07) Matrix: Water Sampled: 2019-05-29 15:35, Continued					
<i>Dissolved Metals, Continued</i>					
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.321	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	0.000011	0.000010	mg/L	2019-06-06	
Calcium, dissolved	75.7	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00108	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00108	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00600	0.00040	mg/L	2019-06-06	
Iron, dissolved	0.122	0.010	mg/L	2019-06-06	
Lead, dissolved	0.00030	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0455	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	92.7	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.00366	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00082	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.00205	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	7.19	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	6.3	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	39.4	0.10	mg/L	2019-06-06	
Strontium, dissolved	4.26	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	82.7	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00141	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0370	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	0.00050	0.00010	mg/L	2019-06-06	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	435	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	435	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	531	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-1b (9052874-07) Matrix: Water Sampled: 2019-05-29 15:35, Continued					
General Parameters, Continued					
Ammonia, Total (as N)	0.531	0.020	mg/L	2019-06-03	
Conductivity (EC)	1150	2.0	µS/cm	2019-06-04	
pH	7.96	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-06-03	
Turbidity	0.27	0.10	NTU	2019-06-01	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	102	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	92	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	82	70-130	%	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
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DMW-4 (9052874-08) | Matrix: Water | Sampled: 2019-05-29 15:20

Anions

Chloride	49.5	0.10	mg/L	2019-06-02	
Fluoride	1.64	0.10	mg/L	2019-06-01	
Nitrate (as N)	< 0.010	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	126	1.0	mg/L	2019-06-02	

Calculated Parameters

Hardness, Total (as CaCO3)	612	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	0.0633	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.0242	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	0.00011	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	0.130	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	70.7	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00088	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00029	0.00010	mg/L	2019-06-06	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-06-06	
Iron, dissolved	0.672	0.010	mg/L	2019-06-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0269	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	106	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.00864	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00037	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.00220	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	4.62	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	7.3	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	28.4	0.10	mg/L	2019-06-06	
Strontium, dissolved	1.73	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	43.4	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (9052874-08) Matrix: Water Sampled: 2019-05-29 15:20, Continued					
<i>Dissolved Metals, Continued</i>					
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.000111	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0101	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	0.00153	0.00010	mg/L	2019-06-06	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	504	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	504	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	615	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.285	0.020	mg/L	2019-06-03	
Conductivity (EC)	1160	2.0	µS/cm	2019-06-04	
pH	7.99	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-06-03	
Turbidity	6.97	0.10	NTU	2019-06-01	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-06-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (9052874-08) Matrix: Water Sampled: 2019-05-29 15:20, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	99	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	86	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	73	70-130	%	2019-06-06	

DUP A (9052874-09) | Matrix: Water | Sampled: 2019-05-29 10:45

Anions

Chloride	397	0.10	mg/L	2019-06-02	
Fluoride	0.15	0.10	mg/L	2019-06-01	
Nitrate (as N)	36.9	0.010	mg/L	2019-06-01	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-06-01	
Sulfate	721	1.0	mg/L	2019-06-02	

Calculated Parameters

Hardness, Total (as CaCO3)	1560	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Antimony, dissolved	0.00044	0.00020	mg/L	2019-06-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Barium, dissolved	0.0512	0.0050	mg/L	2019-06-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Boron, dissolved	1.84	0.0050	mg/L	2019-06-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-06-06	
Calcium, dissolved	170	0.20	mg/L	2019-06-06	
Chromium, dissolved	0.00105	0.00050	mg/L	2019-06-06	
Cobalt, dissolved	0.00167	0.00010	mg/L	2019-06-06	
Copper, dissolved	0.00247	0.00040	mg/L	2019-06-06	
Iron, dissolved	< 0.010	0.010	mg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL	Units	Analyzed	Qualifier
DUP A (9052874-09) Matrix: Water Sampled: 2019-05-29 10:45, Continued					
<i>Dissolved Metals, Continued</i>					
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-06-06	
Lithium, dissolved	0.0458	0.00010	mg/L	2019-06-06	
Magnesium, dissolved	275	0.010	mg/L	2019-06-06	
Manganese, dissolved	0.0792	0.00020	mg/L	2019-06-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-06-05	
Molybdenum, dissolved	0.00031	0.00010	mg/L	2019-06-06	
Nickel, dissolved	0.0114	0.00040	mg/L	2019-06-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-06-06	
Potassium, dissolved	171	0.10	mg/L	2019-06-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Silicon, dissolved	11.3	1.0	mg/L	2019-06-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-06-06	
Sodium, dissolved	294	0.10	mg/L	2019-06-06	
Strontium, dissolved	1.69	0.0010	mg/L	2019-06-06	
Sulfur, dissolved	259	3.0	mg/L	2019-06-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-06-06	
Thallium, dissolved	0.000056	0.000020	mg/L	2019-06-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-06-06	
Tin, dissolved	0.00025	0.00020	mg/L	2019-06-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-06-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Uranium, dissolved	0.00771	0.000020	mg/L	2019-06-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-06-06	
Zinc, dissolved	0.0047	0.0040	mg/L	2019-06-06	
Zirconium, dissolved	0.00015	0.00010	mg/L	2019-06-06	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	970	1.0	mg/L	2019-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	970	1.0	mg/L	2019-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-06-04	
Bicarbonate (HCO ₃)	1180	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.06	0.020	mg/L	2019-06-03	
Conductivity (EC)	4130	2.0	µS/cm	2019-06-04	
pH	7.61	0.10	pH units	2019-06-04	HT2
Solids, Total Suspended	324	2.0	mg/L	2019-06-03	
Turbidity	222	0.10	NTU	2019-06-01	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-06-06	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
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Analyte	Result	RL	Units	Analyzed	Qualifier
DUP A (9052874-09) Matrix: Water Sampled: 2019-05-29 10:45, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Bromodichloromethane	< 1.0	1.0	µg/L	2019-06-06	
Bromoform	< 1.0	1.0	µg/L	2019-06-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-06-06	
Chlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
Chloroethane	< 2.0	2.0	µg/L	2019-06-06	
Chloroform	< 1.0	1.0	µg/L	2019-06-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-06-06	
Dibromomethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-06-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Dichloromethane	< 3.0	3.0	µg/L	2019-06-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-06-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-06-06	
Ethylbenzene	< 1.0	1.0	µg/L	2019-06-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-06-06	
Styrene	< 1.0	1.0	µg/L	2019-06-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-06-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Toluene	< 1.0	1.0	µg/L	2019-06-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-06-06	
Trichloroethylene	< 1.0	1.0	µg/L	2019-06-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-06-06	
Vinyl chloride	< 1.0	1.0	µg/L	2019-06-06	
Xylenes (total)	< 2.0	2.0	µg/L	2019-06-06	
Surrogate: Toluene-d8	93	70-130	%	2019-06-06	
Surrogate: 4-Bromofluorobenzene	85	70-130	%	2019-06-06	
Surrogate: 1,4-Dichlorobenzene-d4	77	70-130	%	2019-06-06	

Sample Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

RA5 Due to matrix interference, the sample cannot be accurately quantified. Result is Semi-Quantitative.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H ₂ SO ₄	Kelowna
Ammonia, Total in Water	SM 4500-NH ₃ G* (2017)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	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*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Turbidity in Water	SM 2130 B (2017)	Nephelometry	Kelowna
Volatile Organic Compounds in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	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
>4	Greater than the specified Result
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, pH > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

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: estclair@caro.ca

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Ecoscape Environmental Ltd.
PROJECT 19-2850 - Golden

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REPORTED 2019-06-07 12:08

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
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Anions, Batch B9E2582

Blank (B9E2582-BLK1)			Prepared: 2019-06-01, Analyzed: 2019-06-01						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9E2582-BLK2)			Prepared: 2019-06-01, Analyzed: 2019-06-01						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9E2582-BS1)			Prepared: 2019-06-01, Analyzed: 2019-06-01						
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.01	0.10 mg/L	4.00		100	88-108			
Nitrate (as N)	4.03	0.010 mg/L	4.00		101	90-110			
Nitrite (as N)	1.97	0.010 mg/L	2.00		99	85-115			
Sulfate	16.1	1.0 mg/L	16.0		100	90-110			
LCS (B9E2582-BS2)			Prepared: 2019-06-01, Analyzed: 2019-06-01						
Chloride	15.9	0.10 mg/L	16.0		100	90-110			
Fluoride	4.01	0.10 mg/L	4.00		100	88-108			
Nitrate (as N)	3.92	0.010 mg/L	4.00		98	90-110			
Nitrite (as N)	1.88	0.010 mg/L	2.00		94	85-115			
Sulfate	16.0	1.0 mg/L	16.0		100	90-110			

Dissolved Metals, Batch B9F0345

Blank (B9F0345-BLK1)			Prepared: 2019-06-05, Analyzed: 2019-06-05						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Reference (B9F0345-SRM1)			Prepared: 2019-06-05, Analyzed: 2019-06-05						
Mercury, dissolved	0.00421	0.000010 mg/L	0.00489		86	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9F0349									
Blank (B9F0349-BLK1)				Prepared: 2019-06-06, Analyzed: 2019-06-06					
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							
Lithium, dissolved	< 0.00010	0.00010 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							

Blank (B9F0349-BLK2)				Prepared: 2019-06-06, Analyzed: 2019-06-06					
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							
Lithium, dissolved	< 0.00010	0.00010 mg/L							
Magnesium, dissolved	< 0.010	0.010 mg/L							
Manganese, dissolved	< 0.00020	0.00020 mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9F0349, Continued									
Blank (B9F0349-BLK2), Continued				Prepared: 2019-06-06, Analyzed: 2019-06-06					
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							
Blank (B9F0349-BLK3)				Prepared: 2019-06-06, Analyzed: 2019-06-06					
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							
Lithium, dissolved	< 0.00010	0.00010 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							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9F0349, Continued									
Blank (B9F0349-BLK3), Continued					Prepared: 2019-06-06, Analyzed: 2019-06-06				
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 (B9F0349-BS1)					Prepared: 2019-06-06, Analyzed: 2019-06-06				
Aluminum, dissolved	0.0238	0.0050 mg/L	0.0200		119	80-120			
Antimony, dissolved	0.0208	0.00020 mg/L	0.0200		104	80-120			
Arsenic, dissolved	0.0195	0.00050 mg/L	0.0200		97	80-120			
Barium, dissolved	0.0197	0.0050 mg/L	0.0200		99	80-120			
Beryllium, dissolved	0.0210	0.00010 mg/L	0.0200		105	80-120			
Bismuth, dissolved	0.0210	0.00010 mg/L	0.0200		105	80-120			
Boron, dissolved	0.0213	0.0050 mg/L	0.0200		107	80-120			
Cadmium, dissolved	0.0201	0.000010 mg/L	0.0200		100	80-120			
Calcium, dissolved	2.16	0.20 mg/L	2.00		108	80-120			
Chromium, dissolved	0.0193	0.00050 mg/L	0.0200		96	80-120			
Cobalt, dissolved	0.0197	0.00010 mg/L	0.0200		98	80-120			
Copper, dissolved	0.0205	0.00040 mg/L	0.0200		103	80-120			
Iron, dissolved	1.88	0.010 mg/L	2.00		94	80-120			
Lead, dissolved	0.0211	0.00020 mg/L	0.0200		106	80-120			
Lithium, dissolved	0.0221	0.00010 mg/L	0.0200		110	80-120			
Magnesium, dissolved	2.00	0.010 mg/L	2.00		100	80-120			
Manganese, dissolved	0.0197	0.00020 mg/L	0.0200		99	80-120			
Molybdenum, dissolved	0.0193	0.00010 mg/L	0.0200		97	80-120			
Nickel, dissolved	0.0198	0.00040 mg/L	0.0200		99	80-120			
Phosphorus, dissolved	1.99	0.050 mg/L	2.00		99	80-120			
Potassium, dissolved	1.87	0.10 mg/L	2.00		94	80-120			
Selenium, dissolved	0.0216	0.00050 mg/L	0.0200		108	80-120			
Silicon, dissolved	1.6	1.0 mg/L	2.00		81	80-120			
Silver, dissolved	0.0211	0.000050 mg/L	0.0200		105	80-120			
Sodium, dissolved	2.04	0.10 mg/L	2.00		102	80-120			
Strontium, dissolved	0.0192	0.0010 mg/L	0.0200		96	80-120			
Sulfur, dissolved	4.6	3.0 mg/L	5.00		91	80-120			
Tellurium, dissolved	0.0226	0.00050 mg/L	0.0200		113	80-120			
Thallium, dissolved	0.0210	0.000020 mg/L	0.0200		105	80-120			
Thorium, dissolved	0.0202	0.00010 mg/L	0.0200		101	80-120			
Tin, dissolved	0.0205	0.00020 mg/L	0.0200		102	80-120			
Titanium, dissolved	0.0192	0.0050 mg/L	0.0200		96	80-120			
Tungsten, dissolved	0.0203	0.0010 mg/L	0.0200		101	80-120			
Uranium, dissolved	0.0221	0.000020 mg/L	0.0200		110	80-120			
Vanadium, dissolved	0.0190	0.0010 mg/L	0.0200		95	80-120			
Zinc, dissolved	0.0214	0.0040 mg/L	0.0200		107	80-120			
Zirconium, dissolved	0.0215	0.00010 mg/L	0.0200		107	80-120			
LCS (B9F0349-BS2)					Prepared: 2019-06-06, Analyzed: 2019-06-06				
Aluminum, dissolved	0.0223	0.0050 mg/L	0.0200		111	80-120			
Antimony, dissolved	0.0210	0.00020 mg/L	0.0200		105	80-120			
Arsenic, dissolved	0.0197	0.00050 mg/L	0.0200		99	80-120			
Barium, dissolved	0.0197	0.0050 mg/L	0.0200		99	80-120			
Beryllium, dissolved	0.0214	0.00010 mg/L	0.0200		107	80-120			
Bismuth, dissolved	0.0214	0.00010 mg/L	0.0200		107	80-120			
Boron, dissolved	0.0201	0.0050 mg/L	0.0200		101	80-120			
Cadmium, dissolved	0.0203	0.000010 mg/L	0.0200		102	80-120			
Calcium, dissolved	2.08	0.20 mg/L	2.00		104	80-120			
Chromium, dissolved	0.0195	0.00050 mg/L	0.0200		98	80-120			
Cobalt, dissolved	0.0199	0.00010 mg/L	0.0200		99	80-120			
Copper, dissolved	0.0207	0.00040 mg/L	0.0200		104	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9F0349, Continued									
LCS (B9F0349-BS2), Continued				Prepared: 2019-06-06, Analyzed: 2019-06-06					
Iron, dissolved	1.90	0.010 mg/L	2.00		95	80-120			
Lead, dissolved	0.0214	0.00020 mg/L	0.0200		107	80-120			
Lithium, dissolved	0.0222	0.00010 mg/L	0.0200		111	80-120			
Magnesium, dissolved	2.03	0.010 mg/L	2.00		102	80-120			
Manganese, dissolved	0.0201	0.00020 mg/L	0.0200		101	80-120			
Molybdenum, dissolved	0.0196	0.00010 mg/L	0.0200		98	80-120			
Nickel, dissolved	0.0200	0.00040 mg/L	0.0200		100	80-120			
Phosphorus, dissolved	2.03	0.050 mg/L	2.00		102	80-120			
Potassium, dissolved	1.92	0.10 mg/L	2.00		96	80-120			
Selenium, dissolved	0.0215	0.00050 mg/L	0.0200		107	80-120			
Silicon, dissolved	1.7	1.0 mg/L	2.00		85	80-120			
Silver, dissolved	0.0211	0.000050 mg/L	0.0200		105	80-120			
Sodium, dissolved	2.06	0.10 mg/L	2.00		103	80-120			
Strontium, dissolved	0.0196	0.0010 mg/L	0.0200		98	80-120			
Sulfur, dissolved	4.8	3.0 mg/L	5.00		96	80-120			
Tellurium, dissolved	0.0232	0.00050 mg/L	0.0200		116	80-120			
Thallium, dissolved	0.0214	0.000020 mg/L	0.0200		107	80-120			
Thorium, dissolved	0.0206	0.00010 mg/L	0.0200		103	80-120			
Tin, dissolved	0.0208	0.00020 mg/L	0.0200		104	80-120			
Titanium, dissolved	0.0193	0.0050 mg/L	0.0200		97	80-120			
Tungsten, dissolved	0.0203	0.0010 mg/L	0.0200		101	80-120			
Uranium, dissolved	0.0224	0.000020 mg/L	0.0200		112	80-120			
Vanadium, dissolved	0.0192	0.0010 mg/L	0.0200		96	80-120			
Zinc, dissolved	0.0208	0.0040 mg/L	0.0200		104	80-120			
Zirconium, dissolved	0.0216	0.00010 mg/L	0.0200		108	80-120			
Duplicate (B9F0349-DUP2)				Source: 9052874-06	Prepared: 2019-06-06, Analyzed: 2019-06-06				
Aluminum, dissolved	< 0.0050	0.0050 mg/L		< 0.0050				11	
Antimony, dissolved	< 0.00020	0.00020 mg/L		< 0.00020				20	
Arsenic, dissolved	< 0.00050	0.00050 mg/L		< 0.00050				8	
Barium, dissolved	0.162	0.0050 mg/L		0.165			2	7	
Beryllium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				14	
Bismuth, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Boron, dissolved	0.0089	0.0050 mg/L		0.0099				13	
Cadmium, dissolved	< 0.000010	0.000010 mg/L		< 0.000010				20	
Calcium, dissolved	95.4	0.20 mg/L		99.2			4	8	
Chromium, dissolved	0.00088	0.00050 mg/L		0.00090				14	
Cobalt, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				10	
Copper, dissolved	0.0116	0.00040 mg/L		0.00231			134	20	RPD
Iron, dissolved	< 0.010	0.010 mg/L		0.016				14	
Lead, dissolved	0.00026	0.00020 mg/L		< 0.00020				20	
Lithium, dissolved	0.00155	0.00010 mg/L		0.00160			3	14	
Magnesium, dissolved	30.1	0.010 mg/L		31.6			5	6	
Manganese, dissolved	0.00154	0.00020 mg/L		0.00175			13	9	RPD
Molybdenum, dissolved	0.00033	0.00010 mg/L		0.00036				19	
Nickel, dissolved	0.00043	0.00040 mg/L		< 0.00040				20	
Phosphorus, dissolved	< 0.050	0.050 mg/L		< 0.050				14	
Potassium, dissolved	0.98	0.10 mg/L		1.02			5	8	
Selenium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050				20	
Silicon, dissolved	4.2	1.0 mg/L		4.4				12	
Silver, dissolved	< 0.000050	0.000050 mg/L		< 0.000050				20	
Sodium, dissolved	22.1	0.10 mg/L		23.1			4	6	
Strontium, dissolved	0.321	0.0010 mg/L		0.328			2	6	
Sulfur, dissolved	10.9	3.0 mg/L		12.0				20	
Tellurium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050				20	
Thallium, dissolved	< 0.000020	0.000020 mg/L		< 0.000020				13	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9F0349, Continued									
Duplicate (B9F0349-DUP2), Continued		Source: 9052874-06		Prepared: 2019-06-06, Analyzed: 2019-06-06					
Thorium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Tin, dissolved	< 0.00020	0.00020 mg/L		< 0.00020				20	
Titanium, dissolved	< 0.0050	0.0050 mg/L		< 0.0050				20	
Tungsten, dissolved	< 0.0010	0.0010 mg/L		< 0.0010				20	
Uranium, dissolved	0.00125	0.000020 mg/L		0.00130			4	14	
Vanadium, dissolved	< 0.0010	0.0010 mg/L		< 0.0010				20	
Zinc, dissolved	0.0051	0.0040 mg/L		0.0055				11	
Zirconium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Reference (B9F0349-SRM1)		Prepared: 2019-06-06, Analyzed: 2019-06-06							
Aluminum, dissolved	0.227	0.0050 mg/L	0.235		97	79-114			
Antimony, dissolved	0.0463	0.00020 mg/L	0.0431		108	89-123			
Arsenic, dissolved	0.431	0.00050 mg/L	0.423		102	87-113			
Barium, dissolved	3.02	0.0050 mg/L	3.30		91	85-114			
Beryllium, dissolved	0.220	0.00010 mg/L	0.209		105	79-122			
Boron, dissolved	1.66	0.0050 mg/L	1.65		101	79-117			
Cadmium, dissolved	0.224	0.000010 mg/L	0.221		101	89-112			
Calcium, dissolved	7.41	0.20 mg/L	7.72		96	85-120			
Chromium, dissolved	0.430	0.00050 mg/L	0.434		99	87-113			
Cobalt, dissolved	0.126	0.00010 mg/L	0.124		101	90-117			
Copper, dissolved	0.844	0.00040 mg/L	0.815		104	90-115			
Iron, dissolved	1.24	0.010 mg/L	1.27		98	86-112			
Lead, dissolved	0.114	0.00020 mg/L	0.110		104	90-113			
Lithium, dissolved	0.113	0.00010 mg/L	0.100		113	77-127			
Magnesium, dissolved	6.74	0.010 mg/L	6.59		102	84-116			
Manganese, dissolved	0.333	0.00020 mg/L	0.342		97	85-113			
Molybdenum, dissolved	0.417	0.00010 mg/L	0.404		103	87-112			
Nickel, dissolved	0.846	0.00040 mg/L	0.835		101	90-114			
Phosphorus, dissolved	0.517	0.050 mg/L	0.499		104	74-119			
Potassium, dissolved	2.82	0.10 mg/L	2.88		98	78-119			
Selenium, dissolved	0.0360	0.00050 mg/L	0.0324		111	89-123			
Sodium, dissolved	18.3	0.10 mg/L	18.0		102	81-117			
Strontium, dissolved	0.906	0.0010 mg/L	0.935		97	82-111			
Thallium, dissolved	0.0404	0.000020 mg/L	0.0385		105	90-113			
Uranium, dissolved	0.253	0.000020 mg/L	0.258		98	87-113			
Vanadium, dissolved	0.838	0.0010 mg/L	0.873		96	85-110			
Zinc, dissolved	0.881	0.0040 mg/L	0.848		104	88-114			
Reference (B9F0349-SRM2)		Prepared: 2019-06-06, Analyzed: 2019-06-06							
Aluminum, dissolved	0.225	0.0050 mg/L	0.235		96	79-114			
Antimony, dissolved	0.0468	0.00020 mg/L	0.0431		109	89-123			
Arsenic, dissolved	0.436	0.00050 mg/L	0.423		103	87-113			
Barium, dissolved	3.04	0.0050 mg/L	3.30		92	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	0.224	0.000010 mg/L	0.221		102	89-112			
Calcium, dissolved	7.46	0.20 mg/L	7.72		97	85-120			
Chromium, dissolved	0.434	0.00050 mg/L	0.434		100	87-113			
Cobalt, dissolved	0.126	0.00010 mg/L	0.124		102	90-117			
Copper, dissolved	0.847	0.00040 mg/L	0.815		104	90-115			
Iron, dissolved	1.24	0.010 mg/L	1.27		98	86-112			
Lead, dissolved	0.114	0.00020 mg/L	0.110		104	90-113			
Lithium, dissolved	0.111	0.00010 mg/L	0.100		111	77-127			
Magnesium, dissolved	6.70	0.010 mg/L	6.59		102	84-116			
Manganese, dissolved	0.334	0.00020 mg/L	0.342		98	85-113			
Molybdenum, dissolved	0.420	0.00010 mg/L	0.404		104	87-112			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B9F0349, Continued

Reference (B9F0349-SRM2), Continued				Prepared: 2019-06-06, Analyzed: 2019-06-06					
Nickel, dissolved	0.847	0.00040 mg/L	0.835		101	90-114			
Phosphorus, dissolved	0.498	0.050 mg/L	0.499		100	74-119			
Potassium, dissolved	2.83	0.10 mg/L	2.88		98	78-119			
Selenium, dissolved	0.0360	0.00050 mg/L	0.0324		111	89-123			
Sodium, dissolved	18.3	0.10 mg/L	18.0		102	81-117			
Strontium, dissolved	0.914	0.0010 mg/L	0.935		98	82-111			
Thallium, dissolved	0.0405	0.000020 mg/L	0.0385		105	90-113			
Uranium, dissolved	0.253	0.000020 mg/L	0.258		98	87-113			
Vanadium, dissolved	0.842	0.0010 mg/L	0.873		96	85-110			
Zinc, dissolved	0.880	0.0040 mg/L	0.848		104	88-114			

Dissolved Metals, Batch B9F0379

Blank (B9F0379-BLK1)				Prepared: 2019-06-05, Analyzed: 2019-06-05					
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Reference (B9F0379-SRM1)				Prepared: 2019-06-05, Analyzed: 2019-06-05					
Mercury, dissolved	0.00428	0.000010 mg/L	0.00489		87	80-120			

General Parameters, Batch B9E2585

Blank (B9E2585-BLK1)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	< 0.10	0.10 NTU							
Blank (B9E2585-BLK2)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	< 0.10	0.10 NTU							
Blank (B9E2585-BLK3)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	< 0.10	0.10 NTU							
LCS (B9E2585-BS1)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	39.8	0.10 NTU	40.0		100	90-110			
LCS (B9E2585-BS2)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	41.0	0.10 NTU	40.0		102	90-110			
LCS (B9E2585-BS3)				Prepared: 2019-06-01, Analyzed: 2019-06-01					
Turbidity	40.2	0.10 NTU	40.0		100	90-110			

General Parameters, Batch B9F0033

Blank (B9F0033-BLK1)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9F0033-BLK2)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9F0033-BLK3)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9F0033-BLK4)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9F0033-BLK5)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	< 0.020	0.020 mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9F0033, Continued									
LCS (B9F0033-BS1)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	1.04	0.020 mg/L	1.00		104	90-115			
LCS (B9F0033-BS2)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	1.03	0.020 mg/L	1.00		103	90-115			
LCS (B9F0033-BS3)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	1.09	0.020 mg/L	1.00		109	90-115			
LCS (B9F0033-BS4)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	1.06	0.020 mg/L	1.00		106	90-115			
LCS (B9F0033-BS5)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Ammonia, Total (as N)	1.12	0.020 mg/L	1.00		112	90-115			
General Parameters, Batch B9F0121									
Blank (B9F0121-BLK1)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Solids, Total Suspended	< 2.0	2.0 mg/L							
Blank (B9F0121-BLK2)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Solids, Total Suspended	< 2.0	2.0 mg/L							
LCS (B9F0121-BS1)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Solids, Total Suspended	97.0	10.0 mg/L	100		97	85-115			
LCS (B9F0121-BS2)				Prepared: 2019-06-03, Analyzed: 2019-06-03					
Solids, Total Suspended	101	10.0 mg/L	100		101	85-115			
Duplicate (B9F0121-DUP2)				Source: 9052874-03		Prepared: 2019-06-03, Analyzed: 2019-06-03			
Solids, Total Suspended	13800	2.0 mg/L		14100			2	20	
General Parameters, Batch B9F0173									
Blank (B9F0173-BLK1)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B9F0173-BLK2)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B9F0173-BLK3)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9F0173, Continued									
LCS (B9F0173-BS1)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	105	1.0 mg/L	100		105	80-120			
LCS (B9F0173-BS2)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	104	1.0 mg/L	100		104	80-120			
LCS (B9F0173-BS3)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	105	1.0 mg/L	100		105	80-120			
LCS (B9F0173-BS4)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Conductivity (EC)	1410	2.0 µS/cm	1410		100	95-104			
LCS (B9F0173-BS5)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Conductivity (EC)	1400	2.0 µS/cm	1410		99	95-104			
LCS (B9F0173-BS6)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
Conductivity (EC)	1400	2.0 µS/cm	1410		100	95-104			
Duplicate (B9F0173-DUP1)		Source: 9052874-01		Prepared: 2019-06-04, Analyzed: 2019-06-04					
Alkalinity, Total (as CaCO ₃)	966	1.0 mg/L		963			< 1	10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO ₃)	966	1.0 mg/L		963			< 1	10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Conductivity (EC)	4040	2.0 µS/cm		3990			1	5	
pH	7.61	0.10 pH units		7.61			< 1	4	
Reference (B9F0173-SRM1)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
pH	7.00	0.10 pH units	7.01		100	98-102			
Reference (B9F0173-SRM2)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
pH	7.01	0.10 pH units	7.01		100	98-102			
Reference (B9F0173-SRM3)				Prepared: 2019-06-04, Analyzed: 2019-06-04					
pH	7.01	0.10 pH units	7.01		100	98-102			

Volatile Organic Compounds (VOC), Batch B9F0273

Blank (B9F0273-BLK1)			Prepared: 2019-06-05, Analyzed: 2019-06-05						
Benzene	< 0.5	0.5 µg/L							
Bromodichloromethane	< 1.0	1.0 µg/L							
Bromoform	< 1.0	1.0 µg/L							
Carbon tetrachloride	< 0.5	0.5 µg/L							
Chlorobenzene	< 1.0	1.0 µg/L							
Chloroethane	< 2.0	2.0 µg/L							
Chloroform	< 1.0	1.0 µg/L							
Dibromochloromethane	< 1.0	1.0 µg/L							
1,2-Dibromoethane	< 0.3	0.3 µg/L							
Dibromomethane	< 1.0	1.0 µg/L							
1,2-Dichlorobenzene	< 0.5	0.5 µg/L							
1,3-Dichlorobenzene	< 1.0	1.0 µg/L							
1,4-Dichlorobenzene	< 1.0	1.0 µg/L							
1,1-Dichloroethane	< 1.0	1.0 µg/L							
1,2-Dichloroethane	< 1.0	1.0 µg/L							
1,1-Dichloroethylene	< 1.0	1.0 µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0 µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0 µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B9F0273, Continued									
Blank (B9F0273-BLK1), Continued					Prepared: 2019-06-05, Analyzed: 2019-06-05				
Dichloromethane	< 3.0	3.0 µg/L							
1,2-Dichloropropane	< 1.0	1.0 µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0 µg/L							
Ethylbenzene	< 1.0	1.0 µg/L							
Methyl tert-butyl ether	< 1.0	1.0 µg/L							
Styrene	< 1.0	1.0 µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5 µg/L							
Tetrachloroethylene	< 1.0	1.0 µg/L							
Toluene	< 1.0	1.0 µg/L							
1,1,1-Trichloroethane	< 1.0	1.0 µg/L							
1,1,2-Trichloroethane	< 1.0	1.0 µg/L							
Trichloroethylene	< 1.0	1.0 µg/L							
Trichlorofluoromethane	< 1.0	1.0 µg/L							
Vinyl chloride	< 1.0	1.0 µg/L							
Xylenes (total)	< 2.0	2.0 µg/L							
Surrogate: Toluene-d8	28.8	µg/L	26.2		110	70-130			
Surrogate: 4-Bromofluorobenzene	25.0	µg/L	25.0		100	70-130			
Surrogate: 1,4-Dichlorobenzene-d4	22.5	µg/L	25.0		90	70-130			
LCS (B9F0273-BS1)					Prepared: 2019-06-06, Analyzed: 2019-06-06				
Benzene	17.8	0.5 µg/L	20.1		89	70-130			
Bromodichloromethane	20.0	1.0 µg/L	20.2		99	70-130			
Bromoform	23.5	1.0 µg/L	20.1		117	70-130			
Carbon tetrachloride	17.8	0.5 µg/L	20.1		88	70-130			
Chlorobenzene	20.9	1.0 µg/L	20.2		104	70-130			
Chloroethane	22.3	2.0 µg/L	20.0		111	60-140			
Chloroform	20.7	1.0 µg/L	20.1		103	70-130			
Dibromochloromethane	20.3	1.0 µg/L	20.2		100	70-130			
1,2-Dibromoethane	19.8	0.3 µg/L	20.1		98	70-130			
Dibromomethane	20.1	1.0 µg/L	20.1		100	70-130			
1,2-Dichlorobenzene	23.9	0.5 µg/L	20.1		119	70-130			
1,3-Dichlorobenzene	22.9	1.0 µg/L	20.1		114	70-130			
1,4-Dichlorobenzene	23.7	1.0 µg/L	20.1		118	70-130			
1,1-Dichloroethane	21.4	1.0 µg/L	20.1		106	70-130			
1,2-Dichloroethane	20.0	1.0 µg/L	20.1		99	70-130			
1,1-Dichloroethylene	18.5	1.0 µg/L	20.1		92	70-130			
cis-1,2-Dichloroethylene	19.2	1.0 µg/L	20.1		95	70-130			
trans-1,2-Dichloroethylene	18.8	1.0 µg/L	20.1		93	70-130			
Dichloromethane	21.3	3.0 µg/L	20.1		106	70-130			
1,2-Dichloropropane	19.8	1.0 µg/L	20.2		98	70-130			
1,3-Dichloropropene (cis + trans)	33.8	1.0 µg/L	40.0		85	70-130			
Ethylbenzene	18.6	1.0 µg/L	20.1		93	70-130			
Methyl tert-butyl ether	19.0	1.0 µg/L	20.0		95	70-130			
Styrene	22.2	1.0 µg/L	20.1		111	70-130			
1,1,2,2-Tetrachloroethane	36.7	0.5 µg/L	20.2		182	70-130			SPK
Tetrachloroethylene	17.2	1.0 µg/L	20.1		85	70-130			
Toluene	17.6	1.0 µg/L	20.1		88	70-130			
1,1,1-Trichloroethane	18.5	1.0 µg/L	20.2		91	70-130			
1,1,2-Trichloroethane	20.7	1.0 µg/L	20.1		103	70-130			
Trichloroethylene	18.7	1.0 µg/L	20.1		93	70-130			
Trichlorofluoromethane	21.6	1.0 µg/L	20.0		108	60-140			
Vinyl chloride	20.1	1.0 µg/L	20.0		100	60-140			
Xylenes (total)	62.2	2.0 µg/L	60.1		104	70-130			
Surrogate: Toluene-d8	26.3	µg/L	26.2		100	70-130			
Surrogate: 4-Bromofluorobenzene	28.6	µg/L	25.0		114	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9052874
2019-06-07 12:08

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<i>Volatile Organic Compounds (VOC), Batch B9F0273, Continued</i>									
LCS (B9F0273-BS1), Continued					Prepared: 2019-06-06, Analyzed: 2019-06-06				
Surrogate: 1,4-Dichlorobenzene-d4	28.5	µg/L	25.0		114	70-130			

QC Qualifiers:

RPD Relative percent difference (RPD) of duplicate analysis are outside of control limits for unknown reason(s).
SPK The recovery of this analyte was outside of established control limits.

CERTIFICATE OF ANALYSIS

REPORTED TO Ecoscape Environmental Ltd.
#102 - 450 Neave Court
Kelowna, BC V1V 2M2

ATTENTION Kelsey Tanaka

PO NUMBER 19-2850

PROJECT 19-2850 - Golden

PROJECT INFO Golden

WORK ORDER 9081278

RECEIVED / TEMP 2019-08-14 16:04 / 8°C

REPORTED 2019-08-22 11:11

COC NUMBER No Number

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



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

Authorized By:

Alana Crump
Junior Account Manager



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#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (9081278-01) Matrix: Water Sampled: 2019-08-13 16:25					
Anions					
Chloride	388	0.10	mg/L	2019-08-16	
Fluoride	0.18	0.10	mg/L	2019-08-16	
Nitrate (as N)	33.6	0.010	mg/L	2019-08-16	
Nitrite (as N)	0.154	0.010	mg/L	2019-08-16	
Sulfate	698	1.0	mg/L	2019-08-16	
Calculated Parameters					
Hardness, Total (as CaCO3)	1510	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.0510	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	1.85	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	163	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00165	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00199	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0434	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	268	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.0868	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00033	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.0120	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	173	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	12.0	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	288	0.10	mg/L	2019-08-22	
Strontium, dissolved	1.70	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	271	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	0.000062	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW09-6S (9081278-01) | Matrix: Water | Sampled: 2019-08-13 16:25, Continued

Dissolved Metals, Continued

Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00775	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	0.00015	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	915	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	915	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	1120	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.18	0.020	mg/L	2019-08-15	
Conductivity (EC)	3990	2.0	µS/cm	2019-08-15	
pH	7.61	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	420	2.0	mg/L	2019-08-19	
Turbidity	248	0.10	NTU	2019-08-15	

MW10-08 (9081278-02) | Matrix: Water | Sampled: 2019-08-13 13:50

Anions

Chloride	651	0.10	mg/L	2019-08-16	
Fluoride	0.22	0.10	mg/L	2019-08-16	
Nitrate (as N)	0.890	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	
Sulfate	48.8	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	767	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	0.00220	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.208	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.0574	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	0.000011	0.000010	mg/L	2019-08-22	
Calcium, dissolved	100	0.20	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW10-08 (9081278-02) | Matrix: Water | Sampled: 2019-08-13 13:50, Continued

Dissolved Metals, Continued

Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00039	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00067	0.00040	mg/L	2019-08-22	
Iron, dissolved	0.011	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0217	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	125	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.00690	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00056	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.00287	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	5.87	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	9.2	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	334	0.10	mg/L	2019-08-22	
Strontium, dissolved	1.45	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	19.1	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	0.000032	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	0.0035	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00226	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	500	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	500	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	610	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.118	0.020	mg/L	2019-08-15	
Conductivity (EC)	2990	2.0	µS/cm	2019-08-15	
pH	7.91	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	2770	2.0	mg/L	2019-08-19	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW10-08 (9081278-02) | Matrix: Water | Sampled: 2019-08-13 13:50, Continued

General Parameters, Continued

Turbidity	3080	0.10	NTU	2019-08-15	
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MW18-10 (9081278-03) | Matrix: Water | Sampled: 2019-08-13 15:35

Anions

Chloride	337	0.10	mg/L	2019-08-16	
Fluoride	0.13	0.10	mg/L	2019-08-16	
Nitrate (as N)	30.0	0.010	mg/L	2019-08-16	
Nitrite (as N)	0.131	0.010	mg/L	2019-08-16	
Sulfate	73.5	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO3)	1020	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	0.00133	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.316	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.408	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	0.000032	0.000010	mg/L	2019-08-22	
Calcium, dissolved	92.5	0.20	mg/L	2019-08-22	
Chromium, dissolved	0.00056	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00559	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00125	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0220	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	192	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.195	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00141	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.0447	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	24.4	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	9.9	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	183	0.10	mg/L	2019-08-22	
Strontium, dissolved	1.46	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	28.2	3.0	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-10 (9081278-03) | Matrix: Water | Sampled: 2019-08-13 15:35, Continued

Dissolved Metals, Continued

Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	0.000091	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00442	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	0.0043	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	0.00026	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	785	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	785	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	957	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.63	0.020	mg/L	2019-08-15	
Conductivity (EC)	2580	2.0	µS/cm	2019-08-15	
pH	7.88	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	2170	2.0	mg/L	2019-08-19	
Turbidity	3590	0.10	NTU	2019-08-15	

MW18-11 (9081278-04) | Matrix: Water | Sampled: 2019-08-13 14:20

Anions

Chloride	89.7	0.10	mg/L	2019-08-16	
Fluoride	0.65	0.10	mg/L	2019-08-16	
Nitrate (as N)	< 0.010	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	
Sulfate	70.7	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	542	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	0.00348	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	0.00511	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.0271	0.0050	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-11 (9081278-04) | Matrix: Water | Sampled: 2019-08-13 14:20, Continued

Dissolved Metals, Continued

Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.170	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	43.2	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00017	0.00010	mg/L	2019-08-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-08-22	
Iron, dissolved	2.05	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0212	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	105	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.152	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00344	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.0111	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	4.78	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	3.1	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	85.3	0.10	mg/L	2019-08-22	
Strontium, dissolved	0.622	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	25.2	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.000084	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	0.0073	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	541	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	541	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	660	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-11 (9081278-04) Matrix: Water Sampled: 2019-08-13 14:20, Continued					
<i>General Parameters, Continued</i>					
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.228	0.020	mg/L	2019-08-15	
Conductivity (EC)	1330	2.0	µS/cm	2019-08-15	
pH	8.10	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	211	2.0	mg/L	2019-08-19	
Turbidity	202	0.10	NTU	2019-08-15	

Town Well #4 (9081278-05) | Matrix: Water | Sampled: 2019-08-13 11:40

Anions

Chloride	92.7	0.10	mg/L	2019-08-16	
Fluoride	< 0.10	0.10	mg/L	2019-08-16	
Nitrate (as N)	1.65	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	
Sulfate	41.4	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO3)	403	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.218	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.0225	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	93.5	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00140	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.00224	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	41.1	0.010	mg/L	2019-08-22	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00020	0.00010	mg/L	2019-08-22	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	1.86	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
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Town Well #4 (9081278-05) | Matrix: Water | Sampled: 2019-08-13 11:40, Continued

Dissolved Metals, Continued

Silicon, dissolved	5.0	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	55.9	0.10	mg/L	2019-08-22	
Strontium, dissolved	0.479	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	15.7	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00128	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	346	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	346	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	423	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.070	0.020	mg/L	2019-08-15	
Conductivity (EC)	989	2.0	µS/cm	2019-08-15	
pH	7.92	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	2.2	2.0	mg/L	2019-08-19	
Turbidity	< 0.10	0.10	NTU	2019-08-15	

Town Well #6 (9081278-06) | Matrix: Water | Sampled: 2019-08-13 11:26

Anions

Chloride	42.1	0.10	mg/L	2019-08-16	
Fluoride	< 0.10	0.10	mg/L	2019-08-16	
Nitrate (as N)	1.32	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	
Sulfate	28.6	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	354	0.500	mg/L	N/A	
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TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #6 (9081278-06) Matrix: Water Sampled: 2019-08-13 11:26, Continued					
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.161	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.0106	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	93.4	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00228	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.00146	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	29.3	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.00077	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00031	0.00010	mg/L	2019-08-22	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	1.00	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	4.5	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	22.6	0.10	mg/L	2019-08-22	
Strontium, dissolved	0.331	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	10.7	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00121	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	0.0094	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO3)	317	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO3)	317	1.0	mg/L	2019-08-15	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #6 (9081278-06) Matrix: Water Sampled: 2019-08-13 11:26, Continued					
<i>General Parameters, Continued</i>					
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	387	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.067	0.020	mg/L	2019-08-15	
Conductivity (EC)	759	2.0	µS/cm	2019-08-15	
pH	7.95	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	37.0	2.0	mg/L	2019-08-19	
Turbidity	23.7	0.10	NTU	2019-08-15	

DMW-1b (9081278-07) | Matrix: Water | Sampled: 2019-08-13 17:25

Anions

Chloride	10.4	0.10	mg/L	2019-08-16	
Fluoride	0.47	0.10	mg/L	2019-08-16	
Nitrate (as N)	0.712	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	
Sulfate	191	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	546	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	0.00110	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.0140	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.204	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	74.4	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00077	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.0150	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	
Lead, dissolved	0.00026	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0301	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	87.4	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.00275	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00105	0.00010	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL	Units	Analyzed	Qualifier
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DMW-1b (9081278-07) | Matrix: Water | Sampled: 2019-08-13 17:25, Continued

Dissolved Metals, Continued

Nickel, dissolved	0.00146	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	5.75	0.10	mg/L	2019-08-22	
Selenium, dissolved	0.00056	0.00050	mg/L	2019-08-22	
Silicon, dissolved	7.2	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	26.2	0.10	mg/L	2019-08-22	
Strontium, dissolved	3.49	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	70.7	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00178	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	0.0276	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	0.00042	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	401	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	401	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	489	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.055	0.020	mg/L	2019-08-15	
Conductivity (EC)	1030	2.0	µS/cm	2019-08-15	
pH	7.90	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-08-19	
Turbidity	0.27	0.10	NTU	2019-08-15	

DMW-4 (9081278-08) | Matrix: Water | Sampled: 2019-08-13 17:08

Anions

Chloride	42.4	0.10	mg/L	2019-08-16	
Fluoride	1.22	0.10	mg/L	2019-08-16	
Nitrate (as N)	< 0.010	0.010	mg/L	2019-08-16	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-08-16	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (9081278-08) Matrix: Water Sampled: 2019-08-13 17:08, Continued					
<i>Anions, Continued</i>					
Sulfate	122	1.0	mg/L	2019-08-16	
<i>Calculated Parameters</i>					
Hardness, Total (as CaCO ₃)	619	0.500	mg/L	N/A	
<i>Dissolved Metals</i>					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	0.0414	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.0229	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	0.00011	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	0.136	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	71.2	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-08-22	
Iron, dissolved	0.409	0.010	mg/L	2019-08-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0249	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	107	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.00410	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00034	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.00217	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	4.68	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	7.7	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	26.7	0.10	mg/L	2019-08-22	
Strontium, dissolved	1.76	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	45.4	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.000140	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	0.0045	0.0040	mg/L	2019-08-22	

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Analyte	Result	RL	Units	Analyzed	Qualifier
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DMW-4 (9081278-08) | Matrix: Water | Sampled: 2019-08-13 17:08, Continued

Dissolved Metals, Continued

Zirconium, dissolved	0.00162	0.00010	mg/L	2019-08-22	
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General Parameters

Alkalinity, Total (as CaCO ₃)	516	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	516	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	630	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.288	0.020	mg/L	2019-08-15	
Conductivity (EC)	1160	2.0	µS/cm	2019-08-15	
pH	7.96	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	2.2	2.0	mg/L	2019-08-19	
Turbidity	3.56	0.10	NTU	2019-08-15	

Dup A (9081278-09) | Matrix: Water | Sampled: 2019-08-13 16:25

Anions

Chloride	395	0.10	mg/L	2019-08-16	
Fluoride	0.19	0.10	mg/L	2019-08-16	
Nitrate (as N)	33.1	0.010	mg/L	2019-08-16	
Nitrite (as N)	0.161	0.010	mg/L	2019-08-16	
Sulfate	704	1.0	mg/L	2019-08-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	1530	0.500	mg/L	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Barium, dissolved	0.0491	0.0050	mg/L	2019-08-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Boron, dissolved	1.86	0.0050	mg/L	2019-08-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-08-22	
Calcium, dissolved	164	0.20	mg/L	2019-08-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Cobalt, dissolved	0.00168	0.00010	mg/L	2019-08-22	
Copper, dissolved	0.00201	0.00040	mg/L	2019-08-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-08-22	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL	Units	Analyzed	Qualifier
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Dup A (9081278-09) | Matrix: Water | Sampled: 2019-08-13 16:25, Continued

Dissolved Metals, Continued

Lead, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Lithium, dissolved	0.0438	0.00010	mg/L	2019-08-22	
Magnesium, dissolved	272	0.010	mg/L	2019-08-22	
Manganese, dissolved	0.0888	0.00020	mg/L	2019-08-22	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-08-20	
Molybdenum, dissolved	0.00032	0.00010	mg/L	2019-08-22	
Nickel, dissolved	0.0123	0.00040	mg/L	2019-08-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-08-22	
Potassium, dissolved	176	0.10	mg/L	2019-08-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Silicon, dissolved	12.3	1.0	mg/L	2019-08-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-08-22	
Sodium, dissolved	294	0.10	mg/L	2019-08-22	
Strontium, dissolved	1.66	0.0010	mg/L	2019-08-22	
Sulfur, dissolved	274	3.0	mg/L	2019-08-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-08-22	
Thallium, dissolved	0.000061	0.000020	mg/L	2019-08-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-08-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-08-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-08-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Uranium, dissolved	0.00761	0.000020	mg/L	2019-08-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-08-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-08-22	
Zirconium, dissolved	0.00014	0.00010	mg/L	2019-08-22	

General Parameters

Alkalinity, Total (as CaCO ₃)	917	1.0	mg/L	2019-08-15	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Bicarbonate (as CaCO ₃)	917	1.0	mg/L	2019-08-15	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-08-15	
Bicarbonate (HCO ₃)	1120	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.30	0.020	mg/L	2019-08-15	
Conductivity (EC)	3970	2.0	µS/cm	2019-08-15	
pH	7.66	0.10	pH units	2019-08-15	HT2
Solids, Total Suspended	396	2.0	mg/L	2019-08-19	
Turbidity	235	0.10	NTU	2019-08-15	

TEST RESULTS

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Sample Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H ₂ SO ₄	Kelowna
Ammonia, Total in Water	SM 4500-NH ₃ G* (2017)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	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*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Turbidity in Water	SM 2130 B (2017)	Nephelometry	Kelowna

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
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

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 PROJECT Ecoscape Environmental Ltd.
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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
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Anions, Batch B9H1276

Blank (B9H1276-BLK1)			Prepared: 2019-08-16, Analyzed: 2019-08-16						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9H1276-BLK2)			Prepared: 2019-08-16, Analyzed: 2019-08-16						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9H1276-BS1)			Prepared: 2019-08-16, Analyzed: 2019-08-16						
Chloride	16.7	0.10 mg/L	16.0		105	90-110			
Fluoride	4.10	0.10 mg/L	4.00		102	88-108			
Nitrate (as N)	4.02	0.010 mg/L	4.00		101	90-110			
Nitrite (as N)	2.25	0.010 mg/L	2.00		112	85-115			
Sulfate	16.2	1.0 mg/L	16.0		101	90-110			
LCS (B9H1276-BS2)			Prepared: 2019-08-16, Analyzed: 2019-08-16						
Chloride	16.0	0.10 mg/L	16.0		100	90-110			
Fluoride	3.97	0.10 mg/L	4.00		99	88-108			
Nitrate (as N)	4.01	0.010 mg/L	4.00		100	90-110			
Nitrite (as N)	1.97	0.010 mg/L	2.00		99	85-115			
Sulfate	15.9	1.0 mg/L	16.0		99	90-110			

Dissolved Metals, Batch B9H1624

Blank (B9H1624-BLK1)			Prepared: 2019-08-19, Analyzed: 2019-08-20						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B9H1624-BLK2)			Prepared: 2019-08-19, Analyzed: 2019-08-20						
Mercury, dissolved	< 0.000010	0.000010 mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B9H1624, Continued

Reference (B9H1624-SRM1)			Prepared: 2019-08-19, Analyzed: 2019-08-20						
Mercury, dissolved	0.00527	0.000010 mg/L	0.00489		108	80-120			
Reference (B9H1624-SRM2)			Prepared: 2019-08-19, Analyzed: 2019-08-20						
Mercury, dissolved	0.00487	0.000010 mg/L	0.00489		100	80-120			

Dissolved Metals, Batch B9H1647

Blank (B9H1647-BLK1)			Prepared: 2019-08-22, Analyzed: 2019-08-22						
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							
Lithium, dissolved	< 0.00010	0.00010 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							
Blank (B9H1647-BLK2)			Prepared: 2019-08-22, Analyzed: 2019-08-22						
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							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B9H1647, Continued

Blank (B9H1647-BLK2), Continued

Prepared: 2019-08-22, Analyzed: 2019-08-22

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
Lithium, dissolved	< 0.00010	0.00010 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

Blank (B9H1647-BLK3)

Prepared: 2019-08-22, Analyzed: 2019-08-22

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
Lithium, dissolved	< 0.00010	0.00010 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

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9H1647, Continued									
Blank (B9H1647-BLK3), Continued					Prepared: 2019-08-22, Analyzed: 2019-08-22				
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 (B9H1647-BS1)					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Aluminum, dissolved	0.0198	0.0050 mg/L	0.0200		99	80-120			
Antimony, dissolved	0.0206	0.00020 mg/L	0.0200		103	80-120			
Arsenic, dissolved	0.0185	0.00050 mg/L	0.0200		93	80-120			
Barium, dissolved	0.0182	0.0050 mg/L	0.0200		91	80-120			
Beryllium, dissolved	0.0187	0.00010 mg/L	0.0200		93	80-120			
Bismuth, dissolved	0.0196	0.00010 mg/L	0.0200		98	80-120			
Boron, dissolved	0.0186	0.0050 mg/L	0.0200		93	80-120			
Cadmium, dissolved	0.0193	0.000010 mg/L	0.0200		96	80-120			
Calcium, dissolved	1.88	0.20 mg/L	2.02		93	80-120			
Chromium, dissolved	0.0181	0.00050 mg/L	0.0200		91	80-120			
Cobalt, dissolved	0.0185	0.00010 mg/L	0.0200		92	80-120			
Copper, dissolved	0.0194	0.00040 mg/L	0.0200		97	80-120			
Iron, dissolved	1.86	0.010 mg/L	2.02		92	80-120			
Lead, dissolved	0.0194	0.00020 mg/L	0.0200		97	80-120			
Lithium, dissolved	0.0185	0.00010 mg/L	0.0199		93	80-120			
Magnesium, dissolved	1.94	0.010 mg/L	2.02		96	80-120			
Manganese, dissolved	0.0184	0.00020 mg/L	0.0200		92	80-120			
Molybdenum, dissolved	0.0193	0.00010 mg/L	0.0200		97	80-120			
Nickel, dissolved	0.0189	0.00040 mg/L	0.0200		95	80-120			
Phosphorus, dissolved	1.99	0.050 mg/L	2.00		99	80-120			
Potassium, dissolved	1.86	0.10 mg/L	2.02		92	80-120			
Selenium, dissolved	0.0199	0.00050 mg/L	0.0200		99	80-120			
Silicon, dissolved	1.9	1.0 mg/L	2.00		97	80-120			
Silver, dissolved	0.0185	0.000050 mg/L	0.0200		93	80-120			
Sodium, dissolved	1.87	0.10 mg/L	2.02		93	80-120			
Strontium, dissolved	0.0179	0.0010 mg/L	0.0200		89	80-120			
Sulfur, dissolved	4.5	3.0 mg/L	5.00		91	80-120			
Tellurium, dissolved	0.0206	0.00050 mg/L	0.0200		103	80-120			
Thallium, dissolved	0.0195	0.000020 mg/L	0.0200		98	80-120			
Thorium, dissolved	0.0197	0.00010 mg/L	0.0200		98	80-120			
Tin, dissolved	0.0199	0.00020 mg/L	0.0200		99	80-120			
Titanium, dissolved	0.0194	0.0050 mg/L	0.0200		97	80-120			
Tungsten, dissolved	0.0197	0.0010 mg/L	0.0200		98	80-120			
Uranium, dissolved	0.0225	0.000020 mg/L	0.0200		112	80-120			
Vanadium, dissolved	0.0178	0.0010 mg/L	0.0200		89	80-120			
Zinc, dissolved	0.0208	0.0040 mg/L	0.0200		104	80-120			
Zirconium, dissolved	0.0214	0.00010 mg/L	0.0200		107	80-120			
LCS (B9H1647-BS2)					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Aluminum, dissolved	0.0201	0.0050 mg/L	0.0200		101	80-120			
Antimony, dissolved	0.0205	0.00020 mg/L	0.0200		102	80-120			
Arsenic, dissolved	0.0184	0.00050 mg/L	0.0200		92	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9H1647, Continued									
LCS (B9H1647-BS2), Continued					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Barium, dissolved	0.0181	0.0050 mg/L	0.0200		91	80-120			
Beryllium, dissolved	0.0190	0.00010 mg/L	0.0200		95	80-120			
Bismuth, dissolved	0.0195	0.00010 mg/L	0.0200		97	80-120			
Boron, dissolved	0.0208	0.0050 mg/L	0.0200		104	80-120			
Cadmium, dissolved	0.0190	0.000010 mg/L	0.0200		95	80-120			
Calcium, dissolved	1.92	0.20 mg/L	2.02		95	80-120			
Chromium, dissolved	0.0182	0.00050 mg/L	0.0200		91	80-120			
Cobalt, dissolved	0.0185	0.00010 mg/L	0.0200		92	80-120			
Copper, dissolved	0.0197	0.00040 mg/L	0.0200		99	80-120			
Iron, dissolved	1.86	0.010 mg/L	2.02		92	80-120			
Lead, dissolved	0.0192	0.00020 mg/L	0.0200		96	80-120			
Lithium, dissolved	0.0189	0.00010 mg/L	0.0199		95	80-120			
Magnesium, dissolved	1.99	0.010 mg/L	2.02		99	80-120			
Manganese, dissolved	0.0184	0.00020 mg/L	0.0200		92	80-120			
Molybdenum, dissolved	0.0191	0.00010 mg/L	0.0200		96	80-120			
Nickel, dissolved	0.0190	0.00040 mg/L	0.0200		95	80-120			
Phosphorus, dissolved	2.05	0.050 mg/L	2.00		103	80-120			
Potassium, dissolved	1.88	0.10 mg/L	2.02		93	80-120			
Selenium, dissolved	0.0204	0.00050 mg/L	0.0200		102	80-120			
Silicon, dissolved	2.0	1.0 mg/L	2.00		100	80-120			
Silver, dissolved	0.0184	0.000050 mg/L	0.0200		92	80-120			
Sodium, dissolved	1.92	0.10 mg/L	2.02		95	80-120			
Strontium, dissolved	0.0178	0.0010 mg/L	0.0200		89	80-120			
Sulfur, dissolved	5.0	3.0 mg/L	5.00		100	80-120			
Tellurium, dissolved	0.0205	0.00050 mg/L	0.0200		103	80-120			
Thallium, dissolved	0.0193	0.000020 mg/L	0.0200		97	80-120			
Thorium, dissolved	0.0197	0.00010 mg/L	0.0200		98	80-120			
Tin, dissolved	0.0196	0.00020 mg/L	0.0200		98	80-120			
Titanium, dissolved	0.0194	0.0050 mg/L	0.0200		97	80-120			
Tungsten, dissolved	0.0196	0.0010 mg/L	0.0200		98	80-120			
Uranium, dissolved	0.0226	0.000020 mg/L	0.0200		113	80-120			
Vanadium, dissolved	0.0177	0.0010 mg/L	0.0200		89	80-120			
Zinc, dissolved	0.0202	0.0040 mg/L	0.0200		101	80-120			
Zirconium, dissolved	0.0214	0.00010 mg/L	0.0200		107	80-120			

Reference (B9H1647-SRM1)					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Aluminum, dissolved	0.226	0.0050 mg/L	0.235		96	79-114			
Antimony, dissolved	0.0456	0.00020 mg/L	0.0431		106	89-123			
Arsenic, dissolved	0.446	0.00050 mg/L	0.423		105	87-113			
Barium, dissolved	3.05	0.0050 mg/L	3.30		92	85-114			
Beryllium, dissolved	0.216	0.00010 mg/L	0.209		103	79-122			
Boron, dissolved	1.66	0.0050 mg/L	1.65		100	79-117			
Cadmium, dissolved	0.231	0.000010 mg/L	0.221		104	89-112			
Calcium, dissolved	7.38	0.20 mg/L	7.72		96	85-120			
Chromium, dissolved	0.435	0.00050 mg/L	0.434		100	87-113			
Cobalt, dissolved	0.129	0.00010 mg/L	0.124		104	90-117			
Copper, dissolved	0.858	0.00040 mg/L	0.815		105	90-115			
Iron, dissolved	1.23	0.010 mg/L	1.27		97	86-112			
Lead, dissolved	0.115	0.00020 mg/L	0.110		104	90-113			
Lithium, dissolved	0.105	0.00010 mg/L	0.100		105	77-127			
Magnesium, dissolved	6.44	0.010 mg/L	6.59		98	84-116			
Manganese, dissolved	0.340	0.00020 mg/L	0.342		100	85-113			
Molybdenum, dissolved	0.418	0.00010 mg/L	0.404		103	87-112			
Nickel, dissolved	0.863	0.00040 mg/L	0.835		103	90-114			
Phosphorus, dissolved	0.509	0.050 mg/L	0.499		102	74-119			
Potassium, dissolved	2.83	0.10 mg/L	2.88		98	78-119			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9H1647, Continued									
Reference (B9H1647-SRM1), Continued					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Selenium, dissolved	0.0366	0.00050 mg/L	0.0324		113	89-123			
Sodium, dissolved	17.3	0.10 mg/L	18.0		96	81-117			
Strontium, dissolved	0.907	0.0010 mg/L	0.935		97	82-111			
Thallium, dissolved	0.0403	0.000020 mg/L	0.0385		105	90-113			
Uranium, dissolved	0.253	0.000020 mg/L	0.258		98	87-113			
Vanadium, dissolved	0.842	0.0010 mg/L	0.873		96	85-110			
Zinc, dissolved	0.927	0.0040 mg/L	0.848		109	88-114			
Reference (B9H1647-SRM2)					Prepared: 2019-08-22, Analyzed: 2019-08-22				
Aluminum, dissolved	0.226	0.0050 mg/L	0.235		96	79-114			
Antimony, dissolved	0.0443	0.00020 mg/L	0.0431		103	89-123			
Arsenic, dissolved	0.443	0.00050 mg/L	0.423		105	87-113			
Barium, dissolved	3.00	0.0050 mg/L	3.30		91	85-114			
Beryllium, dissolved	0.215	0.00010 mg/L	0.209		103	79-122			
Boron, dissolved	1.66	0.0050 mg/L	1.65		100	79-117			
Cadmium, dissolved	0.226	0.000010 mg/L	0.221		102	89-112			
Calcium, dissolved	7.41	0.20 mg/L	7.72		96	85-120			
Chromium, dissolved	0.435	0.00050 mg/L	0.434		100	87-113			
Cobalt, dissolved	0.129	0.00010 mg/L	0.124		104	90-117			
Copper, dissolved	0.861	0.00040 mg/L	0.815		106	90-115			
Iron, dissolved	1.23	0.010 mg/L	1.27		97	86-112			
Lead, dissolved	0.114	0.00020 mg/L	0.110		104	90-113			
Lithium, dissolved	0.105	0.00010 mg/L	0.100		105	77-127			
Magnesium, dissolved	6.45	0.010 mg/L	6.59		98	84-116			
Manganese, dissolved	0.341	0.00020 mg/L	0.342		100	85-113			
Molybdenum, dissolved	0.413	0.00010 mg/L	0.404		102	87-112			
Nickel, dissolved	0.871	0.00040 mg/L	0.835		104	90-114			
Phosphorus, dissolved	0.520	0.050 mg/L	0.499		104	74-119			
Potassium, dissolved	2.88	0.10 mg/L	2.88		100	78-119			
Selenium, dissolved	0.0364	0.00050 mg/L	0.0324		112	89-123			
Sodium, dissolved	17.5	0.10 mg/L	18.0		97	81-117			
Strontium, dissolved	0.887	0.0010 mg/L	0.935		95	82-111			
Thallium, dissolved	0.0399	0.000020 mg/L	0.0385		104	90-113			
Uranium, dissolved	0.249	0.000020 mg/L	0.258		96	87-113			
Vanadium, dissolved	0.850	0.0010 mg/L	0.873		97	85-110			
Zinc, dissolved	0.919	0.0040 mg/L	0.848		108	88-114			

General Parameters, Batch B9H1196

Blank (B9H1196-BLK1)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9H1196-BLK2)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9H1196-BLK3)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9H1196-BLK4)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9H1196-BLK5)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
LCS (B9H1196-BS1)					Prepared: 2019-08-15, Analyzed: 2019-08-15				
Ammonia, Total (as N)	1.03	0.020 mg/L	1.00		103	90-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9H1196, Continued									
LCS (B9H1196-BS2)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Ammonia, Total (as N)	1.02	0.020 mg/L	1.00		102	90-115			
LCS (B9H1196-BS3)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Ammonia, Total (as N)	1.06	0.020 mg/L	1.00		106	90-115			
LCS (B9H1196-BS4)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Ammonia, Total (as N)	1.04	0.020 mg/L	1.00		104	90-115			
LCS (B9H1196-BS5)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Ammonia, Total (as N)	1.01	0.020 mg/L	1.00		101	90-115			
Duplicate (B9H1196-DUP5)				Source: 9081278-08		Prepared: 2019-08-15, Analyzed: 2019-08-15			
Ammonia, Total (as N)	0.290	0.020 mg/L		0.288			< 1	15	
Matrix Spike (B9H1196-MS5)				Source: 9081278-08		Prepared: 2019-08-15, Analyzed: 2019-08-15			
Ammonia, Total (as N)	0.552	0.020 mg/L	0.250	0.288	106	75-125			
General Parameters, Batch B9H1252									
Blank (B9H1252-BLK1)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Turbidity	< 0.10	0.10 NTU							
LCS (B9H1252-BS1)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Turbidity	36.4	0.10 NTU	40.0		91	90-110			
General Parameters, Batch B9H1256									
Blank (B9H1256-BLK1)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B9H1256-BLK2)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B9H1256-BLK3)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
LCS (B9H1256-BS1)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	97.0	1.0 mg/L	100		97	80-120			
LCS (B9H1256-BS2)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	96.2	1.0 mg/L	100		96	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED 9081278
2019-08-22 11:11

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9H1256, Continued									
LCS (B9H1256-BS3)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Alkalinity, Total (as CaCO ₃)	97.4	1.0 mg/L	100		97	80-120			
LCS (B9H1256-BS4)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Conductivity (EC)	1390	2.0 µS/cm	1410		98	95-104			
LCS (B9H1256-BS5)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Conductivity (EC)	1390	2.0 µS/cm	1410		98	95-104			
LCS (B9H1256-BS6)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
Conductivity (EC)	1400	2.0 µS/cm	1410		99	95-104			
Duplicate (B9H1256-DUP3)				Source: 9081278-08		Prepared: 2019-08-15, Analyzed: 2019-08-15			
Alkalinity, Total (as CaCO ₃)	492	1.0 mg/L		516			5	10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO ₃)	492	1.0 mg/L		516			5	10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Conductivity (EC)	1160	2.0 µS/cm		1160			< 1	5	
pH	7.95	0.10 pH units		7.96			< 1	4	
Reference (B9H1256-SRM1)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
pH	6.97	0.10 pH units	7.01		99	98-102			
Reference (B9H1256-SRM2)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
pH	6.98	0.10 pH units	7.01		100	98-102			
Reference (B9H1256-SRM3)				Prepared: 2019-08-15, Analyzed: 2019-08-15					
pH	6.98	0.10 pH units	7.01		100	98-102			
General Parameters, Batch B9H1482									
Blank (B9H1482-BLK1)				Prepared: 2019-08-19, Analyzed: 2019-08-19					
Solids, Total Suspended	< 1.0	1.0 mg/L							
Blank (B9H1482-BLK2)				Prepared: 2019-08-19, Analyzed: 2019-08-19					
Solids, Total Suspended	< 1.0	1.0 mg/L							
LCS (B9H1482-BS1)				Prepared: 2019-08-19, Analyzed: 2019-08-19					
Solids, Total Suspended	107	10.0 mg/L	100		107	85-115			
LCS (B9H1482-BS2)				Prepared: 2019-08-19, Analyzed: 2019-08-19					
Solids, Total Suspended	102	10.0 mg/L	100		102	85-115			

Page 26 of 26

CERTIFICATE OF ANALYSIS

REPORTED TO Ecoscape Environmental Ltd.
#102 - 450 Neave Court
Kelowna, BC V1V 2M2

ATTENTION Kelsey Tanaka

PO NUMBER 19-2850

PROJECT 19-2850 - Golden

PROJECT INFO Golden

WORK ORDER N000444

RECEIVED / TEMP 2019-10-30 16:00 / NA
REPORTED 2019-11-14 00:30

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
Junior Account Manager



1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (N000444-01) Matrix: Water Sampled: 2019-10-29 14:25					
Anions					
Chloride	391	0.10	mg/L	2019-10-31	
Fluoride	0.11	0.10	mg/L	2019-10-31	
Nitrate (as N)	31.0	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	700	1.0	mg/L	2019-10-31	
Calculated Parameters					
Hardness, Total (as CaCO3)	1590	0.500	mg/L	N/A	
Dissolved Metals					
Lithium, dissolved	0.0440	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.0470	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	2.22	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-11-08	
Calcium, dissolved	156	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	0.00157	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.00229	0.00040	mg/L	2019-11-08	
Iron, dissolved	< 0.010	0.010	mg/L	2019-11-08	
Lead, dissolved	0.00096	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	292	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.0864	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00029	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.0115	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	168	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	13.2	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	306	0.10	mg/L	2019-11-08	
Strontium, dissolved	1.54	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	277	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	0.000061	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (N000444-01) Matrix: Water Sampled: 2019-10-29 14:25, Continued					
<i>Dissolved Metals, Continued</i>					
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00734	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	0.00016	0.00010	mg/L	2019-11-08	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	1000	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	1000	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	1220	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.14	0.020	mg/L	2019-11-01	
Conductivity (EC)	3920	2.0	µS/cm	2019-11-05	
pH	7.61	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	130	2.0	mg/L	2019-11-04	
Turbidity	77.2	0.10	NTU	2019-10-31	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (N000444-01) Matrix: Water Sampled: 2019-10-29 14:25, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	103	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	131	70-130	%	2019-11-05	S02
Surrogate: 1,4-Dichlorobenzene-d4	117	70-130	%	2019-11-05	

MW10-08 (N000444-02) | Matrix: Water | Sampled: 2019-10-29 15:40

Anions

Chloride	736	0.10	mg/L	2019-10-31	
Fluoride	0.20	0.10	mg/L	2019-10-31	
Nitrate (as N)	1.22	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	43.5	1.0	mg/L	2019-10-31	

Calculated Parameters

Hardness, Total (as CaCO3)	772	0.500	mg/L	N/A	
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Dissolved Metals

Lithium, dissolved	0.0227	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	0.00353	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.223	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	0.196	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-11-08	
Calcium, dissolved	103	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.00146	0.00040	mg/L	2019-11-08	
Iron, dissolved	< 0.010	0.010	mg/L	2019-11-08	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW10-08 (N000444-02) | Matrix: Water | Sampled: 2019-10-29 15:40, Continued

Dissolved Metals, Continued

Lead, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	125	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.00106	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00035	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.00098	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	6.26	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	10.6	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	431	0.10	mg/L	2019-11-08	
Strontium, dissolved	1.31	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	17.5	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	0.00029	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	0.0012	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00218	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	

General Parameters

Alkalinity, Total (as CaCO ₃)	518	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	518	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	632	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.075	0.020	mg/L	2019-11-01	
Conductivity (EC)	3160	2.0	µS/cm	2019-11-05	
pH	8.04	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	656	2.0	mg/L	2019-11-04	
Turbidity	671	0.10	NTU	2019-10-31	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW10-08 (N000444-02) Matrix: Water Sampled: 2019-10-29 15:40, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	95	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	115	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	115	70-130	%	2019-11-05	

MW18-10 (N000444-03) | Matrix: Water | Sampled: 2019-10-29 13:45

Anions

Chloride	348	0.10	mg/L	2019-10-31	
Fluoride	< 0.10	0.10	mg/L	2019-10-31	
Nitrate (as N)	34.7	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (N000444-03) Matrix: Water Sampled: 2019-10-29 13:45, Continued					
<i>Anions, Continued</i>					
Sulfate	74.2	1.0	mg/L	2019-10-31	
<i>Calculated Parameters</i>					
Hardness, Total (as CaCO ₃)	1070	0.500	mg/L	N/A	
<i>Dissolved Metals</i>					
Lithium, dissolved	0.0243	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	0.00026	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	0.00143	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.296	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	0.610	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	0.000039	0.000010	mg/L	2019-11-08	
Calcium, dissolved	92.9	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	0.00423	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.00186	0.00040	mg/L	2019-11-08	
Iron, dissolved	< 0.010	0.010	mg/L	2019-11-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	204	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.215	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00127	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.0409	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	25.7	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	11.1	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	206	0.10	mg/L	2019-11-08	
Strontium, dissolved	1.34	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	29.0	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	0.000099	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	0.00023	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00424	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	0.0111	0.0040	mg/L	2019-11-08	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (N000444-03) Matrix: Water Sampled: 2019-10-29 13:45, Continued					
<i>Dissolved Metals, Continued</i>					
Zirconium, dissolved	0.00029	0.00010	mg/L	2019-11-08	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO ₃)	802	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	802	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	978	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	1.37	0.020	mg/L	2019-11-01	
Conductivity (EC)	2650	2.0	µS/cm	2019-11-05	
pH	8.00	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	3050	2.0	mg/L	2019-11-04	
Turbidity	> 4000	0.10	NTU	2019-10-31	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-10 (N000444-03) | Matrix: Water | Sampled: 2019-10-29 13:45, Continued

Volatile Organic Compounds (VOC), Continued

Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	89	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	112	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	105	70-130	%	2019-11-05	

MW18-11 (N000444-04) | Matrix: Water | Sampled: 2019-10-29 15:50

Anions

Chloride	105	0.10	mg/L	2019-10-31	
Fluoride	0.94	0.10	mg/L	2019-10-31	
Nitrate (as N)	< 0.010	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	70.2	1.0	mg/L	2019-10-31	

Calculated Parameters

Hardness, Total (as CaCO3)	726	0.500	mg/L	N/A	
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Dissolved Metals

Lithium, dissolved	0.0276	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	0.00284	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	0.00450	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.0202	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	0.301	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-11-08	
Calcium, dissolved	48.7	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	0.00013	0.00010	mg/L	2019-11-08	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-11-08	
Iron, dissolved	0.495	0.010	mg/L	2019-11-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	147	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.132	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-11 (N000444-04) | Matrix: Water | Sampled: 2019-10-29 15:50, Continued

Dissolved Metals, Continued

Molybdenum, dissolved	0.00324	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.0100	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	4.51	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	4.8	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	110	0.10	mg/L	2019-11-08	
Strontium, dissolved	0.691	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	28.8	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.000100	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	0.0081	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	

General Parameters

Alkalinity, Total (as CaCO ₃)	700	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	700	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	855	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.095	0.020	mg/L	2019-11-01	
Conductivity (EC)	1490	2.0	µS/cm	2019-11-05	
pH	8.20	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	55.0	2.0	mg/L	2019-11-04	
Turbidity	95.6	0.10	NTU	2019-10-31	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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MW18-11 (N000444-04) | Matrix: Water | Sampled: 2019-10-29 15:50, Continued

Volatile Organic Compounds (VOC), Continued

Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	12.8	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	89	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	115	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	108	70-130	%	2019-11-05	

Town Well #4 (N000444-05) | Matrix: Water | Sampled: 2019-10-29 12:36

Anions

Chloride	92.8	0.10	mg/L	2019-10-31	
Fluoride	< 0.10	0.10	mg/L	2019-10-31	
Nitrate (as N)	1.76	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	41.8	1.0	mg/L	2019-10-31	

Calculated Parameters

Hardness, Total (as CaCO3)	407	0.500	mg/L	N/A	
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TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (N000444-05) Matrix: Water Sampled: 2019-10-29 12:36, Continued					
Dissolved Metals					
Lithium, dissolved	0.00228	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.205	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	0.0665	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-11-08	
Calcium, dissolved	89.6	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.00130	0.00040	mg/L	2019-11-08	
Iron, dissolved	< 0.010	0.010	mg/L	2019-11-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	44.5	0.010	mg/L	2019-11-08	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00018	0.00010	mg/L	2019-11-08	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	1.65	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	5.6	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	62.0	0.10	mg/L	2019-11-08	
Strontium, dissolved	0.439	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	16.1	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00124	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	

General Parameters

Alkalinity, Total (as CaCO3)	409	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO3)	409	1.0	mg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (N000444-05) Matrix: Water Sampled: 2019-10-29 12:36, Continued					
<i>General Parameters, Continued</i>					
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	498	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2019-11-01	
Conductivity (EC)	961	2.0	µS/cm	2019-11-05	
pH	8.16	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-11-04	
Turbidity	0.10	0.10	NTU	2019-10-31	
<i>Volatile Organic Compounds (VOC)</i>					
Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (N000444-05) Matrix: Water Sampled: 2019-10-29 12:36, Continued					
<i>Volatile Organic Compounds (VOC), Continued</i>					
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	87	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	112	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	104	70-130	%	2019-11-05	

DMW-1b (N000444-06) | Matrix: Water | Sampled: 2019-10-29 16:35

Anions

Chloride	8.80	0.10	mg/L	2019-10-31	
Fluoride	0.63	0.10	mg/L	2019-10-31	
Nitrate (as N)	0.756	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	175	1.0	mg/L	2019-10-31	

Calculated Parameters

Hardness, Total (as CaCO3)	549	0.500	mg/L	N/A	
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Dissolved Metals

Lithium, dissolved	0.0344	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	0.00082	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.0152	0.0050	mg/L	2019-11-08	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	0.275	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	0.000011	0.000010	mg/L	2019-11-08	
Calcium, dissolved	69.6	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	0.00082	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.0264	0.00040	mg/L	2019-11-08	
Iron, dissolved	0.011	0.010	mg/L	2019-11-08	
Lead, dissolved	0.00034	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	91.0	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.00242	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00097	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.00148	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	5.72	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	7.9	1.0	mg/L	2019-11-08	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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DMW-1b (N000444-06) | Matrix: Water | Sampled: 2019-10-29 16:35, Continued

Dissolved Metals, Continued

Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	29.9	0.10	mg/L	2019-11-08	
Strontium, dissolved	3.11	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	71.2	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00155	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	0.0435	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	0.00034	0.00010	mg/L	2019-11-08	

General Parameters

Alkalinity, Total (as CaCO ₃)	415	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	415	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	506	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	0.028	0.020	mg/L	2019-11-01	
Conductivity (EC)	982	2.0	µS/cm	2019-11-05	
pH	8.04	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-11-04	
Turbidity	0.18	0.10	NTU	2019-10-31	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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DMW-1b (N000444-06) | Matrix: Water | Sampled: 2019-10-29 16:35, Continued

Volatile Organic Compounds (VOC), Continued

1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	83	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	108	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	101	70-130	%	2019-11-05	

DUP (N000444-07) | Matrix: Water | Sampled: 2019-10-29 14:25

Anions

Chloride	391	0.10	mg/L	2019-10-31	
Fluoride	0.11	0.10	mg/L	2019-10-31	
Nitrate (as N)	32.1	0.010	mg/L	2019-10-31	
Nitrite (as N)	< 0.010	0.010	mg/L	2019-10-31	
Sulfate	702	1.0	mg/L	2019-10-31	

Calculated Parameters

Hardness, Total (as CaCO3)	1610	0.500	mg/L	N/A	
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Dissolved Metals

Lithium, dissolved	0.0453	0.00010	mg/L	2019-11-08	
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Barium, dissolved	0.0470	0.0050	mg/L	2019-11-08	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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DUP (N000444-07) | Matrix: Water | Sampled: 2019-10-29 14:25, Continued

Dissolved Metals, Continued

Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Boron, dissolved	2.18	0.0050	mg/L	2019-11-08	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-11-08	
Calcium, dissolved	158	0.20	mg/L	2019-11-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Cobalt, dissolved	0.00164	0.00010	mg/L	2019-11-08	
Copper, dissolved	0.00217	0.00040	mg/L	2019-11-08	
Iron, dissolved	< 0.010	0.010	mg/L	2019-11-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Magnesium, dissolved	295	0.010	mg/L	2019-11-08	
Manganese, dissolved	0.0898	0.00020	mg/L	2019-11-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2019-11-07	
Molybdenum, dissolved	0.00030	0.00010	mg/L	2019-11-08	
Nickel, dissolved	0.0116	0.00040	mg/L	2019-11-08	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-11-08	
Potassium, dissolved	173	0.10	mg/L	2019-11-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Silicon, dissolved	13.7	1.0	mg/L	2019-11-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-11-08	
Sodium, dissolved	317	0.10	mg/L	2019-11-08	
Strontium, dissolved	1.56	0.0010	mg/L	2019-11-08	
Sulfur, dissolved	285	3.0	mg/L	2019-11-08	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-11-08	
Thallium, dissolved	0.000060	0.000020	mg/L	2019-11-08	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-11-08	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-11-08	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-11-08	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Uranium, dissolved	0.00747	0.000020	mg/L	2019-11-08	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-11-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-11-08	
Zirconium, dissolved	0.00017	0.00010	mg/L	2019-11-08	

General Parameters

Alkalinity, Total (as CaCO ₃)	938	1.0	mg/L	2019-11-05	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Bicarbonate (as CaCO ₃)	938	1.0	mg/L	2019-11-05	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	2019-11-05	
Bicarbonate (HCO ₃)	1140	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	

TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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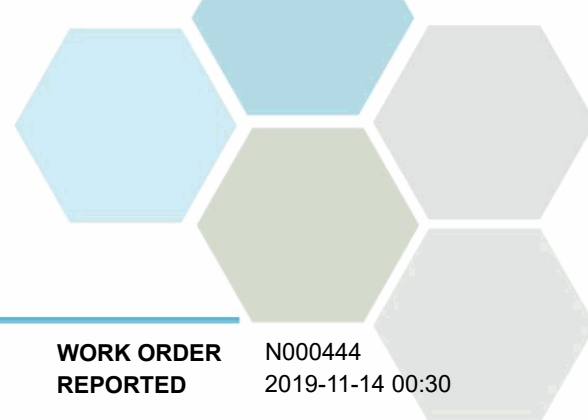
DUP (N000444-07) | Matrix: Water | Sampled: 2019-10-29 14:25, Continued

General Parameters, Continued

Ammonia, Total (as N)	1.00	0.020	mg/L	2019-11-01	
Conductivity (EC)	3860	2.0	µS/cm	2019-11-05	
pH	7.73	0.10	pH units	2019-11-05	HT2
Solids, Total Suspended	172	2.0	mg/L	2019-11-04	
Turbidity	114	0.10	NTU	2019-10-31	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	0.5	µg/L	2019-11-05	
Bromodichloromethane	< 1.0	1.0	µg/L	2019-11-05	
Bromoform	< 1.0	1.0	µg/L	2019-11-05	
Carbon tetrachloride	< 0.5	0.5	µg/L	2019-11-05	
Chlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
Chloroethane	< 2.0	2.0	µg/L	2019-11-05	
Chloroform	< 1.0	1.0	µg/L	2019-11-05	
Dibromochloromethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2019-11-05	
Dibromomethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2019-11-05	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Dichloromethane	< 3.0	3.0	µg/L	2019-11-05	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2019-11-05	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2019-11-05	
Ethylbenzene	< 1.0	1.0	µg/L	2019-11-05	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2019-11-05	
Styrene	< 1.0	1.0	µg/L	2019-11-05	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2019-11-05	
Tetrachloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Toluene	< 1.0	1.0	µg/L	2019-11-05	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2019-11-05	
Trichloroethylene	< 1.0	1.0	µg/L	2019-11-05	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2019-11-05	
Vinyl chloride	< 1.0	1.0	µg/L	2019-11-05	
Xylenes (total)	< 2.0	2.0	µg/L	2019-11-05	
Surrogate: Toluene-d8	85	70-130	%	2019-11-05	
Surrogate: 4-Bromofluorobenzene	110	70-130	%	2019-11-05	
Surrogate: 1,4-Dichlorobenzene-d4	101	70-130	%	2019-11-05	



TEST RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sample Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

S02 Surrogate recovery outside of control limits. Data accepted based on acceptable recovery of other surrogates.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H ₂ SO ₄	Kelowna
Ammonia, Total in Water	SM 4500-NH ₃ G* (2017)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	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*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Turbidity in Water	SM 2130 B (2017)	Nephelometry	Kelowna
Volatile Organic Compounds in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	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
>	Greater than the specified Result
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, pH > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

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 PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

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 B9K0773									
Blank (B9K0773-BLK1)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9K0773-BLK2)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9K0773-BLK3)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 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 (B9K0773-BS1)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	16.0	0.10 mg/L	16.0		100	90-110			
Fluoride	4.08	0.10 mg/L	4.00		102	88-108			
Nitrate (as N)	4.00	0.010 mg/L	4.00		100	90-110			
Nitrite (as N)	2.03	0.010 mg/L	2.00		102	85-115			
Sulfate	16.1	1.0 mg/L	16.0		101	90-110			
LCS (B9K0773-BS2)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.10	0.10 mg/L	4.00		102	88-108			
Nitrate (as N)	4.02	0.010 mg/L	4.00		100	90-110			
Nitrite (as N)	2.05	0.010 mg/L	2.00		102	85-115			
Sulfate	16.0	1.0 mg/L	16.0		100	90-110			
LCS (B9K0773-BS3)			Prepared: 2019-10-31, Analyzed: 2019-10-31						
Chloride	16.1	0.10 mg/L	16.0		100	90-110			

APPENDIX 2: QUALITY CONTROL RESULTS

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B9K0773, Continued									
LCS (B9K0773-BS3), Continued				Prepared: 2019-10-31, Analyzed: 2019-10-31					
Fluoride	4.19	0.10 mg/L	4.00		105	88-108			
Nitrate (as N)	4.15	0.010 mg/L	4.00		104	90-110			
Nitrite (as N)	2.05	0.010 mg/L	2.00		103	85-115			
Sulfate	16.0	1.0 mg/L	16.0		100	90-110			

Dissolved Metals, Batch B9K0669

Blank (B9K0669-BLK1)			Prepared: 2019-11-08, Analyzed: 2019-11-08						
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 (B9K0669-BS1)			Prepared: 2019-11-08, Analyzed: 2019-11-08						
Lithium, dissolved	0.0217	0.00010 mg/L	0.0200		109	80-120			
Aluminum, dissolved	0.0227	0.0050 mg/L	0.0199		114	80-120			
Antimony, dissolved	0.0189	0.00020 mg/L	0.0200		95	80-120			
Arsenic, dissolved	0.0189	0.00050 mg/L	0.0200		94	80-120			
Barium, dissolved	0.0191	0.0050 mg/L	0.0198		97	80-120			
Beryllium, dissolved	0.0220	0.00010 mg/L	0.0198		111	80-120			
Bismuth, dissolved	0.0204	0.00010 mg/L	0.0200		102	80-120			
Boron, dissolved	0.0210	0.0050 mg/L	0.0200		105	80-120			

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9K0669, Continued									
LCS (B9K0669-BS1), Continued				Prepared: 2019-11-08, Analyzed: 2019-11-08					
Cadmium, dissolved	0.0208	0.000010 mg/L	0.0199		104	80-120			
Calcium, dissolved	2.04	0.20 mg/L	2.02		101	80-120			
Chromium, dissolved	0.0196	0.00050 mg/L	0.0198		99	80-120			
Cobalt, dissolved	0.0200	0.00010 mg/L	0.0199		100	80-120			
Copper, dissolved	0.0209	0.00040 mg/L	0.0200		105	80-120			
Iron, dissolved	1.98	0.010 mg/L	2.02		98	80-120			
Lead, dissolved	0.0204	0.00020 mg/L	0.0199		102	80-120			
Magnesium, dissolved	2.16	0.010 mg/L	2.02		107	80-120			
Manganese, dissolved	0.0212	0.00020 mg/L	0.0199		107	80-120			
Molybdenum, dissolved	0.0202	0.00010 mg/L	0.0200		101	80-120			
Nickel, dissolved	0.0203	0.00040 mg/L	0.0200		101	80-120			
Phosphorus, dissolved	2.02	0.050 mg/L	2.00		101	80-120			
Potassium, dissolved	1.80	0.10 mg/L	2.02		89	80-120			
Selenium, dissolved	0.0232	0.00050 mg/L	0.0200		116	80-120			
Silicon, dissolved	2.2	1.0 mg/L	2.00		112	80-120			
Silver, dissolved	0.0209	0.000050 mg/L	0.0200		105	80-120			
Sodium, dissolved	2.13	0.10 mg/L	2.02		106	80-120			
Strontium, dissolved	0.0189	0.0010 mg/L	0.0200		94	80-120			
Sulfur, dissolved	4.8	3.0 mg/L	5.00		95	80-120			
Tellurium, dissolved	0.0212	0.00050 mg/L	0.0200		106	80-120			
Thallium, dissolved	0.0200	0.000020 mg/L	0.0199		101	80-120			
Thorium, dissolved	0.0190	0.00010 mg/L	0.0200		95	80-120			
Tin, dissolved	0.0212	0.00020 mg/L	0.0200		106	80-120			
Titanium, dissolved	0.0194	0.0050 mg/L	0.0200		97	80-120			
Tungsten, dissolved	0.0213	0.0010 mg/L	0.0200		106	80-120			
Uranium, dissolved	0.0196	0.000020 mg/L	0.0200		98	80-120			
Vanadium, dissolved	0.0188	0.0010 mg/L	0.0200		94	80-120			
Zinc, dissolved	0.0224	0.0040 mg/L	0.0200		112	80-120			
Zirconium, dissolved	0.0199	0.00010 mg/L	0.0200		100	80-120			

Duplicate (B9K0669-DUP1)		Source: N000444-01		Prepared: 2019-11-08, Analyzed: 2019-11-08					
Lithium, dissolved	0.0429	0.00010 mg/L		0.0440		2	14		
Aluminum, dissolved	< 0.0050	0.0050 mg/L		< 0.0050			11		
Antimony, dissolved	< 0.00020	0.00020 mg/L		< 0.00020			20		
Arsenic, dissolved	< 0.00050	0.00050 mg/L		< 0.00050			8		
Barium, dissolved	0.0462	0.0050 mg/L		0.0470		2	7		
Beryllium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010			14		
Bismuth, dissolved	< 0.00010	0.00010 mg/L		< 0.00010			20		
Boron, dissolved	2.09	0.0050 mg/L		2.22		6	13		
Cadmium, dissolved	< 0.000010	0.000010 mg/L		< 0.000010			20		
Calcium, dissolved	149	0.20 mg/L		156		4	8		
Chromium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050			14		
Cobalt, dissolved	0.00154	0.00010 mg/L		0.00157		1	10		
Copper, dissolved	0.00224	0.00040 mg/L		0.00229		2	20		
Iron, dissolved	< 0.010	0.010 mg/L		< 0.010			14		
Lead, dissolved	< 0.00020	0.00020 mg/L		0.00096			20		
Magnesium, dissolved	282	0.010 mg/L		292		3	6		
Manganese, dissolved	0.0843	0.00020 mg/L		0.0864		2	9		
Molybdenum, dissolved	0.00032	0.00010 mg/L		0.00029			19		
Nickel, dissolved	0.0111	0.00040 mg/L		0.0115		3	20		
Phosphorus, dissolved	< 0.050	0.050 mg/L		< 0.050			14		
Potassium, dissolved	162	0.10 mg/L		168		4	8		
Selenium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050			20		
Silicon, dissolved	12.6	1.0 mg/L		13.2		5	12		
Silver, dissolved	< 0.000050	0.000050 mg/L		< 0.000050			20		
Sodium, dissolved	298	0.10 mg/L		306		2	6		

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9K0669, Continued									
Duplicate (B9K0669-DUP1), Continued		Source: N000444-01		Prepared: 2019-11-08, Analyzed: 2019-11-08					
Strontium, dissolved	1.48	0.0010 mg/L		1.54			4	6	
Sulfur, dissolved	271	3.0 mg/L		277			2	20	
Tellurium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050				20	
Thallium, dissolved	0.000057	0.000020 mg/L		0.000061				13	
Thorium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Tin, dissolved	0.00021	0.00020 mg/L		< 0.00020				20	
Titanium, dissolved	< 0.0050	0.0050 mg/L		< 0.0050				20	
Tungsten, dissolved	< 0.0010	0.0010 mg/L		< 0.0010				20	
Uranium, dissolved	0.00729	0.000020 mg/L		0.00734			< 1	14	
Vanadium, dissolved	< 0.0010	0.0010 mg/L		< 0.0010				20	
Zinc, dissolved	< 0.0040	0.0040 mg/L		< 0.0040				11	
Zirconium, dissolved	0.00016	0.00010 mg/L		0.00016				20	

Reference (B9K0669-SRM1)		Prepared: 2019-11-08, Analyzed: 2019-11-08							
Lithium, dissolved	0.107	0.00010 mg/L		0.100		107	77-127		
Aluminum, dissolved	0.224	0.0050 mg/L		0.235		95	79-114		
Antimony, dissolved	0.0430	0.00020 mg/L		0.0431		100	89-123		
Arsenic, dissolved	0.409	0.00050 mg/L		0.423		97	87-113		
Barium, dissolved	2.87	0.0050 mg/L		3.30		87	85-114		
Beryllium, dissolved	0.231	0.00010 mg/L		0.209		110	79-122		
Boron, dissolved	1.80	0.0050 mg/L		1.65		109	79-117		
Cadmium, dissolved	0.223	0.000010 mg/L		0.221		101	89-112		
Calcium, dissolved	7.33	0.20 mg/L		7.72		95	85-120		
Chromium, dissolved	0.415	0.00050 mg/L		0.434		96	87-113		
Cobalt, dissolved	0.123	0.00010 mg/L		0.124		99	90-117		
Copper, dissolved	0.815	0.00040 mg/L		0.815		100	90-115		
Iron, dissolved	1.25	0.010 mg/L		1.27		99	86-112		
Lead, dissolved	0.109	0.00020 mg/L		0.110		99	90-113		
Magnesium, dissolved	6.90	0.010 mg/L		6.59		105	84-116		
Manganese, dissolved	0.343	0.00020 mg/L		0.342		100	85-113		
Molybdenum, dissolved	0.409	0.00010 mg/L		0.404		101	87-112		
Nickel, dissolved	0.826	0.00040 mg/L		0.835		99	90-114		
Phosphorus, dissolved	0.486	0.050 mg/L		0.499		97	74-119		
Potassium, dissolved	2.64	0.10 mg/L		2.88		92	78-119		
Selenium, dissolved	0.0393	0.00050 mg/L		0.0324		121	89-123		
Sodium, dissolved	18.5	0.10 mg/L		18.0		103	81-117		
Strontium, dissolved	0.842	0.0010 mg/L		0.935		90	82-111		
Thallium, dissolved	0.0384	0.000020 mg/L		0.0385		100	90-113		
Uranium, dissolved	0.243	0.000020 mg/L		0.258		94	87-113		
Vanadium, dissolved	0.807	0.0010 mg/L		0.873		92	85-110		
Zinc, dissolved	0.886	0.0040 mg/L		0.848		104	88-114		

Dissolved Metals, Batch B9K0733

Blank (B9K0733-BLK1)		Prepared: 2019-11-07, Analyzed: 2019-11-07							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B9K0733-BLK2)		Prepared: 2019-11-07, Analyzed: 2019-11-07							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Reference (B9K0733-SRM1)		Prepared: 2019-11-07, Analyzed: 2019-11-07							
Mercury, dissolved	0.00443	0.000010 mg/L		0.00489		91	80-120		
Reference (B9K0733-SRM2)		Prepared: 2019-11-07, Analyzed: 2019-11-07							
Mercury, dissolved	0.00536	0.000010 mg/L		0.00489		110	80-120		

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9K0411									
Blank (B9K0411-BLK1)				Prepared: 2019-10-25, Analyzed: 2019-10-25					
Turbidity	< 0.10	0.10 NTU							
Blank (B9K0411-BLK2)				Prepared: 2019-10-28, Analyzed: 2019-10-28					
Turbidity	< 0.10	0.10 NTU							
Blank (B9K0411-BLK3)				Prepared: 2019-10-30, Analyzed: 2019-10-30					
Turbidity	< 0.10	0.10 NTU							
Blank (B9K0411-BLK4)				Prepared: 2019-10-30, Analyzed: 2019-10-30					
Turbidity	< 0.10	0.10 NTU							
Blank (B9K0411-BLK5)				Prepared: 2019-10-31, Analyzed: 2019-10-31					
Turbidity	< 0.10	0.10 NTU							
Blank (B9K0411-BLK6)				Prepared: 2019-11-01, Analyzed: 2019-11-01					
Turbidity	< 0.10	0.10 NTU							
LCS (B9K0411-BS1)				Prepared: 2019-10-25, Analyzed: 2019-10-25					
Turbidity	37.7	0.10 NTU	40.0		94	90-110			
LCS (B9K0411-BS2)				Prepared: 2019-10-28, Analyzed: 2019-10-28					
Turbidity	39.4	0.10 NTU	40.0		98	90-110			
LCS (B9K0411-BS3)				Prepared: 2019-10-30, Analyzed: 2019-10-30					
Turbidity	37.0	0.10 NTU	40.0		92	90-110			
LCS (B9K0411-BS4)				Prepared: 2019-10-30, Analyzed: 2019-10-30					
Turbidity	38.0	0.10 NTU	40.0		95	90-110			
LCS (B9K0411-BS5)				Prepared: 2019-10-31, Analyzed: 2019-10-31					
Turbidity	39.0	0.10 NTU	40.0		98	90-110			
LCS (B9K0411-BS6)				Prepared: 2019-11-01, Analyzed: 2019-11-01					
Turbidity	38.5	0.10 NTU	40.0		96	90-110			
Duplicate (B9K0411-DUP5)				Source: N000444-01		Prepared: 2019-10-31, Analyzed: 2019-10-31			
Turbidity	83.8	0.10 NTU		77.2			8	15	
General Parameters, Batch B9K0428									
Blank (B9K0428-BLK1)				Prepared: 2019-11-04, Analyzed: 2019-11-04					
Solids, Total Suspended	< 2.0	2.0 mg/L							
LCS (B9K0428-BS1)				Prepared: 2019-11-04, Analyzed: 2019-11-04					
Solids, Total Suspended	91.0	2.0 mg/L	100		91	85-115			
General Parameters, Batch B9K0613									
Blank (B9K0613-BLK1)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9K0613, Continued									
Blank (B9K0613-BLK2)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B9K0613-BLK3)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
LCS (B9K0613-BS1)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	100	1.0 mg/L	100		100	80-120			
LCS (B9K0613-BS2)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	100	1.0 mg/L	100		100	80-120			
LCS (B9K0613-BS3)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Alkalinity, Total (as CaCO ₃)	102	1.0 mg/L	100		102	80-120			
LCS (B9K0613-BS4)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Conductivity (EC)	1360	2.0 µS/cm	1410		97	95-104			
LCS (B9K0613-BS5)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Conductivity (EC)	1370	2.0 µS/cm	1410		97	95-104			
LCS (B9K0613-BS6)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Conductivity (EC)	1380	2.0 µS/cm	1410		98	95-104			
Duplicate (B9K0613-DUP2)				Source: N000444-05		Prepared: 2019-11-05, Analyzed: 2019-11-05			
Alkalinity, Total (as CaCO ₃)	406	1.0 mg/L		409			< 1	10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO ₃)	406	1.0 mg/L		409			< 1	10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Conductivity (EC)	956	2.0 µS/cm		961			< 1	5	
pH	8.17	0.10 pH units		8.16			< 1	4	
Reference (B9K0613-SRM1)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
pH	6.97	0.10 pH units	7.01		99	98-102			
Reference (B9K0613-SRM2)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
pH	7.01	0.10 pH units	7.01		100	98-102			
Reference (B9K0613-SRM3)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
pH	7.02	0.10 pH units	7.01		100	98-102			

General Parameters, Batch B9K0809

Blank (B9K0809-BLK1) Prepared: 2019-11-01, Analyzed: 2019-11-01

Ammonia, Total (as N)	< 0.020	0.020 mg/L
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APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9K0809, Continued									
Blank (B9K0809-BLK2)			Prepared: 2019-11-01, Analyzed: 2019-11-01						
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
Blank (B9K0809-BLK3)			Prepared: 2019-11-01, Analyzed: 2019-11-01						
Ammonia, Total (as N)	< 0.020	0.020 mg/L							
LCS (B9K0809-BS1)			Prepared: 2019-11-01, Analyzed: 2019-11-01						
Ammonia, Total (as N)	1.05	0.020 mg/L	1.00		105	90-115			
LCS (B9K0809-BS2)			Prepared: 2019-11-01, Analyzed: 2019-11-01						
Ammonia, Total (as N)	1.00	0.020 mg/L	1.00		100	90-115			
LCS (B9K0809-BS3)			Prepared: 2019-11-01, Analyzed: 2019-11-01						
Ammonia, Total (as N)	1.02	0.020 mg/L	1.00		102	90-115			
Duplicate (B9K0809-DUP2)			Source: N000444-05		Prepared: 2019-11-01, Analyzed: 2019-11-01				
Ammonia, Total (as N)	0.020	0.020 mg/L		< 0.020				15	
Matrix Spike (B9K0809-MS2)			Source: N000444-05		Prepared: 2019-11-01, Analyzed: 2019-11-01				
Ammonia, Total (as N)	0.284	0.020 mg/L	0.250	< 0.020	108	75-125			

Volatile Organic Compounds (VOC), Batch B9K0225

Blank (B9K0225-BLK1)			Prepared: 2019-11-05, Analyzed: 2019-11-05						
Benzene	< 0.5	0.5 µg/L							
Bromodichloromethane	< 1.0	1.0 µg/L							
Bromoform	< 1.0	1.0 µg/L							
Carbon tetrachloride	< 0.5	0.5 µg/L							
Chlorobenzene	< 1.0	1.0 µg/L							
Chloroethane	< 2.0	2.0 µg/L							
Chloroform	< 1.0	1.0 µg/L							
Dibromochloromethane	< 1.0	1.0 µg/L							
1,2-Dibromoethane	< 0.3	0.3 µg/L							
Dibromomethane	< 1.0	1.0 µg/L							
1,2-Dichlorobenzene	< 0.5	0.5 µg/L							
1,3-Dichlorobenzene	< 1.0	1.0 µg/L							
1,4-Dichlorobenzene	< 1.0	1.0 µg/L							
1,1-Dichloroethane	< 1.0	1.0 µg/L							
1,2-Dichloroethane	< 1.0	1.0 µg/L							
1,1-Dichloroethylene	< 1.0	1.0 µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0 µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0 µg/L							
Dichloromethane	< 3.0	3.0 µg/L							
1,2-Dichloropropane	< 1.0	1.0 µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0 µg/L							
Ethylbenzene	< 1.0	1.0 µg/L							
Methyl tert-butyl ether	< 1.0	1.0 µg/L							
Styrene	< 1.0	1.0 µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5 µg/L							
Tetrachloroethylene	< 1.0	1.0 µg/L							
Toluene	< 1.0	1.0 µg/L							
1,1,1-Trichloroethane	< 1.0	1.0 µg/L							
1,1,2-Trichloroethane	< 1.0	1.0 µg/L							
Trichloroethylene	< 1.0	1.0 µg/L							
Trichlorofluoromethane	< 1.0	1.0 µg/L							
Vinyl chloride	< 1.0	1.0 µg/L							
Xylenes (total)	< 2.0	2.0 µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
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WORK ORDER REPORTED N000444
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B9K0225, Continued									
Blank (B9K0225-BLK1), Continued				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Surrogate: Toluene-d8	27.2	µg/L	26.2		104	70-130			
Surrogate: 4-Bromofluorobenzene	32.9	µg/L	25.0		131	70-130			S02
Surrogate: 1,4-Dichlorobenzene-d4	30.8	µg/L	24.8		124	70-130			
LCS (B9K0225-BS1)				Prepared: 2019-11-05, Analyzed: 2019-11-05					
Benzene	21.6	0.5 µg/L	20.0		108	70-130			
Bromodichloromethane	19.1	1.0 µg/L	20.1		95	70-130			
Bromoform	22.8	1.0 µg/L	20.1		113	70-130			
Carbon tetrachloride	20.3	0.5 µg/L	20.2		100	70-130			
Chlorobenzene	22.1	1.0 µg/L	20.1		110	70-130			
Chloroethane	27.4	2.0 µg/L	20.0		137	60-140			
Chloroform	20.5	1.0 µg/L	20.1		102	70-130			
Dibromochloromethane	19.3	1.0 µg/L	20.2		96	70-130			
1,2-Dibromoethane	19.3	0.3 µg/L	20.0		96	70-130			
Dibromomethane	20.9	1.0 µg/L	20.0		104	70-130			
1,2-Dichlorobenzene	22.5	0.5 µg/L	20.1		112	70-130			
1,3-Dichlorobenzene	22.3	1.0 µg/L	20.1		111	70-130			
1,4-Dichlorobenzene	22.4	1.0 µg/L	20.1		112	70-130			
1,1-Dichloroethane	23.0	1.0 µg/L	20.1		115	70-130			
1,2-Dichloroethane	18.4	1.0 µg/L	20.1		91	70-130			
1,1-Dichloroethylene	22.3	1.0 µg/L	20.0		112	70-130			
cis-1,2-Dichloroethylene	20.5	1.0 µg/L	20.0		103	70-130			
trans-1,2-Dichloroethylene	19.4	1.0 µg/L	20.0		97	70-130			
Dichloromethane	21.6	3.0 µg/L	20.1		107	70-130			
1,2-Dichloropropane	22.6	1.0 µg/L	20.1		112	70-130			
1,3-Dichloropropene (cis + trans)	33.7	1.0 µg/L	40.0		84	70-130			
Ethylbenzene	21.4	1.0 µg/L	20.0		107	70-130			
Methyl tert-butyl ether	17.0	1.0 µg/L	20.0		85	70-130			
Styrene	21.6	1.0 µg/L	20.0		108	70-130			
1,1,2,2-Tetrachloroethane	23.4	0.5 µg/L	20.1		117	70-130			
Tetrachloroethylene	23.3	1.0 µg/L	20.1		116	70-130			
Toluene	23.0	1.0 µg/L	20.0		115	70-130			
1,1,1-Trichloroethane	19.3	1.0 µg/L	20.0		97	70-130			
1,1,2-Trichloroethane	20.7	1.0 µg/L	20.1		103	70-130			
Trichloroethylene	22.9	1.0 µg/L	20.1		114	70-130			
Trichlorofluoromethane	23.2	1.0 µg/L	20.1		115	60-140			
Vinyl chloride	29.2	1.0 µg/L	20.1		145	60-140			SPK1
Xylenes (total)	67.2	2.0 µg/L	60.0		112	70-130			
Surrogate: Toluene-d8	23.1	µg/L	26.2		88	70-130			
Surrogate: 4-Bromofluorobenzene	37.7	µg/L	25.0		151	70-130			S02
Surrogate: 1,4-Dichlorobenzene-d4	42.6	µg/L	24.8		172	70-130			S02
Duplicate (B9K0225-DUP1)				Source: N000444-07	Prepared: 2019-11-05, Analyzed: 2019-11-05				
Benzene	< 0.5	0.5 µg/L		< 0.5				22	
Bromodichloromethane	< 1.0	1.0 µg/L		< 1.0				23	
Bromoform	< 1.0	1.0 µg/L		< 1.0				23	
Carbon tetrachloride	< 0.5	0.5 µg/L		< 0.5				30	
Chlorobenzene	< 1.0	1.0 µg/L		< 1.0				26	
Chloroethane	< 2.0	2.0 µg/L		< 2.0				50	
Chloroform	< 1.0	1.0 µg/L		< 1.0				22	
Dibromochloromethane	< 1.0	1.0 µg/L		< 1.0				28	
1,2-Dibromoethane	< 0.3	0.3 µg/L		< 0.3				30	
Dibromomethane	< 1.0	1.0 µg/L		< 1.0				30	
1,2-Dichlorobenzene	< 0.5	0.5 µg/L		< 0.5				27	
1,3-Dichlorobenzene	< 1.0	1.0 µg/L		< 1.0				30	
1,4-Dichlorobenzene	< 1.0	1.0 µg/L		< 1.0				30	

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WORK ORDER REPORTED N000444
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B9K0225, Continued									
Duplicate (B9K0225-DUP1), Continued		Source: N000444-07		Prepared: 2019-11-05, Analyzed: 2019-11-05					
1,1-Dichloroethane	< 1.0	1.0 µg/L		< 1.0				24	
1,2-Dichloroethane	< 1.0	1.0 µg/L		< 1.0				24	
1,1-Dichloroethylene	< 1.0	1.0 µg/L		< 1.0				30	
cis-1,2-Dichloroethylene	< 1.0	1.0 µg/L		< 1.0				22	
trans-1,2-Dichloroethylene	< 1.0	1.0 µg/L		< 1.0				27	
Dichloromethane	< 3.0	3.0 µg/L		< 3.0				27	
1,2-Dichloropropane	< 1.0	1.0 µg/L		< 1.0				28	
1,3-Dichloropropane (cis + trans)	< 1.0	1.0 µg/L		< 1.0				30	
Ethylbenzene	< 1.0	1.0 µg/L		< 1.0				30	
Methyl tert-butyl ether	< 1.0	1.0 µg/L		< 1.0				20	
Styrene	< 1.0	1.0 µg/L		< 1.0				30	
1,1,2,2-Tetrachloroethane	< 0.5	0.5 µg/L		< 0.5				30	
Tetrachloroethylene	< 1.0	1.0 µg/L		< 1.0				30	
Toluene	< 1.0	1.0 µg/L		< 1.0				24	
1,1,1-Trichloroethane	< 1.0	1.0 µg/L		< 1.0				30	
1,1,2-Trichloroethane	< 1.0	1.0 µg/L		< 1.0				30	
Trichloroethylene	< 1.0	1.0 µg/L		< 1.0				27	
Trichlorofluoromethane	< 1.0	1.0 µg/L		< 1.0				50	
Vinyl chloride	< 1.0	1.0 µg/L		< 1.0				40	
Xylenes (total)	< 2.0	2.0 µg/L		< 2.0				29	
Surrogate: Toluene-d8	22.2	µg/L	26.2		85	70-130			
Surrogate: 4-Bromofluorobenzene	27.4	µg/L	25.0		109	70-130			
Surrogate: 1,4-Dichlorobenzene-d4	25.4	µg/L	24.8		102	70-130			
Matrix Spike (B9K0225-MS1)		Source: N000444-07		Prepared: 2019-11-05, Analyzed: 2019-11-05					
Benzene	20.7	0.5 µg/L	20.0	< 0.5	104	70-130			
Bromodichloromethane	17.8	1.0 µg/L	20.1	< 1.0	89	70-130			
Bromoform	18.6	1.0 µg/L	20.1	< 1.0	92	70-130			
Carbon tetrachloride	16.7	0.5 µg/L	20.2	< 0.5	83	70-130			
Chlorobenzene	20.5	1.0 µg/L	20.1	< 1.0	102	70-130			
Chloroethane	22.6	2.0 µg/L	20.0	< 2.0	110	60-140			
Chloroform	18.8	1.0 µg/L	20.1	< 1.0	93	70-130			
Dibromochloromethane	18.3	1.0 µg/L	20.2	< 1.0	91	70-130			
1,2-Dibromoethane	20.9	0.3 µg/L	20.0	< 0.3	105	70-130			
Dibromomethane	19.3	1.0 µg/L	20.0	< 1.0	97	70-130			
1,2-Dichlorobenzene	19.1	0.5 µg/L	20.1	< 0.5	95	70-130			
1,3-Dichlorobenzene	18.9	1.0 µg/L	20.1	< 1.0	94	70-130			
1,4-Dichlorobenzene	19.8	1.0 µg/L	20.1	< 1.0	99	70-130			
1,1-Dichloroethane	21.2	1.0 µg/L	20.1	< 1.0	104	70-130			
1,2-Dichloroethane	17.0	1.0 µg/L	20.1	< 1.0	85	70-130			
1,1-Dichloroethylene	19.1	1.0 µg/L	20.0	< 1.0	95	70-130			
cis-1,2-Dichloroethylene	21.3	1.0 µg/L	20.0	< 1.0	107	70-130			
trans-1,2-Dichloroethylene	19.4	1.0 µg/L	20.0	< 1.0	97	70-130			
Dichloromethane	19.9	3.0 µg/L	20.1	< 3.0	98	70-130			
1,2-Dichloropropane	22.4	1.0 µg/L	20.1	< 1.0	111	70-130			
1,3-Dichloropropane (cis + trans)	46.0	1.0 µg/L	40.0	< 1.0	115	70-130			
Ethylbenzene	18.2	1.0 µg/L	20.0	< 1.0	91	70-130			
Methyl tert-butyl ether	28.6	1.0 µg/L	20.0	< 1.0	142	70-130			SPK1
Styrene	19.4	1.0 µg/L	20.0	< 1.0	97	70-130			
1,1,2,2-Tetrachloroethane	25.2	0.5 µg/L	20.1	< 0.5	125	70-130			
Tetrachloroethylene	14.6	1.0 µg/L	20.1	< 1.0	70	70-130			
Toluene	22.0	1.0 µg/L	20.0	< 1.0	109	70-130			
1,1,1-Trichloroethane	18.9	1.0 µg/L	20.0	< 1.0	95	70-130			
1,1,2-Trichloroethane	19.6	1.0 µg/L	20.1	< 1.0	98	70-130			
Trichloroethylene	18.2	1.0 µg/L	20.1	< 1.0	91	70-130			
Trichlorofluoromethane	18.9	1.0 µg/L	20.1	< 1.0	94	60-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Ecoscape Environmental Ltd.
19-2850 - Golden

WORK ORDER REPORTED N000444
2019-11-14 00:30

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B9K0225, Continued									
Matrix Spike (B9K0225-MS1), Continued		Source: N000444-07		Prepared: 2019-11-05, Analyzed: 2019-11-05					
Vinyl chloride	22.0	1.0 µg/L	20.1	< 1.0	109	60-140			
Xylenes (total)	59.6	2.0 µg/L	60.0	< 2.0	99	70-130			
Surrogate: Toluene-d8	25.3	µg/L	26.2		97	70-130			
Surrogate: 4-Bromofluorobenzene	40.0	µg/L	25.0		160	70-130			S02
Surrogate: 1,4-Dichlorobenzene-d4	40.4	µg/L	24.8		163	70-130			S02

QC Qualifiers:

S02 Surrogate recovery outside of control limits. Data accepted based on acceptable recovery of other surrogates.
 SPK1 The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.

APPENDIX F GOLDER 2019 ENVIRONMENTAL MONITORING PLAN