



MORRISON HERSHFIELD

Resort Municipality of Whistler Landfill Annual Monitoring Report 2020

Presented to:

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1. INTRODUCTION

This annual report incorporates monitoring data collected in 2020 for the Resort Municipality of Whistler (RMOW) former landfill site, located approximately 8 km west of Whistler Village and accessed off Highway 99 on Cheakamus Lake Road. The location of the site is illustrated in Figure 1.

The Whistler landfill opened in 1977 and initially accepted residential, industrial, commercial and institutional waste. This continued until the landfill's operating permit was amended in 1988 to also accept construction and demolition waste. The landfill site was closed in October 2005 to accommodate plans to use the area east of the site as the location of the Athletes' Village for the 2010 Winter Olympic Games. Between 1977 and 2005 approximately 350,000 tonnes of waste was disposed of at the Whistler Landfill (CH2M Hill, 2008a).

Construction of residential and commercial buildings in the area commenced in 2007 following the installation of a cover system and landfill gas (LFG) collection system in 2006.

Morrison Hershfield was retained by RMOW to complete the annual environmental monitoring and fulfill reporting requirements as set out in Section 3.31 of the 2005 Whistler Landfill Operational Certificate (MR-04693) and the Whistler Landfill Closure Plan (CH2M Hill, 2006a).

This report documents the 2020 monitoring program and presents a summary of its findings.

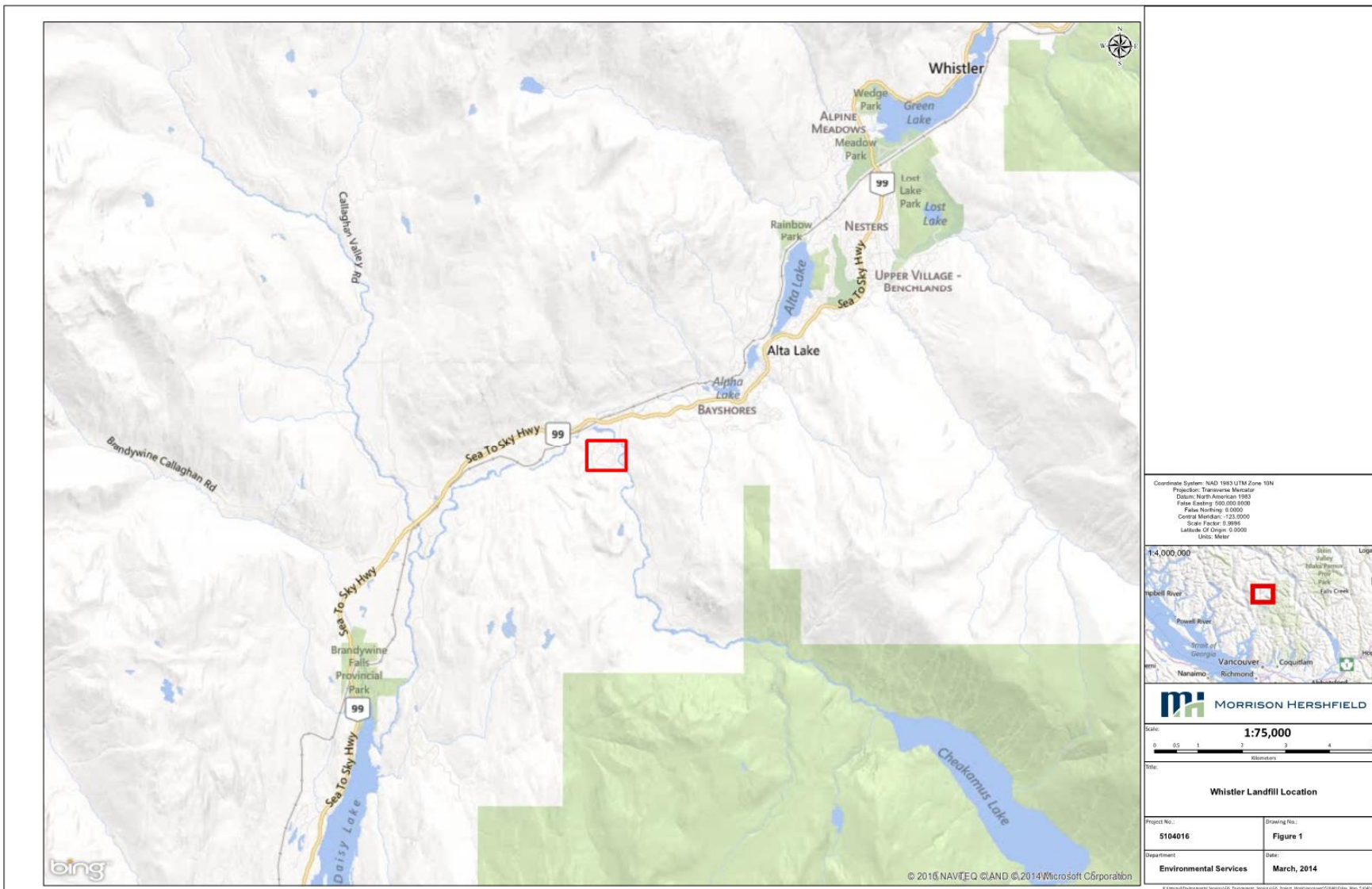


Figure 1: Whistler Closed Landfill Location

1.1 Program Objectives

The overall objective of the Whistler landfill monitoring program is identification of potential effects to the surrounding groundwater or surface water environment as a result of leachate or landfill gas (LFG) escaping the collection systems. Three distinct facets of the former landfill site were assessed: on-site surface water, groundwater and migration of LFG.

The objectives of the Surface Water and Groundwater Monitoring Program are as follows:

- Determine if the landfill is negatively affecting local groundwater and surface water quality; and
- Apply corrective measures as necessary to minimize landfill effects on groundwater and surface water.

The objectives of the LFG monitoring program are as follows:

- Monitor levels of LFG generation;
- Assess the overall collection performance of the Landfill Gas Collection System (LFGCS);
- Identify the composition of LFG within the soil at monitoring probe locations; and
- Adjust LFGCS as necessary based on monitoring data results to prevent off-site gas migration.

Specific monitoring requirements for surface water, groundwater and LFG are outlined in Section 3.

1.2 Report Purpose

The purpose of this report is to address the reporting requirements of the facility's Landfill Operational Certificate (MR-04692) and the following requirements included in the Whistler Landfill Closure Plan:

- Reporting of monitoring data collected in 2020; and
- Summary of maintenance activities that were completed on site in 2020, as well as any planned activities in 2021.

2. SITE DESCRIPTION

2.1 Landfill

The former landfill contains three distinct cells that were developed at different times over its lifespan.

- The northeast cell commenced in 1977 and contains residential waste in addition to industrial, commercial and institutional (ICI) waste. This material is not contained in a lined cell and relies on natural attenuation, coupled with a perimeter collection system, to manage leachate.
- Operations within the southwest cell began in 1988. Only construction and demolition (C & D) waste was accepted within this cell. This cell also relies on natural attenuation and a perimeter collection system to manage leachate.
- A central cell was developed in 1988 between the northeast and southwest cells for residential and ICI waste. This area was developed with a high-density polyethylene (HDPE) liner and an engineered leachate collection system.

In addition to the three cells, a biosolids storage area was installed at the south end of the landfill, covering a portion of the old southwest cell. Based on CH2M Hill (2006a) preliminary survey information from 2005, there was an estimated 6,000 m³ of biosolids stockpiled there.

2.2 Hydrological Conditions

The former landfill site is located within the Cheakamus River watershed. The Cheakamus River itself is located approximately 300 metres north of the waste mass and flows along the eastern boundary of the Athletes' Village (CH2M Hill, 2006a). The surface water features are concentrated mainly on the perimeter of the site, due to a combination of the natural and constructed topography of the area.

2.3 Geological Conditions

The geological conditions associated with the site are described by CH2M Hill (2008a).

In general, the site topography slopes from south to north. As described in the Whistler Landfill Closure Plan, within areas on the site and within adjacent lands, aggregate extraction activities have removed much of the natural overburden materials for use as industrial aggregates and replaced them with imported fill materials. As a result, the present ground surface associated with the landfill has likely been altered by industrial activities. As part of historical aggregate extraction activities conducted at the site, much of the natural overburden materials had been removed from the area and replaced with imported fill, resulting in a disturbance of the natural topography of the site. Exposed bedrock surface, characterized by glaciated surfaces and steep inclines, are present throughout the site. Areas between the exposed bedrock are infilled by coarse and medium grain sediments.

Based on the results of the borehole investigation conducted by CH2M Hill in January 2006, the top layer of the site stratigraphy is composed of sand, gravel, cobbles, and boulders (fill material), followed by a gravel-sand layer. The subsurface includes a poorly graded fine sand layer with some silt, followed by still sandy silt located above the bedrock (green basalt) (CH2M Hill, 2006a).

Overburden at the site was generally found to be consistent across the advanced boreholes and is characterized by progressively finer particle size of the sediments with increasing depth. Overburden thickness is highly variable, ranging from 0 to greater than 21 m. The overburden is consistent with fluvial or near-shore lacustrine deposition environments.

2.4 Hydrogeological Conditions

The hydrogeological conditions associated with the site are described by CH2M Hill (2006a) as follows:

A single unconfined aquifer is within the overburden on the site. The saturated zone in most locations extends from the bedrock surface at depth to within less than one metre of the ground surface. Bedrock in the area was found to be relatively dry and presented no visual indication of water bearing fractures. Groundwater flow is generally in a south to north direction, consistent with the surface topography.

Interpreted groundwater flow at the site is illustrated in Figure 2 (from CH2M Hill, 2006a).

2.5 Climate

Temperature ranges seasonally in Whistler with the coldest monthly typically being December, where the lowest average temperature is -5.4°C. The warmest month with the highest average temperature is August at 19°C. Average annual temperature is 5.9°C. The mean annual precipitation is 2,624 mm per year. On average November is the wettest month, but over the year an average of 1,206 mm of precipitation falls (data from 2020 – 2018). (Weatherstats, 2021)

2.6 Potential Receptors

The receptors within the local area of the landfill include both natural and human aspects. Potential receptors and their distance from the landfill mass include:

- Cheakamus River – 250 m - 450 m
- Unnamed Creek – 10 m
- Residential and commercial development – immediately adjacent to and on top of the landfill mass

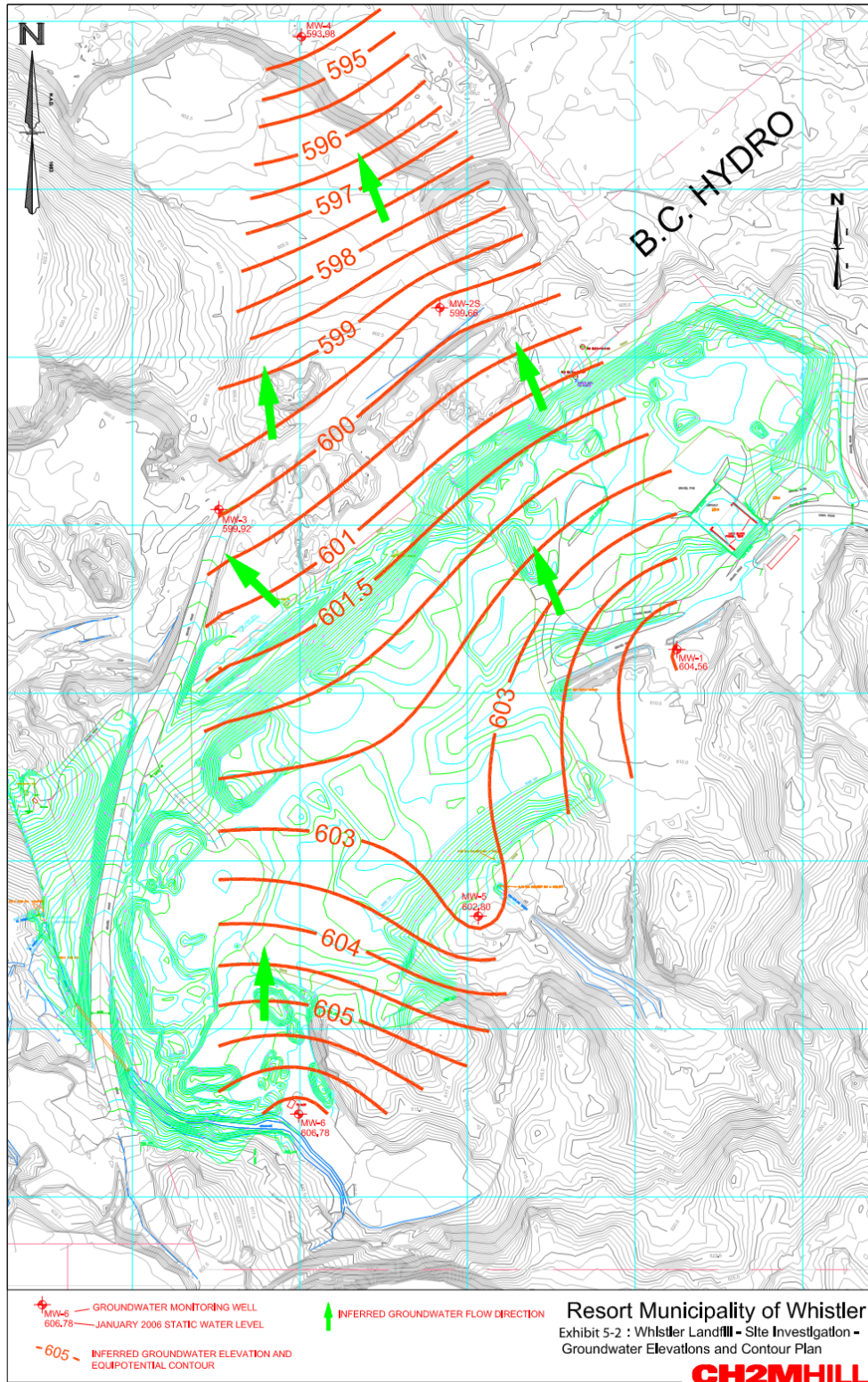


Figure 2: Groundwater Elevations and Flow Pattern at the Former Whistler Landfill Site (from CH2M Hill, 2006a)

3. MONITORING REQUIREMENTS

The following documents form the basis of the post-closure monitoring program and associated requirements, including parameters to be monitored. They are frequently referenced throughout this report.

- Whistler Landfill Closure Plan, Final Report (CH2M HILL, 2006a)
- Whistler Landfill Gas Pre-Design Memorandum (CH2M HILL, 2006b)
- Landfill Operational Certificate MR-04692 (B.C. Ministry of Environment, 2005)
- Mitigation and Safety Measures for Reduction of Landfill Gas Migration Risks (CH2M HILL, 2008a)
- Landfill Gas Collection System Operation and Maintenance Manual (CH2M HILL, 2008b)
- Monitoring and Reporting Requirements (CH2M HILL, 2008c)
- Resort Municipality of Whistler Landfill Annual Monitoring Report – 2011 & Revised Monitoring Program Recommendations (Morrison Hershfield, 2012).

Monitoring and reporting requirements established in the Closure Plan (CH2MHill 2008c) were amended in 2012 (Morrison Hershfield, 2012) based on a review of monitoring data.

4. METHODOLOGY

4.1 Overview of Sampling Locations, Schedule and Applicable Standards & Guidelines

The various leachate, groundwater, surface water and LFG monitoring locations are shown in Figure 3. Groundwater monitoring locations are identified as MW (monitoring well) followed by a number or number / letter combination (e.g. MW-3, MW-2S), a letter is added when both a shallow (S) and a deep (D) well were installed within a single borehole. Surface water sample locations are identified as SFC (surface), followed by a number or number / letter combination (e.g. SFC-2, SFC-2B), where the letter is used to indicate a second surface water sample on the same watercourse. L1 is the single leachate collection point.

The LFG collection system consists of the following components:

- Thirteen vertical LFG extraction wells connected to horizontal LFG collection trenches covering the landfill cell footprint;
- A 200 mm diameter header approximately 800 m in length that carries the LFG from the vertical well and horizontal trench network to a flare station;
- A LFG abstraction plant on the north side of the property that burns the collected LFG in a candle-stick flare;
- Twenty-one monitoring probes (MP) located around the perimeter of the landfill cell; and
- Approximately 91 test ports within selected buildings and residences in close proximity to the landfill.

The landfill gas monitoring probes around the circumference of the landfill mass are identified as MP followed by a number (e.g. MP 14). Also identified in Figure 3 are several components of the LFG collection system, including: thirteen LFG extraction wells (labeled as “W” followed by a number [e.g. W11]), the flare station, and header valves. A new monitoring probe was installed in November 2012 to the west of MP17 (identified as MP17A). As of December 2012, sampling commenced at MP17A and was omitted at MP17.

As per the requirements outlined in CH2M Hill (2008c) and confirmed by the MOE in 2012, groundwater and surface water monitoring have been conducted quarterly. Quarterly monitoring is tracked and reported based on a calendar year.

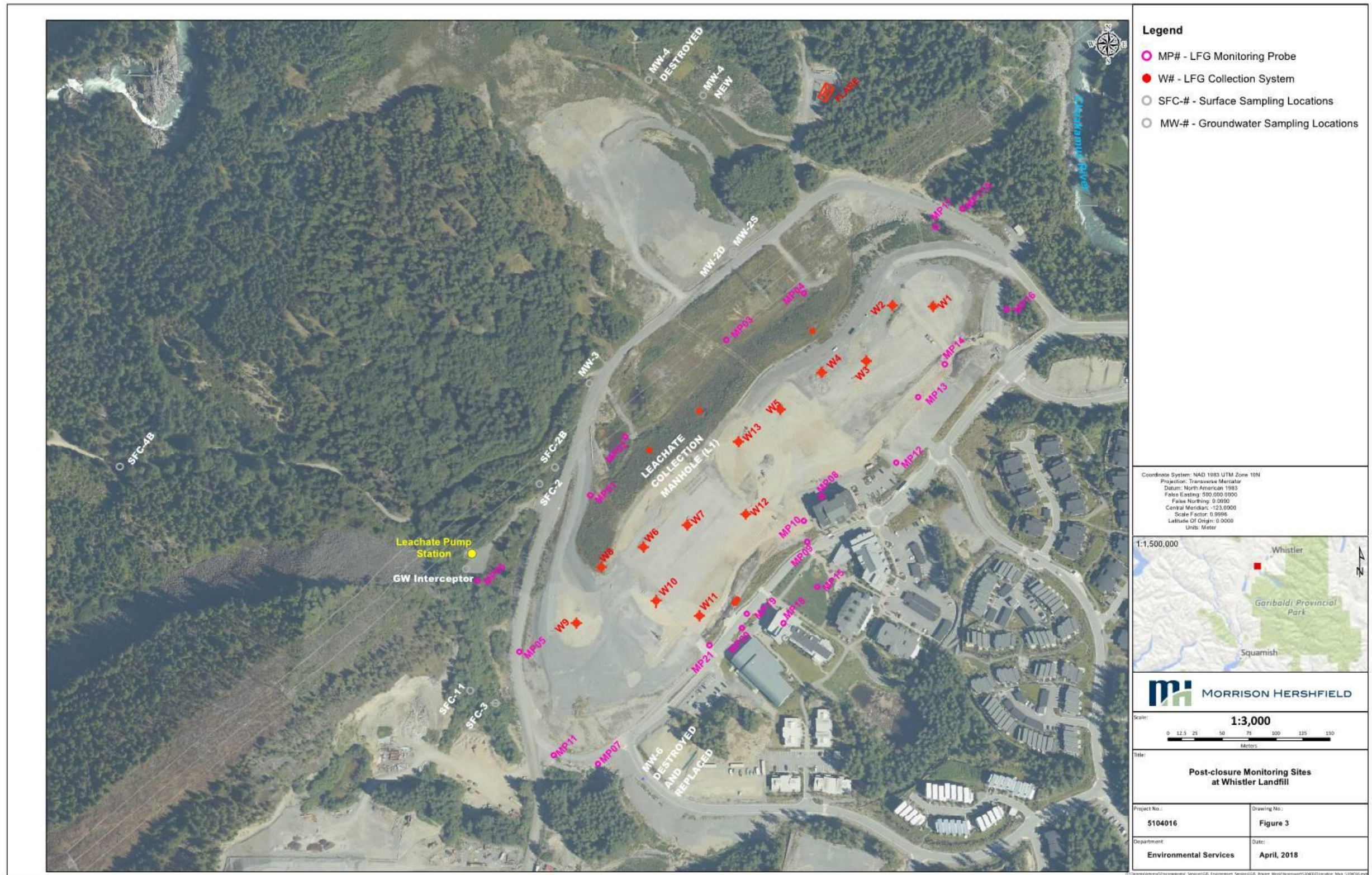


Figure 3: Post-Closure Monitoring Sites at the Closed Whistler Landfill

The 2020 leachate, groundwater and surface water monitoring program was completed by Morrison Hershfield staff. Samples were collected on the dates shown in Table 1. The first quarter sampling event was delayed slightly because of COVID-19 and the need to establish new health and safety procedures for MH staff to conduct work safely. The LFG monitoring program that has been in effect since 2009 has been conducted by Norseman Engineering Ltd. on a minimum monthly basis. During the winter months monitoring occurs on a weekly basis (November through April) when there is snow cover on the landfill or frozen ground (i.e. conditions that could facilitate subsurface LFG migration).

Table 1: 2020 Quarterly Sample Collection Dates

Sample Collection Dates 2020	
Quarter 1 (Q1 2020)	April 23, 2020
Quarter 2 (Q2 2020)	June 23, 2020
Quarter 3 (Q3 2020)	September 29, 2020
Quarter 4 (Q4 2020)	December 10, 2020

4.1.1 Leachate Monitoring

Leachate is captured and treated by the Whistler Wastewater Treatment Plant (WWTP). For monitoring purposes, the leachate quality is tested as part of this monitoring program. The monitoring results help to determine source concentrations prior to any migrations and an indication for when in the future leachate treatment will no longer be required.

A leachate collection point (Leachate Manhole) located on the down-gradient side of the landfill mass (Figure 3) was sampled to provide an indicator of the concentrations of target parameters within the landfill cell. Leachate samples were obtained using a plastic pail rinsed three times with the leachate water.

A leachate sample was collected during the first and third quarter sampling events. In addition to the sample for laboratory analysis, standard leachate field parameters were measured during the sampling event. The field parameters measured include pH, temperature, dissolved oxygen, and conductivity. Field parameters were measured using a YSI model 556 multi-probe meter.

Sampling is also conducted at the Groundwater (GW) Interceptor, adjacent to the Leachate Pump Station to the west and north of the landfill mass (Figure 3). The GW Interceptor is located adjacent to the existing leachate pump station in the southwest area of the closed landfill. The interceptor consists of 24 metres of perforated HDPE pipe (60 cm diameter). A new leachate collection wet well and pump station were constructed in 2009 in close proximity to the GW Interceptor. Intercepted groundwater is piped to the new leachate pump station wet well, where it is pumped along with landfill leachate, to the RMOW WWTP for treatment.

The GW Interceptor is located down-gradient from the unlined Construction and Demolition (C&D) waste cell and was (presumably) installed to minimize the potential for off-site effects associated with groundwater influenced by the C&D waste cell.

Samples were obtained using a plastic pail rinsed three times with the liquid in the manhole. One sample was collected during each quarterly sampling event in 2020. Complete laboratory results can be found in Appendix A. A laboratory error occurred in Q4, therefore no results are reported for PAHs, hydrocarbons or VOCs.

Table 2: 2020 Leachate Monitoring Events and Locations

Site	Site Description	Q1	Q2	Q3	Q4
Leachate Manhole	Access point manhole to leachate collection system	✓		✓	
GW Int	Down-gradient collection pipe	✓	✓	✓	✓

4.1.2 Groundwater Monitoring

CH2M Hill originally installed six monitoring wells (MW-1 to MW-6), one of which (MW-2) was constructed with a shallow and a deep screen, for a total of seven groundwater sampling points. The monitoring wells were constructed with 50 mm (2") diameter new PVC pipe. Screen intervals were constructed with 50 mm (2") diameter #10 slot PVC screen. The depth and screen length of each well was selected in the field based on observations made during drilling. Bentonite surface seals were installed (as required) to prevent infiltration of surface water into the well (CH2M Hill, 2006a).

The groundwater monitoring locations are situated both up- and down-gradient of the landfill to monitor the potential migration of leachate, and to be able to separate potential groundwater effects of residential and commercial development from effects of the landfill. MW-6 is up-gradient of the landfill mass and is used to represent the local background conditions for the area. All of the other wells are down-gradient of the landfill footprint. Table 2 provides a summary of groundwater wells monitored in 2020.

Table 3: 2020 Groundwater Monitoring Events and Locations

Site	Site Description	Q1	Q2	Q3	Q4
MW-2S & 2D	Immediately down-gradient of the landfill footprint	✓	✓	✓	✓
MW-3	Down-gradient of the landfill mass	✓	✓	✓	✓
MW-4	Down-gradient of the landfill mass	✓	✓	✓	✓
MW-6	Up-gradient of the landfill mass (background)	✓	✓	✓	✓

Groundwater samples were collected using dedicated HDPE tubing and foot valves. The procedure for the collection of all groundwater samples follows that described in CH2M Hill (2008c). Laboratory analyses for all of the samples were performed by ALS Environmental in Burnaby, BC. Appendix A provides a summary of the analytical results associated with groundwater quality monitoring.

All groundwater samples collected for dissolved metals analysis were filtered and preserved in the field. In addition to the samples for laboratory analysis, field parameters were also measured using a YSI model 556 multi-probe meter (or similar). The static water level depth in each well was also measured prior to sample collection.

Applicable Standards & Guidelines

The regulatory framework that applies to this project for groundwater water quality include the provincial standard for landfill closure: Schedule 3.2 (Generic Numerical Water Standards for Aquatic Life) of the B.C. Contaminated Sites Regulation (BCCSR). The BCCSR standards were updated as of January 2019 to reflect contemporary science as well as a number of other revisions. As outlined in section 9.2.1 of the Closure Plan, exceedance of any compliance criteria for a period of two consecutive sampling events at any one monitoring location will trigger contingency planning.

In addition to the comparison to the regulatory standards, the tables showing the groundwater results also include a comparison to the B.C. Working and Approved Water Quality Guidelines to provide MoE with additional information for year to year comparison. These guidelines are more restrictive since they generally apply to receiving water conditions and not to groundwater within the landfill site. The guidelines provide concentrations to prevent detrimental effects in water bodies that support aquatic life. Unlike the B.C. Contaminated Sites regulation there is no dilution factor incorporated; thus the values represented in the BC Ambient Water Quality guidelines are more stringent for many parameters. Therefore, while not directly applicable to monitoring locations at the landfill site, these guidelines provide a point of reference for assessing contaminant levels over time.

A summary of the groundwater quality results is provided in Section 5.1. Detailed laboratory results can be found in Appendix A.

4.1.3 Surface Water Monitoring

Sample station SFC-2B is located in a watercourse which originates in the wetland feature immediately adjacent to the leachate collection point. It is also located immediately down-gradient of the lined ICI and Residential Waste Cell and the historic biosolids and wood chip storage area. SFC-2 is located approximately 10 m downstream of SFC-2B. The source of the water in SFC-2 appears to be from a culvert that extends under the landfill in the direction of Athlete's Village. However, the Athlete's Village Pre-Design Report completed by KWL Associates Ltd. in November 2006 indicates that the culvert under the landfill has collapsed. The well was intended to maintain the groundwater table at pre-development elevations. Therefore, it is suspected that the culvert is collecting groundwater, and potentially leachate, which is being transported down-gradient to the outlet at SFC-2. Although the source of water in SFC-2 is expected to be groundwater, the site is still considered a surface water site since samples are collected from the location where the water daylights into a creek.

Monitoring of the nearest receiving waterbody (Cheakamus River) is not incorporated within this monitoring program, as defined by the provincially-approved Landfill Closure Plan. SFC-4B is the furthest down-gradient surface water monitoring location and the one nearest the

Cheakamus River. It provides the best indication of potential effects to receiving water quality resulting from the landfill site.

SFC-3 is located in a perimeter watercourse cross-gradient of the furthest south section of the landfill. SFC-11 is also located cross-gradient from the landfill in a tributary that originates from the southwest. The watershed for these locations do not include the landfill area (Figure 3). SFC-3 and SFC-11 are cross-gradient of the landfill and provide indicators of surface water conditions prior to any landfill related impacts.

Surface water samples were collected using the techniques outlined in CH2M Hill (2008c). Photo documentation are collected at each site for all sampling events. The photos are used to assess algae growth in the watercourses. Table 4 provides a summary of the surface water sites sampled in 2020. Field parameters were also measured using a YSI model 556 multi-probe meter (or similar). Appendix B provides a summary of the field data that was collected. Similar to the groundwater samples, all surface water samples were sent to ALS Environmental in Burnaby, BC for analysis.

Table 4: 2020 Surface Water Monitoring Events and Locations

Site	Site Description	Q1	Q2	Q3	Q4
SFC-2	Down stream of landfill	✓	✓	✓	✓
SFC-2B	Immediately adjacent to the leachate collection point	✓	✓	✓	✓
SFC-3	Located in a perimeter watercourse (cross-gradient)	✓	✓	✓	✓
SFC-4B	Furthest down-gradient and the closest monitoring point to the Cheakamus River	✓	✓	✓	✓
SFC-11	Cross-gradient from the landfill	✓	✓	✓	✓

Applicable Standards & Guidelines

The regulatory framework that applies to this project for surface water quality is the same as for groundwater, the applicable standards are the Schedule 3.2 (Generic Numerical Water Standards for Aquatic Life) of the B.C. Contaminated Sites Regulation. As outlined in section 9.2.1 of the Closure Plan, exceedance of any compliance criteria for a period of two consecutive sampling events at any one monitoring location will trigger contingency planning.

Surface water results are also compared to the B.C. Working and Approved Water Quality Guidelines to provide MoE with additional information for year to year comparison, in the same manner as groundwater results. These guidelines are more restrictive since they generally apply to receiving water conditions and not to locations within the landfill site. The guidelines provide concentrations to prevent detrimental effects in water bodies that support aquatic life. Unlike the B.C. Contaminated Sites Regulation there is no dilution factor incorporated; thus the values represented in the BC Ambient Water Quality guidelines are more stringent for many

parameters. Therefore, while not directly applicable to monitoring locations at the landfill site, these guidelines provide a point of reference for assessing contaminant levels over time.

A summary of the surface water quality results is presented in Section 5.2. Appendix A provides the detailed analytical results associated with surface water quality monitoring.

4.1.4 Landfill Gas Monitoring

Landfill gas monitoring was completed by Norseman Engineering Ltd. on a weekly (winter months) to monthly basis throughout the year. Monitoring at the building ports is conducted twice per year during months when there is snow pack, at least one month apart. Standard monitoring procedures were followed for LFG monitoring.

The following data was collected:

- Methane content at the subsurface probes;
- Methane and oxygen contents, flow rate, and inlet suction at the flare station; and
- Valve position (percent open), methane content and suction at each of the extraction wells (monitored for assessing the operational efficiency of the LFGCS).

Pressure at the wells is measured using 0 – 5" water column (w.c.) or 0 – 0.5" w.c. magnahelic pressure gauges. Methane content, as a percent of the Lower Explosive Limit (LEL), is detected using a Gastech device, model NP204. A concentration of 5% methane in the air is "the lower explosive limit" and concentrations equal to or greater than the LEL are considered hazardous (BC Ministry of Environment, 1996). Other parameters measured at the flare station are obtained from the programmable logic controller. The data gathered are important for assessing the overall function of the LFGCS, particularly the concentration of methane present in the landfill for flaring and to determine if the gas is escaping into the atmosphere and/or migrating off-site.

As per Morrison Hershfield (2012), the frequency of LFG monitoring should increase from monthly or weekly to daily in the event of LFGCS malfunction or maintenance requirements, or if detection of methane in excess of the trigger level (10% LEL) is observed. Morrison Hershfield (2012) also notes that, following detection of methane in excess of the trigger levels, monitoring frequency should be increased to daily at all of the monitoring probes and any buildings within 100 m of the MP. Monitoring at a daily frequency should continue until there are two consecutive days of undetectable methane content in the monitoring probes. If gas concentrations at the property boundaries remain above recommended trigger limits for more than 2 days, additional measures are outlined in the revised LFG monitoring program.

4.1.5 Settlement & Erosion

During the sampling events observations of any major erosion, slope instability or settlement on the closed landfill are noted if observed.

4.2 Quality Assurance and Quality Control

In addition to using an accredited laboratory, QA/QC measures were applied to the monitoring program to determine the accuracy and precision of the field results and the laboratory testing procedures. For each surface and groundwater sampling event a travel blank was submitted for analysis. Travel blanks are used to confirm that the samples have not been contaminated during transportation from the site to the laboratory. Duplicate samples were also collected from one monitoring location. The samples were transported in laboratory supplied coolers, remained closed, and were only reopened in the laboratory for analysis.

5. RESULTS AND DISCUSSION

Water quality monitoring at Whistler Landfill has included a broad suite of parameters, including the following groups of parameters:

- Dissolved & total metals
- Hardness
- Alkalinity
- Total Dissolved Solids
- Ammonia
- Volatile Organic Compounds (VOCs)
- Chemical Oxygen Demand (COD)
- Extractable and Volatile Hydrocarbons (EPH & VH)
- BTEX
- Polycyclic Aromatic Hydrocarbons (PAHs)

There are a limited number of key parameters that have been reviewed as both landfill related *indicator* parameters and parameters of potential concern:

Indicator parameters are compounds that are reliable indicators of groundwater effect from waste disposal, but in of themselves may not be a compound of concern. For the purposes of this water quality review, the landfill-related indicator parameters assessed include:

- chloride,
- conductivity,
- hardness,
- sulfate, and
- iron and manganese.

Parameters of potential concern at landfill sites consist primarily of ammonia (which can be toxic to aquatic life if it reaches an aquatic receptor at high enough concentrations). Other parameters of concern, may include presence of:

- hydrocarbons and/or volatile organic compounds, and
- possibly elevated concentration of heavy metals.

5.1 Groundwater

Monitoring locations up-gradient provide a method to identify parameters that occur at natural or background elevated levels in the local groundwater environment. MW-6 is up-gradient of the landfill and is used to represent the local background conditions for the area, whereas MW-4 is down-gradient of the landfill and the closest groundwater monitoring point to the Cheakamus River.

A summary of the groundwater quality results in comparison to the applicable standards and guidelines are provided in Table 7 and Table 8. Detailed laboratory results can be found in Appendix A.

The following summarizes the groundwater exceedances of the standards and the guidelines for 2020.

BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life

- VPH (C6-C10) exceeded the standard at MW-4 in Q1.

BC Ambient Water Quality Guidelines

- Arsenic concentrations exceeded the guideline at MW-2D and MW-2S in all quarters, and at MW-4 in all quarters except Q1.
- Cadmium concentrations exceeded the guideline at MW-3 in Q1.
- Cobalt concentrations exceeded the guideline at MW-2D and MW-4 in all quarters, and at MW-3 in all quarters except Q2.
- Iron concentrations exceeded the guideline at MW-2D, MW-2S and MW-4 in all quarters, at MW-3 in Q4, and at MW-6 in Q1 and Q2.
- Manganese concentrations exceeded the guideline at MW-2S in Q4, MW-3 in all quarters except Q2, and at MW-4 in all quarters.
- Thallium concentrations exceeded the guideline at MW-3 in Q4.
- Zinc concentrations exceeded the guideline at MW-4 in Q1 and Q4.
- Chlorobenzene concentrations exceeded the guideline at MW-2D in all quarters.

5.1.1 Discussion

Although VPH is a parameter of potential concern, it only exceeded the standard at one location during a single sampling period. This is the first time that VPH exceeded the standard in the past four years of monitoring.

Indicator metals, iron and manganese, were elevated at the wells down-gradient of the landfill (MW-2D, MW-2S, MW-3 and MW-4), but did not exceed the BCCSR standards in 2020. These indicator parameters were consistently elevated relative to background concentrations, which suggests MW-2D, MW-2S, MW-3 and MW-4 have been influenced by landfill leachate.

5.2 Surface Water

There are surface water monitoring locations both cross-gradient and down-gradient of the landfill. Sample locations SFC-3 and SFC-11 are cross-gradient of the landfill and represent surface water conditions prior to confluence with water impacted by the landfill area. SFC-4B is the furthest down-gradient and the closest monitoring point to the Cheakamus River.

Algae growth at the surface water sample locations was generally consistent with previous sample years. Evident orange algae was present in a layer on the watercourse bed materials for each sample event at SFC-2B and SFC-2. Downstream at SFC-4B there is some algae visible which decreases in the second half of the year. Generally, there was little or no orange algae during any of the sampling events at SFC-3 and SFC-11. A selection of photos through the 2020 sample year are provided in Appendix C.

A summary of the surface water monitoring results in comparison to the applicable standards and guidelines are provided in Table 9. Detailed laboratory results can be found in Appendix A.

The following summarizes the surface water exceedances of the standards and the guidelines for 2020.

BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life

- Cobalt concentrations exceeded the standard at SFC-2B in all quarters except Q4.
- Copper concentrations exceeded the standard at SFC-2B in all quarters.

BC Ambient Water Quality Guidelines

- pH was outside the range of the guideline at SFC-2B in all quarters.
- Nitrite concentrations exceeded the guideline at SFC-2B in Q3.
- Sulfate concentrations exceeded the guideline at SFC-2B in Q2.
- Aluminum concentrations exceeded the guideline at SFC-2 and SFC-2B in all quarters, and at SFC-3, SFC-4B and SFC-11 in all quarters except Q2.
- Beryllium concentrations exceeded the guideline at SFC-2B in all quarters, and at SFC-2 in Q3.
- Chromium concentrations exceeded the guidelines at SFC-2B in all quarters.
- Cobalt concentrations exceeded the guideline at SFC-2B in all quarters, and at SFC-2 in all quarters except Q1.
- Copper concentrations exceeded the guideline at SFC-2 in all quarters except Q2, at SFC-2B in all quarters, at SCF-3 and SFC-11 in Q4, and at SFC-4B in Q2 and Q4.
- Iron concentrations exceeded the guideline at SFC-2, SFC-2B and SFC-4B in all quarters, and at SFC-3 in Q4.
- Manganese concentrations exceeded the guideline at all surface water sample sites in all quarters.
- Nickel exceeded guidelines at SFC-2B in Q1, Q2 and Q3.

5.2.1 Discussion

Indicators of leachate influenced groundwater quality are regularly above the guidelines immediately down-gradient of the landfill footprint at SFC-2B and SFC-2. The levels of these parameters are generally greatest at SFC-2B and decrease incrementally further downstream at SFC-2 and SFC-4B.

Hardness, conductivity, sulfate, iron and manganese were consistently elevated at SFC-2B and SFC-2 relative to cross-gradient concentrations, which suggests that these locations are influenced by landfill leachate. However, elevated concentrations of metals such as aluminum, copper, iron and manganese that were observed at SFC-4B were also occasionally observed at cross-gradient locations SFC-3 and/or SFC-11. This suggests that surface water quality may be influenced by areas other than the landfill at these locations. At sample location SFC-2B, the

concentrations of cobalt and copper were in exceedance of the BCCSR standards for at least two sampling events in a row, which as per the Closure Plan indicates that contingency planning should be initiated. Prior to initiating contingency planning or measures, an assessment of the environmental risks was conducted, the findings of which are discussed here. There were three key areas that were assessed: the zone of influence, contribution of flow or magnitude of the issue, and habitat value within the watercourse sampled at SFC-2B.

Zone of influence: Exceedances of the standards did not report downstream at SFC-2 (located less than 30 m downstream), or at SFC-4B (the closest sampling location to the Cheakamus River) for all parameters.

Furthermore, a trend analysis was conducted in 2019 (using data from 2010-2018) which presented summary tables for key parameters, two of which are presented below for metals. The data summary tables indicate the significant attenuation and dilution between sample site SFC-2B and SFC-2, as well as SFC-2 and SFC-4B. (Morrison Hershfield, 2019)

Table 5 Total Iron Summary for Surface Water (2010 – 2018)

Sample Location	Mean (mg/L)	Minimum (mg/L)	Maximum (mg/L)
SFC2B	32.3	0.480	130
SFC2	3.40	0.057	8.43
SFC3	1.94	0.09	30.3
SFC4	1.02	0.062	4.89
SFC11	0.454	0.028	8.68

Table 6 Total Manganese Summary for Surface Water (2010 – 2018)

Sample Location	Mean (mg/L)	Minimum (mg/L)	Maximum (mg/L)
SFC2B	4.65	0.539	11.0
SFC2	1.27	0.010	3.36
SFC4	0.296	0.0001	1.08
SFC3	0.149	0.011	2.01
SFC11	0.016	0.002	0.236

Flow: SFC-2B is a drainage feature that is often dry or only standing water during Q3 sampling events. Throughout the year the flow contribution to the downstream environment in SFC-2 and SFC-4B is very minimal.

Habitat: A formal fish habitat assessment has not been completed at SFC-2B, however there have been no observations of fish or other aquatic life at this site. SFC-2B is dense with vegetation, has intermittent flow, and the pH is not considered ideal for aquatic species (generally too low). Furthermore, there is a partial barrier to fish passage (gradient is steep with minimal flow) at the confluence with the downstream waterbody. Given these attributes, it is highly unlikely that this location supports fish.

Based on the analysis of potential impact to human health and the environment from the zone of influence, flow and habitat value, it was decided that contingency planning is not warranted.

5.3 Leachate & Groundwater Interceptor

A summary of the leachate monitoring results in comparison to the applicable standards and guidelines are provided in Table 10 and Table 11. Detailed laboratory results can be found in Appendix A, however a laboratory error results in missing analytics for PAHs, hydrocarbons and VOCs in Q4.

The following summarizes the leachate exceedances of the standards and the guidelines for 2020.

BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life

- No parameters exceeded the standards in 2020.

BC Ambient Water Quality Guidelines

- pH was outside the range of the guideline at the Groundwater Interceptor in Q2.
- Alkalinity concentrations exceeded the guideline at the Leachate Manhole and Groundwater Interceptor for all quarters.
- Cobalt concentrations exceeded the guideline at the Groundwater Interceptor for Q3 and Q4.
- Copper concentrations exceeded the guideline at the Leachate Manhole in Q3.
- Iron concentrations exceeded the guideline at the Groundwater Interceptor in all quarters except Q1.
- Zinc concentrations exceeded the guideline at the Groundwater Interceptor in Q1.
- Pyrene concentrations exceeded the guideline at the Groundwater Interceptor in all quarters.

5.3.1 Discussion

The concentration of the indicator parameters were generally higher at the Groundwater Interceptor than at the Leachate Manhole. Similarly, concentrations of some potential parameters of concern were also higher at the Groundwater Interceptor than at the Leachate Manhole. In particular, measurable concentrations of pyrene were found in all quarters in the Groundwater Interceptor.

5.4 Landfill Gas

Testing was performed monthly during the months without snow cover (May – October). During the months with snowpack (January – April and November – December) testing was completed weekly. A summary of the landfill gas monitoring results is provided in Table 12.

On September 29th methane was detected with a concentration of 1% at monitoring points (MP) #12 and #14, which are located next to the Podium Building on Legacy Way. Remedial action was taken immediately, as outlined in Section 5.4.1. However, the migration had not cleared up by the end of the day on September 29th. A follow-up visit was conducted on October 9th, where

the measured methane content in air was 0% at MP # 12 and #14 (Norseman Engineering, Report #137, 2020).

In December 2020 a non-routine additional site inspection was conducted by MH staff as well as Norseman Engineering, the inspection identified that 5 of the 13 wells are no longer in service. Based on the inspection a work plan has been developed to conduct further inspection and optimization of the LFG system.

Methane was not detected at any other monitoring points in 2020. Based on 2020 data, the operation and maintenance of the landfill gas system ensured that landfill gas is effectively extracted from the landfill area and lateral migration was prevented, with the exception of the September 29th event.

5.4.1 Maintenance Activities

Routine maintenance of monitoring probes and vertical wells were completed on as needed basis during monitoring activities by Norseman Engineering.

- On January 31st the vacuum for well #11 and #12 was reduced to direct more vacuum to the northern wells. Oscillations in the vacuum at the flare indicate that there is liquid condensate at the low spot of the landfill gas transmission line, but not enough to prevent landfill gas from passing through. The low spot will need to be pumped out when the oscillations stop (Norseman Engineering, Report #129, 2020).
- The methane level at the flare dropped slightly to 27%, which is still adequate for proper combustion. However, the flare flow was reduced slightly on February 14th in an attempt to prevent it from falling any further. This appeared to be successful and the methane content stabilized at 27% (Norseman Engineering, Report #130, 2020).
- The methane level rose to 29% by the end of March, indicating that the slight decrease in flare flow in February had the desired effect of increasing the methane content at the flare. The intent is to keep the methane level around 30% to ensure combustion while preventing off site migration. Oscillations in the vacuum at the flare indicate that landfill gas is still passing through the low spot and there is still vacuum to the south end wells. It is expected that the low spot on the landfill gas transmission line will be pumped out this spring (Norseman Engineering, Report #131, 2020).
- The low spot in the landfill gas transmission line (35 feet north of cleanout manhole C2) was pumped out on May 23rd. A 1 ½ inch PVC flex hose with a weighted end was fed down the pipe to the desired point. An aluminum pump with no steel parts was used to pump the condensate such that no sparks were created in the event that methane was contacted. The discharge of the pump was directed downstream of C2 and a “sound check” was performed between manholes, confirming that the operation was successful. The pumping operation removed approximately 400 liters of condensate from the low spot. After pumping the methane content rose to 45% as a result of the addition of the southern wells. On May 29th, the methane content leveled off to 36%, which is still well within the combustion limit (Norseman Engineering, Report #133, 2020).

- Damage to blower 301 may have occurred during start up due to water freezing inside the blower during the winter. Blower #301 was removed for repairs in July (Norseman Engineering, #135, 2020).
- On September 29th methane was detected with a concentration of 1% methane in air at MP #12 and #14, which are located next to the Podium Building on Legacy Way. Flow to the flare was increased to raise the vacuum in the well field, such that the off-site methane will be drawn towards the landfill and ultimately combusted in the flare. The northern wells (#1 through #5) were opened up and the southern wells (#11, #12 and #13) were restricted to adjust the vacuum to the problem area of off-site migration. A follow up migration check was completed on October 9th to confirm whether the adjustments made on September 29th were successful in restricting off-site LFG migration. It was confirmed that the adjustments were successful, and the methane content in air was measured at 0% for all monitoring points, including MP #12 and #14 (Norseman Engineering, Report #137, 2020).
- By October 30th the methane content had started to fall to 28% as a result of adjustments made on September 29th. This is below the desirable methane content of 30% going into the winter season. As a result, the flare flow was adjusted downward from 112 cfm to 105 cfm. However, the vacuum to the well field was not taken below 4.0 “w.c., as this is the level of vacuum required to keep off site migration in check (Norseman Engineering, Report #138, 2020).
- Some oscillation in the vacuum was observed on November 6th, which indicates that the low spot in the landfill gas transmission line is almost full again. Oscillations were not observed in the subsequent three monitoring events conducted in November 2020 (Norseman Engineering, Report #139, 2020).
- Blower #301 has been repaired and was in the process of being installed in December 2020. The vacuum in well #11 and well #12 was increased to compensate for the reduced vacuum caused by condensate in the low spot of the LFG transmission line. Two attempts were made to pump out the low spot without success. The reason for the lack of success may have been that there was not enough liquid condensate to fill the hose and start the pump. A smaller diameter hose was obtained to allow smaller quantities of liquid to fill the hose and enable the system to be pumped. An indicator device was also installed to show the exact location of the low spot. Another attempt to pump out the low spot will be made in January 2021 (Norseman Engineering, Report #140, 2020).

5.5 Settlement & Erosion

During the 2020 sampling events there were no major settlement areas or areas of erosion identified.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Groundwater, Surface Water & Leachate

6.1.1 Monitoring

Data from the 2020 monitoring results are generally consistent with the results from previous years' monitoring except for a single exceedance of VPH in groundwater. Concentrations of cobalt and copper at SFC-2B were also consistently elevated.

Overall we have recommended continued monitoring; however we are currently reviewing the monitoring programs for potential updates and revisions. The proposed revised program will be sent to the Ministry for review and comment. The estimated timeline for submission to the Ministry is Q2 2021.

Groundwater

- The standard for VPH was exceeded in 2020 for one sample at down-gradient MW-4.
- Indicators of leachate influenced groundwater quality appear at this time in locations down-gradient of the landfill mass (MW-2S / MW-2D and MW-3), and further down-gradient of the landfill (MW-4).
- Metals such as arsenic, cadmium, cobalt, iron, and manganese continue to exceed the guidelines. For the first time in the past four years, thallium exceeded the guidelines.
- Down-gradient of the landfill there are no groundwater points of diversion / users.

Based on the elements noted above, continued monitoring of groundwater in 2021 is recommended and required as per the Closure Plan.

Surface Water

- Surface water samples at SFC-2B exceeded the standards for cobalt and copper, a trend also observed in 2018 and 2017.
- Hardness, conductivity, sulfate, iron and manganese were regularly elevated at SFC-2B and SFC-2 relative to cross-gradient concentrations. This is consistent with historic sampling events and suggests that these locations are influenced by landfill leachate.
- Iron and manganese were consistently elevated at SFC-4B. These parameters were also occasionally elevated at cross-gradient locations SFC-3 and SFC-11, which suggests that there may be some surface water quality influence at these locations that is unrelated to the landfill site.
- Surface water sampling location SFC-4B is the nearest to the Cheakamus River, therefore this location provides the best indication of potential effects to receiving water quality resulting from the site, and all BCCSR standards were met at this location.

Continued surface water monitoring in 2021 is recommended and required as per the Closure Plan.

Leachate

Continued monitoring is recommended in 2021 for leachate to assist in determining source concentrations of contaminants of concern and when in the future leachate treatment will no longer be required.

6.1.2 Maintenance

There are no recommended maintenance activities for 2021.

6.2 Landfill Gas

6.2.1 Monitoring & Maintenance

The December 2020 inspection of the LFG system resulted in recommendations for a wellfield inspection and clean-up as well as a fugitive methane emissions and gas leak investigation. These pieces of work are scheduled for 2021.

The results of the inspection and clean-up may result in suggested changes to the monitoring and maintenance of the LFGCS. Until the additional information from the 2021 work is complete, we recommend continued monitoring for LFG as prescribed in the methodology (Morrison Hershfield, 2012) is recommended.

6.3 Settlement & Erosion

6.3.1 Monitoring & Maintenance

Continued monitoring for any settlement or erosions issues is recommended to continue in 2021. No maintenance activities are recommended at this time.

7. DISCLAIMER

RMOW retained Morrison Hershfield to conduct the work described in this report, and this report has been prepared solely for this purpose.

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8. CLOSURE

We trust the information presented in this report meets your requirements. If you have any further questions or need addition details, please do not hesitate to contact one of the undersigned.

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9. REFERENCES

- B.C. Ministry of Environment, 2019. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Summary Report. August 2019. Aces February 23, 2021 at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/wqg_summary_aquaticlife_wildlife_agri.pdf
- B.C. Ministry of Environment. 2005. Landfill Operational Certificate MR-04692.
- B.C. Ministry of Environment. 1996. Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. Accessed April 8, 2020 at: https://www2.gov.bc.ca/assets/gov/environment/waste-management/garbage/guidelines_environmental_monitoring_municipal_solid_waste_landfills.pdf
- CH2M Hill. 2008a. Mitigation and Safety Measures for Reduction of Landfill Gas Migration Risks. Prepared for the Regional Municipality of Whistler.
- CH2M Hill. 2008b. Landfill Gas Collection System Operation and Maintenance Manual. Prepared for the Regional Municipality of Whistler.
- CH2M Hill. 2008c. Monitoring and Reporting Requirements. Prepared for the Regional Municipality of Whistler.
- CH2M Hill. 2006a. Whistler Landfill Closure Plan. Final Report prepared for the Regional Municipality of Whistler.
- CH2M Hill, 2006b. Whistler Landfill Gas Pre-Design Memorandum. Prepared for the Regional Municipality of Whistler.
- Contaminated Sites Regulation, B.C. Reg. 375/96. Schedule 3.2 Generic Numerical Water Standards.
- Morrison Hershfield, 2021. Ammonia Study. Prepared for the Regional Municipality of Whistler. February 21, 2021.
- Morrison Hershfield, 2019. Resort Municipality of Whistler Closed Landfill – Water Quality trend Analysis. Prepared for the Resort Municipality of Whistler. August 29, 2019.
- Morrison Hershfield, 2012. Resort Municipality of Whistler Landfill Annual Monitoring Report – 2011 & Revised Monitoring Program Recommendations. Prepared for the Resort Municipality of Whistler.
- Norseman Engineering, 2020a. Whistler Monitoring Report # 129 to 140.
- Weatherstats, 2021. Monthly data for Whistler, BC. Accessed Feb. 23, 2021: <https://whistler.weatherstats.ca/charts/precipitation-monthly.html>

Tables

TABLE 9: 2020 SURFACE WATER QUALITY - GENERAL CHEMISTRY AND METALS

Table with columns for Analyte, Units, LOR, and 20 sampling dates (2020) grouped by SFC-2, SFC-2B, SFC-3, SFC-4B, and SFC-11. Rows include Field Parameters, General Chemistry, Anions and Nutrients, and Total Metals.

*Standard: British Columbia Contaminated Sites Regulation (January, 2019) - Schedule 3.2 Water Standards Freshwater Aquatic Life
**Guideline: British Columbia Approved and Working Water Quality Guidelines (August, 2019) - BCAAWWQG - Freshwater Aquatic Life

Color Key: Exceeds Standard and Guideline Exceeds Guideline

TABLE 10: 2020 LEACHATE MANHOLE/GW INTERCEPTOR WATER QUALITY - GENERAL CHEMISTRY AND METALS

			Sample ID Date Sampled Quarter		LEACHATE MANHOLE		GW INTERCEPTOR				
					23-Apr-20	29-Sep-20	23-Apr-20	23-Jun-20	29-Sep-20	10-Dec-20	
					Q1	Q3	Q1	Q2	Q3	Q4	
Analyte	Units	LOR	Sch. 3.2 Water FAW*	BCAWWQG-FAL**							
Field Parameters											
Field Conductivity	uS/cm	-	-	-	256.9	452.4	236.9	537	435.4	814.0	
Temperature	C	-	-	-	6.9	12.9	8.6	9.1	9.0	8.0	
pH	-	-	-	-	6.51	6.37	6.74	6.23	6.29	6.38	
Dissolved Oxygen	mg/L	-	-	-	5.34	7.29	5.10	0.32	1.05	1.15	
Oxidation Reduction Potential	-	-	-	-	123.5	106.2	108.9	153.4	98.7	26.5	
General Chemistry											
Conductivity	uS/cm	2	-	-	397	599	350	689	577	772	
Hardness (as CaCO3)	mg/L	0.5	-	-	174	279	96	202	183	318	
pH	pH	0.1	-	6.5 - 9.0	7.93	7.25	7.8	6.39	6.83	6.76	
Total Suspended Solids	mg/L	3	-	-	3	<3.0	4.6	28.3	13.6	13.9	
COD	mg/L	20	-	-	28	50	<20	37	45	24	
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	mg/L	1.0	-	-	106	79.7	53.5	119	119	119	
Ammonia, Total (as N)	mg/L	0.0050	pH & Temp based 1.31 - 18.4	pH & Temp based 0.681 - 28.7	0.0453	0.0284	0.212	0.939	1.4	1.12	
Bromide (Br)	mg/L	0.050	-	-	<0.050	<0.050	<0.050	<0.250	<0.050	<0.250	
Chloride (Cl)	mg/L	0.50	1500	600	5.62	2.97	35.9	84.7	54	48	
Fluoride (F)	mg/L	0.020	2 @ H < 50 3 @ H >= 50	H based 0.4 - 2.5	0.023	0.031	0.074	0.117	0.121	<0.100	
Nitrate and Nitrite (as N)	mg/L	0.0051	400	-	6.16	22.2	0.842	<0.0500	0.0112	<0.0255	
Nitrate (as N)	mg/L	0.0050	400	33	6.16	22.2	0.831	<0.0250	0.01	<0.0250	
Nitrite (as N)	mg/L	0.0010	Cl based 0.2 - 2	Cl based 0.06 - 0.6	0.0014	0.0023	0.0107	<0.0050	0.0012	<0.0050	
Total Kjeldahl Nitrogen	mg/L	0.050	-	-	0.866	0.971	0.549	1.27	1.61	1.34	
Total Nitrogen	mg/L	0.030	-	-	6.3	23.7	1.19	1.38	1.54	1.38	
Phosphorus (P)-Total	mg/L	0.0020	-	15	0.032	0.0604	0.0163	0.0232	0.0096	0.0306	
Sulfate (SO4)	mg/L	0.30	1280 @ H <= 30 2180 @ H 31-75 3090 @ H 76-180 4290 @ H >180	-	64.9	127	54.7	111	90.5	216	
Dissolved Metals											
Aluminum (Al)-Dissolved	mg/L	0.0010	-	pH based 0.2 - 3.4	0.021	0.0216	0.0185	0.035	0.0368	0.0478	
Antimony (Sb)-Dissolved	mg/L	0.00010	0.09	-	<0.00010	0.0002	<0.00010	<0.00010	<0.00010	0.0002	
Arsenic (As)-Dissolved	mg/L	0.00010	0.05	0.005	0.00011	0.00022	<0.00010	0.0005	0.00079	0.00076	
Barium (Ba)-Dissolved	mg/L	0.00010	10	1	0.0357	0.0442	0.0268	0.0603	0.0591	0.0816	
Beryllium (Be)-Dissolved	mg/L	0.00010	0.0015	0.00013	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
Bismuth (Bi)-Dissolved	mg/L	0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved	mg/L	0.010	12	1.2	0.021	0.031	0.079	0.107	0.115	0.176	
Cadmium (Cd)-Dissolved	mg/L	0.0000050	0.0005 @ H <30 0.0015 @ H 30-<90 0.0025 @ H 90-<150 0.0035 @ H 150-<210 0.004 @ H >= 210	H based 0.02 - 2.8	0.0000406	0.0000749	0.0000138	0.0000128	0.0000093	0.0000148	
Calcium (Ca)-Dissolved	mg/L	0.050	-	-	60.5	99	33.7	68.6	60.9	109	
Cesium (Cs)-Dissolved	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	0.000016	0.000011	0.000011	
Chromium (Cr)-Dissolved	mg/L	0.00010	0.01	0.001	0.00013	0.00025	<0.00010	0.00023	0.00024	0.00029	
Cobalt (Co)-Dissolved	mg/L	0.00010	0.04	0.004	0.00023	0.00036	0.00061	0.00214	0.00438	0.00543	
Copper (Cu)-Dissolved	mg/L	0.00020	0.02 @ H < 50 0.03 @ H 50 - <75 0.04 @ H 75 - <100 0.05 @ H 100 - < 125 0.06 @ H 125 - <150 0.07 @ H 150 - < 175 0.08 @ H 175 - <200 0.09 @ H >= 200	H based (0.094(H)+2) / 1000	0.0148	0.0359	0.00178	<0.00020	0.00047	0.00029	
Iron (Fe)-Dissolved	mg/L	0.010	-	0.35	0.011	0.021	0.188	24.6	21.1	29	
Lead (Pb)-Dissolved	mg/L	0.000050	0.04 @ H <50 0.05 @ H 50 - <100 0.06 @ H 100 - <200 110 @ H 200 - <300 160 @ H >= 300	0.003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved	mg/L	0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved	mg/L	0.0050	-	-	5.45	7.84	2.85	7.55	7.59	10.8	
Manganese (Mn)-Dissolved	mg/L	0.00010	-	0.01102*H+0.54	0.0154	0.00753	0.283	1.86	2.1	2.5	
Mercury (Hg)-Dissolved	mg/L	0.0000050	0.00025	0.00001	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved	mg/L	0.000050	10	2	0.00039	0.000346	0.00024	0.000282	0.000733	0.000419	
Nickel (Ni)-Dissolved	mg/L	0.00050	0.25 @ H < 60 0.65 @ H 60 - <120 1.1 @ H 120 - < 180 1.5 @ H >= 180	0.025	0.00132	0.00241	0.00078	0.0021	0.00259	0.00364	
Phosphorus (P)-Dissolved	mg/L	0.050	-	-	<0.050	0.055	<0.050	<0.050	<0.050	<0.050	
Potassium (K)-Dissolved	mg/L	0.050	-	-	3.32	3.63	3.93	5.86	6.2	5.15	
Rubidium (Rb)-Dissolved	mg/L	0.00020	-	-	0.00226	0.00224	0.00238	0.00402	0.00436	0.00404	
Selenium (Se)-Dissolved	mg/L	0.000050	0.02	0.002	0.000097	0.000192	<0.000050	<0.000050	<0.000050	<0.000050	
Silicon (Si)-Dissolved	mg/L	0.050	-	-	7.44	11.8	3.59	9	9.19	10.6	
Silver (Ag)-Dissolved	mg/L	0.000010	0.0005 @ H <= 100 0.015 @ H > 100	0.00005	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved	mg/L	0.050	-	-	7.72	11.2	23.7	51.8	44.1	37.2	
Strontium (Sr)-Dissolved	mg/L	0.00020	-	-	0.228	0.343	0.22	0.453	0.43	0.7	
Sulfur (S)-Dissolved	mg/L	0.50	-	-	21.2	45	18.3	37	32.4	81.7	
Tellurium (Te)-Dissolved	mg/L	0.00020	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)-Dissolved	mg/L	0.000010	0.003	0.0008	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)-Dissolved	mg/L	0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)-Dissolved	mg/L	0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	
Titanium (Ti)-Dissolved	mg/L	0.00030	1	-	<0.00030	<0.00030	0.00039	0.00036	0.00033	<0.00060	
Tungsten (W)-Dissolved	mg/L	0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)-Dissolved	mg/L	0.000010	0.085	0.0085	0.000024	0.000028	<0.000010	<0.000010	0.00005	0.000019	
Vanadium (V)-Dissolved	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	0.00058	0.00058	0.00052	
Zinc (Zn)-Dissolved	mg/L	0.0010	0.075 @ H <90 0.15 @ H 90 - <100 0.9 @ H 100 - <200 1.65 @ H 200 - <300 2.4 @ H 300 - <400	H based	0.0291	0.0405	0.0598	0.0334	0.0297	0.0184	
Zirconium (Zr)-Dissolved	mg/L	0.000060	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	

*Standard: British Columbia Contaminated Sites Regulation (January, 2019) - Schedule 3.2 Water Standards Freshwater Aquatic Life

**Guideline: British Columbia Approved and Working Water Quality Guidelines (August, 2019) - BCAWWQG - Freshwater Aquatic Life

Color Key: Exceeds Standard and Guideline Exceeds Guideline

				Sample ID	LEACHATE MANHOLE		GW INTERCEPTOR				
				Date Sampled	23-Apr-20	29-Sep-20	23-Apr-20	23-Jun-20	29-Sep-20	10-Dec-20	
				Quarter	Q1	Q3	Q1	Q2	Q3	Q4	
Analyte	Units	LOR	Sch. 3.2 Water FAW*	BCAWWQG-FAL**							
Volatile Organic Compounds											
Benzene	mg/L	0.00050	0.4	0.04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Bromodichloromethane	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
Bromoform	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
Carbon Tetrachloride	mg/L	0.00050	0.13	0.0133	<0.0005		<0.0005	<0.0005			
Chlorobenzene	mg/L	0.0010	0.013	0.0013	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Dibromochloromethane	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
Chloroethane	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
Chloroform	mg/L	0.0010	0.02	0.0018	<0.0005		<0.0005	<0.0005			
Chloromethane	mg/L	0.0050	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
1,2-Dichlorobenzene	mg/L	0.00050	0.007	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
1,3-Dichlorobenzene	mg/L	0.0010	1.5	0.15	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
1,4-Dichlorobenzene	mg/L	0.0010	0.26	0.026	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
1,1-Dichloroethane	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
1,2-Dichloroethane	mg/L	0.0010	1	0.1	<0.0005		<0.0005	<0.0005			
1,1-Dichloroethylene	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
cis-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
trans-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.0005		<0.0005	<0.0005			
Dichloromethane	mg/L	0.0050	0.98	0.0981	<0.0005		<0.0005	<0.0005			
1,2-Dichloropropane	mg/L	0.0010	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
cis-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
trans-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.0005		<0.0005	<0.0005			
1,3-Dichloropropene (cis & trans)	mg/L	0.0010	-	-	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075		
Ethylbenzene	mg/L	0.00050	2	0.2	<0.0005		<0.0005	<0.0005			
Methyl t-butyl ether (MTBE)	mg/L	0.00050	34	3.4	<0.0005		<0.0005	<0.0005			
Styrene	mg/L	0.00050	0.72	0.072	<0.0005		<0.0005	<0.0005			
1,1,1,2-Tetrachloroethane	mg/L	0.0010	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
1,1,2,2-Tetrachloroethane	mg/L	0.00020	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tetrachloroethylene	mg/L	0.0010	1.1	0.11	<0.0005		<0.0005	<0.0005			
Toluene	mg/L	0.00045	0.005	0.0005	<0.0005		<0.0005	<0.0005			
1,1,1-Trichloroethane	mg/L	0.0010	-	11.1	<0.0005		<0.0005	<0.0005			
1,1,2-Trichloroethane	mg/L	0.00050	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Trichloroethylene	mg/L	0.0010	0.2	0.021	<0.0005		<0.0005	<0.0005			
Trichlorofluoromethane	mg/L	0.0010	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Vinyl Chloride	mg/L	0.00040	-	-	<0.0004		<0.0004	<0.0004			
ortho-Xylene	mg/L	0.00050	-	0.03	<0.0005		<0.0005	<0.0005			
meta- & para-Xylene	mg/L	0.00050	-	0.03	<0.0005		<0.0005	<0.0005			
Xylenes	mg/L	0.00075	0.3	0.03	<0.0005		<0.0005	<0.0005			
4-Bromofluorobenzene (SS)	%	Surrogate	-	-	0.00882	0.00978	0.00898	0.0099	0.00956		
1,4-Difluorobenzene (SS)	%	Surrogate	-	-	0.00862	0.00943	0.00938	0.00102	0.00942		
Hydrocarbons											
EPH10-19	mg/L	0.25	5	-	<0.25	<0.25	<0.25	<0.25	<0.25		
EPH19-32	mg/L	0.25	-	-	<0.25	<0.25	<0.25	<0.25	<0.25		
LEPH	mg/L	0.25	0.5	-	<0.25	<0.25	<0.25	<0.25	<0.25		
HEPH	mg/L	0.25	-	-	<0.25	<0.25	<0.25	<0.25	<0.25		
Volatile Hydrocarbons (VH6-10)	mg/L	0.10	15	-	<0.1	<0.1	<0.1	<0.1	<0.1		
VPH (C6-C10)	mg/L	0.10	1.5	-	<0.1	<0.1	<0.1	<0.1	<0.1		
2-Bromobenzotrifluoride	%	Surrogate	-	-	6.07	4.17	6.09	6	4.1		
3,4-Dichlorotoluene (SS)	%	Surrogate	-	-	1.16	1.02	1.22	0.89	0.908		
Polycyclic Aromatic Hydrocarbons											
Acenaphthene	mg/L	0.000010	0.06	0.006	<0.00001	<0.00001	0.000105	0.000329	0.00111		
Acenaphthylene	mg/L	0.000010	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Acridine	mg/L	0.000010	0.0005	0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Anthracene	mg/L	0.000010	0.001	0.0001	<0.00001	<0.00001	<0.00001	0.000014	0.000019		
Benz(a)anthracene	mg/L	0.000010	0.001	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Benzo(a)pyrene	mg/L	0.0000050	0.0001	0.00001	<0.000005	<0.000005	0.0000076	0.0000052	<0.000005		
Benzo(b&j)fluoranthene	mg/L	0.000010	-	-	<0.00001	<0.00001	0.000012	<0.00001	<0.00001		
Benzo(b+j+k)fluoranthene	mg/L	0.000015	-	-	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015		
Benzo(g,h,i)perylene	mg/L	0.000010	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Benzo(k)fluoranthene	mg/L	0.000010	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Chrysene	mg/L	0.000010	0.001	-	<0.00001	<0.00001	<0.000020	<0.00001	<0.00001		
Dibenz(a,h)anthracene	mg/L	0.0000050	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005		
Fluoranthene	mg/L	0.000010	0.002	0.0002	<0.00001	<0.00001	0.000061	0.000112	0.000177		
Fluorene	mg/L	0.000010	0.12	0.012	<0.00001	<0.00001	0.000038	0.000118	0.000177		
Indeno(1,2,3-c,d)pyrene	mg/L	0.000010	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
1-Methylnaphthalene	mg/L	0.000050	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
2-Methylnaphthalene	mg/L	0.000050	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Naphthalene	mg/L	0.000050	0.01	0.001	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005		
Phenanthrene	mg/L	0.000020	0.003	0.0003	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		
Pyrene	mg/L	0.000010	0.0002	0.00002	<0.00001	<0.00001	0.000037	0.000064	0.000093		
Quinoline	mg/L	0.000050	0.034	0.0034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Acridine d9	%	Surrogate	-	-	0.00065	0.000648	0.00067	0.000913	0.00086		
Chrysene d12	%	Surrogate	-	-	0.001	0.000868	0.000991	0.000946	0.000879		
Naphthalene d8	%	Surrogate	-	-	0.000644	0.000843	0.000608	0.000903	0.000866		
Phenanthrene d10	%	Surrogate	-	-	0.000779	0.000869	0.000776	0.001	0.000895		
*Standard: British Columbia Contaminated Sites Regulation (January, 2019) - Schedule 3.2 Water Standards Freshwater Aquatic Life											
**Guideline: British Columbia Approved and Working Water Quality Guidelines (August, 2019) - BCAWWQG - Freshwater Aquatic Life											
Color Key:											
				Exceeds Standard and Guideline		Exceeds Guideline					

**APPENDIX A: Analytical Laboratory Results for Leachate,
Groundwater & Surface Water**



CERTIFICATE OF ANALYSIS

Work Order : **VA20A5335**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
 Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 18001536
PO : 726379
C-O-C number : ----
Sampler : E. Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 16
No. of samples analysed : 16

Page : 1 of 17
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 24-Apr-2020 09:30
Date Analysis Commenced : 26-Apr-2020
Issue Date : 04-May-2020 18:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Analyst	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Evan Ben-Oliel	Metal Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Matthew Woods	Lab Assistant	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Inorganics - Water Quality, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Apr-2020 08:00	23-Apr-2020 08:30	23-Apr-2020 09:30	23-Apr-2020 16:45	23-Apr-2020 14:00
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-001	VA20A5335-002	VA20A5335-003	VA20A5335-004	VA20A5335-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	286	84.4	26.2	132	29.7
conductivity	----	E100	2.0	µS/cm	950	311	187	423	743
pH	----	E108	0.10	pH units	7.31	8.01	7.53	7.76	7.44
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	59.6	19.0	6.8	364	238
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	346	104	44.6	150	162
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	11.9	4.46	0.473	2.35	0.0534
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 ^{DLDS}	<0.050	<0.050	0.068	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	50.8	12.3	17.3	25.1	144
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 ^{DLDS}	0.120	0.032	<0.046 ^{DLCl}	0.059
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	12.6	4.55	0.581	2.45	0.639
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 ^{DLDS}	0.0052	0.741	0.0107	0.304
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	<0.0500	<0.0500	0.747	<0.0500	0.304
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	<0.0010	0.0060	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	12.5	4.68	0.758	2.62	0.892
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0887	0.0350	0.0036	0.186 ^{RRV}	0.834
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	154	47.2	29.0	48.0	97.9
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0039	0.0023	0.0309	0.0096	0.0168
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0147	0.00675	<0.00010	0.00334	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0380	0.0807	0.0688	0.207	0.0443
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.284	0.106	<0.010	0.069	0.012
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000270	0.000296	0.0000650
calcium, dissolved	7440-70-2	E421	0.050	mg/L	116	33.9	13.6	48.5	54.6
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000018	0.000018	0.000046	0.000045	0.000011
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0110	0.00106	0.00999	0.0272	0.00041



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Apr-2020 08:00	23-Apr-2020 08:30	23-Apr-2020 09:30	23-Apr-2020 16:45	23-Apr-2020 14:00
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-001	VA20A5335-002	VA20A5335-003	VA20A5335-004	VA20A5335-005
					Result	Result	Result	Result	Result
Dissolved Metals									
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00139	0.00549	0.00282	0.00209
iron, dissolved	7439-89-6	E421	0.010	mg/L	46.2	27.7	0.248	31.4	0.450
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.7	4.82	2.56	6.99	6.17
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.10	1.36	1.98	2.24	0.0823
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0138	0.00322	0.000574	0.00742	0.000582
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00196	0.00058	0.00142	0.00505	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.082	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L	18.7	7.65	2.72	6.10	3.55
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0102	0.00492	0.00789	0.00510	0.00523
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000082	<0.000050	<0.000050	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.6	8.65	6.02	10.4	5.28
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	36.9	9.03	13.8	17.8	78.2
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.539	0.200	0.104	0.305	0.557
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	48.5	15.6	10.1	15.9	34.1
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0.000103	0.000050	0.000031
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000146	0.000015	<0.000010	0.000208	0.000012
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0013	0.0025	0.0040	0.0081	0.0024
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
Aggregate Organics									



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Apr-2020 08:00	23-Apr-2020 08:30	23-Apr-2020 09:30	23-Apr-2020 16:45	23-Apr-2020 14:00
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-001	VA20A5335-002	VA20A5335-003	VA20A5335-004	VA20A5335-005
					Result	Result	Result	Result	Result
Aggregate Organics									
chemical oxygen demand [COD]	----	E559	20	mg/L	32	<20	<20	166	27
Volatile Organic Compounds									
benzene	71-43-2	E611C	0.50	µg/L	0.58	<0.50	<0.50	<0.50	<0.50
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
chlorobenzene	108-90-7	E611C	0.50	µg/L	2.37	<0.50	<0.50	0.79	<0.50
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	0.54	<0.50	<0.50	<0.50	<0.50
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Apr-2020 08:00	23-Apr-2020 08:30	23-Apr-2020 09:30	23-Apr-2020 16:45	23-Apr-2020 14:00
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-001	VA20A5335-002	VA20A5335-003	VA20A5335-004	VA20A5335-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	83.1	85.3	80.1	80.7	75.3
chrysene-d12	1719-03-5	E641A	0.010	%	126	120	118	102	125
naphthalene-d8	1146-65-2	E641A	0.010	%	80.9	72.8	77.5	96.2	74.4
phenanthrene-d10	1517-22-2	E641A	0.010	%	106	96.3	92.9	109	99.0

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
Client sampling date / time					23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	126	<1.0	53.5	106	22.9	
conductivity	----	E100	2.0	µS/cm	404	<2.0	350	397	98.0	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	----	----	----	30.0	
pH	----	E108	0.10	pH units	7.85	5.46	7.80	7.93	7.43	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	823	<3.0	4.6	3.0	<3.0	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	150	<0.60	96.0	174	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	2.47	0.0255 ^{RRV}	0.212	0.0453	0.0100	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.062	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	23.3	<0.50	35.9	5.62	6.97	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.042 ^{DLCl}	<0.020	0.074	0.023	0.021	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.85	<0.050	0.549	0.866	0.150	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0132	<0.0050	0.831	6.16	<0.0050	
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	<0.0500	<0.0500	0.842	6.16	<0.0500	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0.0107	0.0014	<0.0010	
nitrogen, total	7727-37-9	E366	0.030	mg/L	2.73	0.043 ^{RRV}	1.19	6.30	0.157	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.310 ^{RRV}	<0.0020	0.0163	0.0320	0.0090	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	46.6	<0.30	54.7	64.9	11.6	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	----	----	----	0.0405	
antimony, total	7440-36-0	E420	0.00010	mg/L	----	----	----	----	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	----	----	----	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	----	----	----	----	0.0169	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	----	----	----	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	----	----	----	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	----	----	----	----	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	----	----	----	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	----	----	----	----	10.7	
cesium, total	7440-46-2	E420	0.000010	mg/L	----	----	----	----	<0.000010	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	----	----	----	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	----	----	----	0.00018	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
Client sampling date / time					23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	----	----	----	----	0.00116	
iron, total	7439-89-6	E420	0.010	mg/L	----	----	----	----	0.227	
lead, total	7439-92-1	E420	0.000050	mg/L	----	----	----	----	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	----	----	----	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	----	----	----	0.820	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	----	----	----	0.0312	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	----	----	----	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	----	----	----	0.00447	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	----	----	----	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	----	----	----	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	----	----	----	----	1.23	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	----	----	----	0.00126	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	----	----	----	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	----	----	----	----	2.01	
silver, total	7440-22-4	E420	0.000010	mg/L	----	----	----	----	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	----	----	----	----	5.28	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	----	----	----	0.0540	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	----	----	----	3.70	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	----	----	----	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	----	----	----	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	----	----	----	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	----	----	----	----	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	----	----	----	0.00040	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	----	----	----	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	----	----	----	0.000017	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	----	----	----	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	----	----	----	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	----	----	----	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.107	<0.0010	0.0185	0.0210	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
Client sampling date / time					23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Dissolved Metals										
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00259	<0.00010	<0.00010	0.00011	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.175	<0.00010	0.0268	0.0357	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.064	<0.010	0.079	0.021	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000371	<0.0000050	0.0000138	0.0000406	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	49.8	<0.050	33.7	60.5	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000058	<0.000010	<0.000010	<0.000010	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00011	<0.00010	<0.00010	0.00013	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0222	<0.00010	0.00061	0.00023	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00355	<0.00020	0.00178	0.0148	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	21.3	<0.010	0.188	0.011	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000814	<0.000050	<0.000050	<0.000050	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.36	<0.0050	2.85	5.45	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	2.05	<0.00010	0.283	0.0154	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00550	<0.000050	0.000240	0.000390	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00502	<0.00050	0.00078	0.00132	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	5.55	<0.050	3.93	3.32	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00502	<0.00020	0.00238	0.00226	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000097	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	9.94	<0.050	3.59	7.44	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	16.0	<0.050	23.7	7.72	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.299	<0.00020	0.220	0.228	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	15.4	<0.50	18.3	21.2	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000053	<0.000010	<0.000010	<0.000010	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	0.00044	<0.00010	<0.00010	<0.00010	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
Client sampling date / time					23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Dissolved Metals										
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00156	<0.00030	0.00039	<0.00030	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000332	<0.000010	<0.000010	0.000024	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0145	<0.0010	0.0598	0.0291	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----	
dissolved metals filtration location	----	EP421	-	-	Field	Laboratory	Field	Field	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	68	<20	<20	28	<20	
Volatile Organic Compounds										
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
chlorobenzene	108-90-7	E611C	0.50	µg/L	0.71	<0.50	<0.50	<0.50	----	
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
Client sampling date / time					23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Volatile Organic Compounds										
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	----	
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
toluene	108-88-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	----	
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	----	
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	88.8	90.0	89.8	88.2	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	91.8	90.5	93.8	86.2	----	
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	<250	----	
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	<250	<250	----	
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	840	<100	<100	<100	----	
HEPHw	----	EC600A	250	µg/L	<250	<250	<250	<250	----	
LEPHw	----	EC600A	250	µg/L	<250	<250	<250	<250	----	
VPHw	----	EC580A	100	µg/L	840	<100	<100	<100	----	
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	91.3	96.7	96.4	96.1	----	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	115	116	122	116	----	



Analytical Results

Sub-Matrix: Water
 (Matrix: Water)

					Client sample ID	Duplicate - MW4	Field Blank	GW Int.	L1	SFC-1
					Client sampling date / time	23-Apr-2020 17:00	23-Apr-2020 08:00	23-Apr-2020 10:30	23-Apr-2020 11:15	23-Apr-2020 14:45
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-006	VA20A5335-007	VA20A5335-008	VA20A5335-009	VA20A5335-010	
					Result	Result	Result	Result	Result	
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	0.105	<0.010	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
acridine	260-94-6	E641A	0.010	µg/L	<0.020 ^{DLCl}	<0.010	<0.010	<0.010	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	0.0076	<0.0050	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	0.012	<0.010	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.020 ^{DLCl}	<0.010	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	0.061	<0.010	----	
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	0.038	<0.010	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	----	
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	0.037	<0.010	----	
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----	
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A	0.010	%	41.0 ^{RRV}	83.5	79.5	77.1	----	
chrysene-d12	1719-03-5	E641A	0.010	%	102	126	118	119	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	95.4	81.3	72.2	76.4	----	
phenanthrene-d10	1517-22-2	E641A	0.010	%	110	97.0	92.2	92.5	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-5
Client sampling date / time					23-Apr-2020 12:00	23-Apr-2020 12:15	23-Apr-2020 12:45	23-Apr-2020 15:15	23-Apr-2020 15:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-011	VA20A5335-012	VA20A5335-013	VA20A5335-014	VA20A5335-015	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	50.7	<1.0	19.7	28.1	26.7	
conductivity	----	E100	2.0	µS/cm	276	962	107	168	166	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	86.4	199	22.6	46.3	----	
pH	----	E108	0.10	pH units	7.82	3.12	7.21	7.50	7.53	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	30.0	4.0	3.0	<3.0	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.290	0.835	0.0062	0.0502	0.0377	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.250 ^{DLDS}	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	21.0	9.09	11.1	15.1	15.6	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.057	0.677	0.049	0.055	0.053	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.570	1.22	0.078	0.160	0.158	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.904	0.110	0.204	0.315	0.318	
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	0.905	0.114	0.205	0.315	0.319	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0050 ^{DLDS}	0.0013	<0.0010	0.0012	
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.23	1.12	0.292	0.424	0.402	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0053	0.0755	0.0079	0.0064	0.0072	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	43.9	394	12.4	26.1	25.4	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.769	16.2	0.157	0.164	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	0.00080	0.00011	<0.00010	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0423	0.0234	0.0103	0.0154	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000423	<0.000100	<0.000100	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
boron, total	7440-42-8	E420	0.010	mg/L	0.021	0.020	<0.010	0.014	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000330	0.000559	0.0000165	0.0000146	----	
calcium, total	7440-70-2	E420	0.050	mg/L	30.0	54.5	7.43	15.7	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	0.000047	<0.000010	<0.000010	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00010	0.00236	<0.00010	<0.00010	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00331	0.0782	0.00010	0.00050	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0135	0.308	0.00203	0.00266	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-5
Client sampling date / time					23-Apr-2020 12:00	23-Apr-2020 12:15	23-Apr-2020 12:45	23-Apr-2020 15:15	23-Apr-2020 15:45	
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-011	VA20A5335-012	VA20A5335-013	VA20A5335-014	VA20A5335-015	
					Result	Result	Result	Result	Result	
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	1.69	32.4	0.094	0.566	----	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000056	0.000062	0.000061	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0047	<0.0010	<0.0010	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	2.75	15.3	0.984	1.73	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.464	2.83	0.00533	0.127	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00598	0.000311	0.000640	0.000869	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00129	0.0337	<0.00050	<0.00050	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
potassium, total	7440-09-7	E420	0.050	mg/L	3.20	3.19	0.773	1.27	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00307	0.00460	0.00062	0.00112	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000075	0.000130	<0.000050	<0.000050	----	
silicon, total	7440-21-3	E420	0.10	mg/L	3.74	10.6	5.10	5.23	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
sodium, total	7440-23-5	E420	0.050	mg/L	12.9	7.87	9.61	10.4	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.197	0.229	0.0648	0.130	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	13.8	124	3.34	8.02	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	0.00186	<0.00010	<0.00010	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00041	0.00141	0.00382	0.00314	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000062	0.000862	0.000012	0.000015	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00072	<0.00050	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0051	0.0728	<0.0030	<0.0030	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	27	<20	<20	<20	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-11	----	----	----	----
(Matrix: Water)					Client sampling date / time	23-Apr-2020 13:00	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-016	-----	-----	-----	-----	
					Result	---	---	---	---	
Physical Tests										
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	20.3	---	---	---	---	
conductivity	---	E100	2.0	µS/cm	82.7	---	---	---	---	
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	24.1	---	---	---	---	
pH	---	E108	0.10	pH units	7.34	---	---	---	---	
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	3.4	---	---	---	---	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0061	---	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	4.34	---	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.052	---	---	---	---	
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	0.123	---	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.361	---	---	---	---	
nitrate + nitrite (as N)	---	EC235.N+N	0.0500	mg/L	0.362	---	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	---	---	---	---	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.427	---	---	---	---	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0087	---	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	10.3	---	---	---	---	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.143	---	---	---	---	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00010	---	---	---	---	
barium, total	7440-39-3	E420	0.00010	mg/L	0.00786	---	---	---	---	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	---	---	---	---	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	---	---	---	---	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	---	---	---	---	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000133	---	---	---	---	
calcium, total	7440-70-2	E420	0.050	mg/L	7.70	---	---	---	---	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	---	---	---	---	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	---	---	---	---	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	---	---	---	---	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00145	---	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-11	----	----	----	----
(Matrix: Water)					Client sampling date / time	23-Apr-2020 13:00	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A5335-016	-----	-----	-----	-----	
					Result	---	---	---	---	
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	0.086	----	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000083	----	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	1.19	----	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00316	----	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000318	----	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	0.568	----	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00035	----	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	----	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	6.39	----	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	4.88	----	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0897	----	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	3.00	----	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	----	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00335	----	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	----	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00088	----	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0031	----	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



CERTIFICATE OF ANALYSIS

Work Order : **VA20A9031**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 18001536
PO : 726379
C-O-C number : 17-847097
Sampler : ----
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 7
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 24-Jun-2020 10:25
Date Analysis Commenced : 25-Jun-2020
Issue Date : 02-Jul-2020 15:08

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



Analytical Results

Sub-Matrix: Water
 (Matrix: Water)

					Client sample ID	SFC 1	SFC 2	SFC 2B	SFC 3	SFC 4B
					Client sampling date / time	23-Jun-2020 09:40	23-Jun-2020 12:45	23-Jun-2020 13:30	23-Jun-2020 15:00	23-Jun-2020 16:45
Analyte	CAS Number	Method	LOR	Unit	VA20A9031-001	VA20A9031-002	VA20A9031-003	VA20A9031-004	VA20A9031-005	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	42.8	61.3	<1.0	32.1	47.9	
conductivity	----	E100	2.0	µS/cm	170	339	1220	166	314	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	113	298	38.1	97.9	
pH	----	E108	0.10	pH units	7.28	7.04	3.02	7.34	7.59	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	4.7	6.7	59.7	<3.0	<3.0	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0241	0.331	1.70	<0.0050	0.0677	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.250 ^{DLDS}	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	10.8	27.8	9.99	20.5	37.0	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.024	0.057	0.940	0.051	0.060	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.345	0.639	2.06	0.084	0.203	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	1.77	<0.0250 ^{DLDS}	0.274	0.578	
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	<0.0500	1.77	<0.0500	0.274	0.581	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 ^{DLDS}	<0.0010	0.0028	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.347	2.22	2.04	0.353	0.742	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0163	0.0090	0.0102	0.0130	0.0039	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	21.6	57.4	544	15.9	47.9	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	0.544	20.6	0.0583	0.0449	
antimony, total	7440-36-0	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	0.00013	0.00097	<0.00010	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	----	0.0541	0.0253	0.0144	0.0249	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	<0.000100	0.000646	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	----	0.030	0.021	<0.010	0.038	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	0.0000354	0.000565	0.0000190	0.0000122	
calcium, total	7440-70-2	E420	0.050	mg/L	----	39.0	79.3	12.5	33.4	
cesium, total	7440-46-2	E420	0.000010	mg/L	----	<0.000010	0.000093	<0.000010	<0.000010	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	<0.00010	0.00181	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	0.00454	0.110	<0.00010	0.00074	



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					SFC 1	SFC 2	SFC 2B	SFC 3	SFC 4B
Client sampling date / time					23-Jun-2020 09:40	23-Jun-2020 12:45	23-Jun-2020 13:30	23-Jun-2020 15:00	23-Jun-2020 16:45
Analyte	CAS Number	Method	LOR	Unit	VA20A9031-001	VA20A9031-002	VA20A9031-003	VA20A9031-004	VA20A9031-005
					Result	Result	Result	Result	Result
Total Metals									
copper, total	7440-50-8	E420	0.00050	mg/L	----	0.00934	0.253	0.00152	0.00147
iron, total	7439-89-6	E420	0.010	mg/L	----	2.47	62.8	0.094	0.706
lead, total	7439-92-1	E420	0.000050	mg/L	----	<0.000050	0.000068	<0.000050	<0.000050
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	0.0069	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	3.85	24.2	1.70	3.51
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.861	5.52	0.00968	0.254
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.00347	0.000334	0.000568	0.000565
nickel, total	7440-02-0	E420	0.00050	mg/L	----	0.00140	0.0488	<0.00050	0.00063
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L	----	3.76	3.19	0.979	2.43
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00372	0.00633	0.00081	0.00216
selenium, total	7782-49-2	E420	0.000050	mg/L	----	0.000064	0.000102	<0.000050	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L	----	4.67	15.1	7.67	6.80
silver, total	7440-22-4	E420	0.000010	mg/L	----	<0.000010	<0.000010	<0.000010	0.000011
sodium, total	7440-23-5	E420	0.050	mg/L	----	18.2	9.97	16.2	21.0
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.262	0.324	0.127	0.304
sulfur, total	7704-34-9	E420	0.50	mg/L	----	19.8	196	5.26	16.1
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	<0.00020	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	<0.000010	<0.000010	<0.000010
thorium, total	7440-29-1	E420	0.00010	mg/L	----	<0.00010	0.00134	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	----	<0.00030	0.00064	0.00126	0.00047
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L	----	0.000053	0.000707	<0.000010	0.000012
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	<0.00050	<0.00050	0.00051	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0039	0.0869	<0.0030	0.0031
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics									
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	28	<20	<20



Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC 5	SFC 11	GW Interceptor 2	----	----
Client sampling date / time					23-Jun-2020 16:15	23-Jun-2020 15:15	23-Jun-2020 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20A9031-006	VA20A9031-007	VA20A9031-008	-----	-----	
					Result	Result	Result	---	---	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	44.1	30.0	56.9	----	----	
conductivity	----	E100	2.0	µS/cm	307	135	188	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	43.7	----	----	----	
pH	----	E108	0.10	pH units	7.71	7.12	7.56	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	6.9	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0126	<0.0050	<0.0050	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	39.9	11.7	9.08	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.056	0.049	0.029	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.098	<0.050	0.127	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.535	0.356	0.419	----	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	0.536	0.357	0.419	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.607	0.382	0.527	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0029	0.0057	0.0183	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	43.8	15.1	21.3	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	0.0408	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	----	<0.00010	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	<0.00010	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	----	0.0107	----	----	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	<0.000100	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	<0.000050	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	----	<0.010	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	0.0000153	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	----	13.9	----	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	----	<0.000010	----	----	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	<0.00010	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	<0.00010	----	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	----	0.00055	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC 5	SFC 11	GW Interceptor 2	----	----
Client sampling date / time					23-Jun-2020 16:15	23-Jun-2020 15:15	23-Jun-2020 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20A9031-006	VA20A9031-007	VA20A9031-008	-----	-----	
					Result	Result	Result	---	---	
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	----	0.043	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	----	<0.000050	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	2.18	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.00717	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.000216	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	<0.00050	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	<0.050	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	----	0.654	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00038	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	<0.000050	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	----	9.47	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	----	<0.000010	----	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	----	7.68	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.186	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	4.87	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	<0.00010	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	0.00096	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	<0.000010	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	0.00072	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0033	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	<0.00020	----	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	<20	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



CERTIFICATE OF ANALYSIS

Work Order : **VA20A9029**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : ----
PO : ----
C-O-C number : 17-842268
Sampler : ----
Site : ----
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 10
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 24-Jun-2020 10:25
Date Analysis Commenced : 25-Jun-2020
Issue Date : 02-Jul-2020 15:14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Inorganics - Water Quality, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Jun-2020	23-Jun-2020	23-Jun-2020	23-Jun-2020	23-Jun-2020
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-001	VA20A9029-002	VA20A9029-003	VA20A9029-004	VA20A9029-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	276	85.7	26.7	112	39.5
conductivity	----	E100	2.0	µS/cm	901	300	170	371	643
pH	----	E108	0.10	pH units	6.61	6.74	6.51	6.56	6.71
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	92.7	40.7	5.1	472	43.9
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	300	102	38.5	122	138
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	11.8	3.40	0.371	2.18	0.0743
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 ^{DLDS}	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	48.4	8.18	17.8	23.1	116
fluoride	16984-48-8	E235.F	0.020	mg/L	0.100	0.131	0.030	0.049	0.073
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	13.4	3.73	0.551	2.64	0.270
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0674	<0.0050	1.02	<0.0050	0.0893
nitrate + nitrite (as N)	----	EC235.N+N	0.0500	mg/L	0.0682	<0.0500	1.02	<0.0500	0.0894
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	12.4	3.68	1.43	2.45	0.344
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0970	0.0311	<0.0020	0.226	0.199
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	131	49.1	20.6	43.0	95.2
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0023	0.0029	0.0088	0.0065	0.0105
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0141	0.00702	<0.00010	0.00728	0.00028
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0352	0.0708	0.0664	0.167	0.0477
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.206	0.088	<0.010	0.043	0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000127	0.000122	0.0000362
calcium, dissolved	7440-70-2	E421	0.050	mg/L	98.6	31.8	12.2	39.7	46.4
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000022	0.000019	0.000043	0.000035	0.000012
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00015	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0100	0.00139	0.00247	0.0210	0.00206
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00069	0.00028	0.00185	0.00165	0.00246



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					23-Jun-2020	23-Jun-2020	23-Jun-2020	23-Jun-2020	23-Jun-2020
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-001	VA20A9029-002	VA20A9029-003	VA20A9029-004	VA20A9029-005
					Result	Result	Result	Result	Result
Dissolved Metals									
iron, dissolved	7439-89-6	E421	0.010	mg/L	46.2	31.2	<0.010	36.8	4.76
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0020 ^{DLA}	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.0	5.46	1.97	5.68	5.47
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.11	1.42	0.860	1.97	0.297
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0108	0.00379	0.000734	0.0114	0.00107
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00192	<0.00050	0.00051	0.00295	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.092	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L	19.7	6.94	3.31	6.28	4.46
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0103	0.00427	0.00836	0.00418	0.00483
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000070	<0.000050	<0.000050	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.8	8.76	6.24	10.5	6.09
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000020 ^{DLM}	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	38.6	7.94	13.7	16.8	70.7
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.500	0.190	0.108	0.239	0.374
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	44.1	16.0	5.98	13.9	31.1
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0.000071	0.000025	0.000025
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000141	0.000016	<0.000010	0.000164	0.000025
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0031	0.0013	0.0029	0.0071	0.0014
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
Aggregate Organics									
chemical oxygen demand [COD]	----	E559	20	mg/L	51	28	<20	45	21



Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					GW Interceptor	Field Blank	----	----	----
Client sampling date / time					23-Jun-2020	23-Jun-2020	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-006	VA20A9029-007	-----	-----	-----
					Result	Result	---	---	---
Physical Tests									
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	119	<1.0	---	---	---
conductivity	---	E100	2.0	µS/cm	689	<2.0	---	---	---
pH	---	E108	0.10	pH units	6.39	5.46	---	---	---
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	28.3	<3.0	---	---	---
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	202	<0.60	---	---	---
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.939	<0.0050	---	---	---
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 ^{DLDS}	<0.050	---	---	---
chloride	16887-00-6	E235.Cl	0.50	mg/L	84.7	<0.50	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	0.117	<0.020	---	---	---
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	1.27	<0.050	---	---	---
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 ^{DLDS}	<0.0050	---	---	---
nitrate + nitrite (as N)	---	EC235.N+N	0.0500	mg/L	<0.0500	<0.0500	---	---	---
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	<0.0010	---	---	---
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.38	<0.030	---	---	---
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0232	<0.0020	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	111	<0.30	---	---	---
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0350	<0.0010	---	---	---
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00050	<0.00010	---	---	---
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0603	<0.00010	---	---	---
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	---	---	---
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	---	---	---
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.107	<0.010	---	---	---
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000128	<0.0000050	---	---	---
calcium, dissolved	7440-70-2	E421	0.050	mg/L	68.6	<0.050	---	---	---
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000016	<0.000010	---	---	---
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00023	<0.00010	---	---	---
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00214	<0.00010	---	---	---
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	---	---	---
iron, dissolved	7439-89-6	E421	0.010	mg/L	24.6	<0.010	---	---	---



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					GW Interceptor	Field Blank	----	----	----
					23-Jun-2020	23-Jun-2020	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-006	VA20A9029-007	-----	-----	-----
					Result	Result	---	---	---
Dissolved Metals									
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	---	---	---
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	---	---	---
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.55	<0.0050	---	---	---
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.86	<0.00010	---	---	---
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000282	<0.000050	---	---	---
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00210	<0.00050	---	---	---
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	---	---	---
potassium, dissolved	7440-09-7	E421	0.050	mg/L	5.86	<0.050	---	---	---
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00402	<0.00020	---	---	---
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	---	---	---
silicon, dissolved	7440-21-3	E421	0.050	mg/L	9.00	<0.050	---	---	---
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	---	---	---
sodium, dissolved	7440-23-5	E421	0.050	mg/L	51.8	<0.050	---	---	---
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.453	<0.00020	---	---	---
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	37.0	<0.50	---	---	---
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	---	---	---
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	---	---	---
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00036	<0.00030	---	---	---
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	---	---	---
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00058	<0.00050	---	---	---
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0334	<0.0010	---	---	---
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	---	---	---
dissolved mercury filtration location	----	EP509	-	-	Field	Field	---	---	---
dissolved metals filtration location	----	EP421	-	-	Field	Field	---	---	---
Aggregate Organics									
chemical oxygen demand [COD]	----	E559	20	mg/L	37	<20	---	---	---
Volatile Organic Compounds									
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	---	---	---



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					GW Interceptor	Field Blank	----	----	----
					23-Jun-2020	23-Jun-2020	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-006	VA20A9029-007	-----	-----	-----
					Result	Result	---	---	---
Volatile Organic Compounds									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	0.97 ^{RRV}	----	----	----
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	----	----	----
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
toluene	108-88-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					GW Interceptor	Field Blank	----	----	----
					23-Jun-2020	23-Jun-2020	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-006	VA20A9029-007	-----	-----	-----
					Result	Result	---	---	---
Volatile Organic Compounds									
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	----	----	----
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	99.0	93.5	----	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	102	107	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
VPHw	----	EC580A	100	µg/L	<100	<100	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	95.0	94.0	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	89.0	103	----	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	0.329	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	0.014	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	0.0052	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	0.112	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	0.118	<0.010	----	----	----



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					GW Interceptor	Field Blank	----	----	----
Client sampling date / time					23-Jun-2020	23-Jun-2020	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20A9029-006	VA20A9029-007	-----	-----	-----
					Result	Result	----	----	----
Polycyclic Aromatic Hydrocarbons									
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	0.064	<0.010	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	108	99.0	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	112	102	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	107	98.6	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	119	112	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



CERTIFICATE OF ANALYSIS

Work Order : **VA20B6818**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 726379
PO : 18001536
C-O-C number : ----
Sampler : E.Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 7
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 30-Sep-2020 14:50
Date Analysis Commenced : 01-Oct-2020
Issue Date : 14-Oct-2020 17:14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Ruth Morrison		Metals, Calgary, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SFC-1	SFC-2	SFC-2B	SFC-3	SFC-4B
Client sampling date / time					29-Sep-2020 09:30	29-Sep-2020 12:15	29-Sep-2020 12:35	29-Sep-2020 11:40	29-Sep-2020 09:30
Analyte	CAS Number	Method	LOR	Unit	VA20B6818-001	VA20B6818-002	VA20B6818-003	VA20B6818-004	VA20B6818-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	25.8	66.1	<1.0	33.9	40.0
conductivity	----	E100	2.0	µS/cm	116	369	730	227	244
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	133	257	53.0	73.5
pH	----	E108	0.10	pH units	7.31	7.56	4.05	7.46	7.61
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	11.6	131	<3.0	<3.0
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.117	0.376	0.0124	0.0156
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.250 ^{DLDS}	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	5.45	17.8	4.49	30.0	22.5
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.085	0.734	0.049	0.060
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.213	0.466	2.19	0.162	0.255
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.223	1.91	8.06	0.514	0.750
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.224	1.92	8.29	0.514	0.752
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0092	0.228	<0.0010	0.0016
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.422	2.10	9.44	0.575	0.806
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0182	0.0289	0.585	0.0097	0.0063
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	19.9	80.6	353	26.1	40.0
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	4.10	18.6	0.174	0.222
antimony, total	7440-36-0	E420	0.00010	mg/L	----	<0.00010	0.00012	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	0.00044	0.00160	<0.00010	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L	----	0.0494	0.0384	0.0242	0.0213
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	0.000117	0.000489	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	----	0.018	0.026	<0.010	0.016
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	0.0000922	0.000646	0.0000357	0.0000197
calcium, total	7440-70-2	E420	0.050	mg/L	----	46.1	81.3	17.7	24.7
cesium, total	7440-46-2	E420	0.000010	mg/L	----	0.000010	0.000040	<0.000010	<0.000010
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	0.00043	0.00372	0.00010	<0.00010
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	0.00979	0.0740	0.00052	0.00119



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-1	SFC-2	SFC-2B	SFC-3	SFC-4B
(Matrix: Water)										
Client sampling date / time					29-Sep-2020 09:30	29-Sep-2020 12:15	29-Sep-2020 12:35	29-Sep-2020 11:40	29-Sep-2020 09:30	
Analyte	CAS Number	Method	LOR	Unit	VA20B6818-001	VA20B6818-002	VA20B6818-003	VA20B6818-004	VA20B6818-005	
					Result	Result	Result	Result	Result	
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	----	0.0510	0.307	0.00372	0.00430	
iron, total	7439-89-6	E420	0.010	mg/L	----	4.80	41.1	0.172	0.371	
lead, total	7439-92-1	E420	0.000050	mg/L	----	0.000054	<0.000050	0.000061	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	0.0060	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	4.42	13.1	2.16	2.85	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.533	1.98	0.0223	0.172	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.00728	0.000510	0.000754	0.00124	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	0.00434	0.0362	0.00056	0.00094	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	0.053	0.291	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	----	4.26	3.39	1.54	2.14	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00429	0.00378	0.00137	0.00195	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	0.000069	0.000145	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	----	5.60	14.0	8.27	7.55	
silver, total	7440-22-4	E420	0.000010	mg/L	----	<0.000010	0.000039	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	----	16.5	8.44	22.1	16.0	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.268	0.301	0.161	0.230	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	27.6	128	8.52	13.6	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	0.00018	0.00304	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	0.00308	0.00579	0.00375	0.00329	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	0.000311	0.000896	0.000019	0.000026	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	0.00064	<0.00050	0.00056	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0170	0.0895	0.0048	0.0032	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	<0.00020	<0.00020	<0.00020	<0.00020	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	62	<20	<20	



Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-5	SFC-11	----	----	----
(Matrix: Water)					Client sampling date / time	29-Sep-2020 09:10	29-Sep-2020 11:50	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B6818-006	VA20B6818-007	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	38.9	27.7	---	---	---	
conductivity	---	E100	2.0	µS/cm	249	122	---	---	---	
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	---	40.8	---	---	---	
pH	---	E108	0.10	pH units	7.62	7.44	---	---	---	
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	<3.0	<3.0	---	---	---	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	25.5	5.93	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.058	0.048	---	---	---	
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	0.218	0.185	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.694	0.562	---	---	---	
nitrate + nitrite (as N)	---	EC235.N+N	0.0050	mg/L	0.696	0.563	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0019	<0.0010	---	---	---	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.748	0.601	---	---	---	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0035	0.0068	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	38.4	17.6	---	---	---	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	---	0.172	---	---	---	
antimony, total	7440-36-0	E420	0.00010	mg/L	---	<0.00010	---	---	---	
arsenic, total	7440-38-2	E420	0.00010	mg/L	---	<0.00010	---	---	---	
barium, total	7440-39-3	E420	0.00010	mg/L	---	0.0147	---	---	---	
beryllium, total	7440-41-7	E420	0.000100	mg/L	---	<0.000100	---	---	---	
bismuth, total	7440-69-9	E420	0.000050	mg/L	---	<0.000050	---	---	---	
boron, total	7440-42-8	E420	0.010	mg/L	---	<0.010	---	---	---	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	---	0.000110	---	---	---	
calcium, total	7440-70-2	E420	0.050	mg/L	---	13.1	---	---	---	
cesium, total	7440-46-2	E420	0.000010	mg/L	---	<0.000010	---	---	---	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	---	<0.00010	---	---	---	
cobalt, total	7440-48-4	E420	0.00010	mg/L	---	0.00011	---	---	---	
copper, total	7440-50-8	E420	0.00050	mg/L	---	0.00183	---	---	---	



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-5	SFC-11	----	----	----
(Matrix: Water)					Client sampling date / time	29-Sep-2020 09:10	29-Sep-2020 11:50	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B6818-006	VA20B6818-007	-----	-----	-----	
					Result	Result	---	---	---	
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	----	0.129	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	----	0.000073	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	1.96	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.0168	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.000298	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	<0.00050	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	<0.050	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	----	0.838	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00062	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	<0.000050	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	----	9.20	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	----	<0.000010	----	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	----	7.92	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.158	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	6.21	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	<0.00010	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	0.00410	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	<0.000010	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	0.00078	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0102	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	<0.00020	----	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20B6818	Page	: 1 of 21
Client	: Morrison Hershfield Limited	Laboratory	: Vancouver - Environmental
Contact	: Emily Peets	Account Manager	: Carla Fuginski
Address	: 4321 Still Creek Dr Burnaby BC Canada V5C 6S7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 726379	Date Samples Received	: 30-Sep-2020 14:50
PO	: 18001536	Issue Date	: 14-Oct-2020 17:14
C-O-C number	: ----		
Sampler	: E.Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-1	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-11	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-2	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-2B	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-3	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-4B	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-5	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-1	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-11	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-2	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-2B	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-3	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-4B	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-5	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-11	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-2	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SFC-2B	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SFC-3	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SFC-1	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SFC-4B	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE SFC-5	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-11	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-2	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-2B	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-3	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-1	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-4B	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE SFC-5	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-11	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-2	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-2B	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-3	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-1	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE SFC-4B	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-5	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-11	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-2	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-2B	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-3	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-1	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-4B	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-5	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-11	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-2	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-2B	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-3	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-1	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-4B	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-5	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-11	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-2	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-2B	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE SFC-3	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE SFC-1	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE SFC-4B	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE SFC-5	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SFC-1	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SFC-11	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SFC-2	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SFC-2B	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SFC-3	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-4B	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-5	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-1	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-11	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-2	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-2B	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-3	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-4B	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-5	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-1	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-11	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-2	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-2B	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-3	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-4B	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-5	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-1	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-11	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-2	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-2B	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-3	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-4B	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE SFC-5	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-1	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-11	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-2	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-2B	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : Conductivity in Water										
HDPE SFC-3	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE SFC-4B	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE SFC-5	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE SFC-11	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	72 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-2	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	72 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-2B	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	72 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-3	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	72 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-1	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	75 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-4B	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	75 hrs	* EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
Physical Tests : pH by Meter										
HDPE SFC-5	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	75 hrs	* EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE SFC-1	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-11	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-2	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-2B	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-3	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-4B	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-5	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) SFC-11	E420.Cr-L	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) SFC-2	E420.Cr-L	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) SFC-2B	E420.Cr-L	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) SFC-3	E420.Cr-L	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) SFC-4B	E420.Cr-L	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SFC-11	E508	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SFC-2	E508	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SFC-2B	E508	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SFC-3	E508	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SFC-4B	E508	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-11	E420	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-2	E420	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-2B	E420	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-3	E420	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-4B	E420	29-Sep-2020	----	----	----		07-Oct-2020	180 days	8 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99185	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
pH by Meter	E108	95079	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	97502	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	99162	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	97503	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99185	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
pH by Meter	E108	95079	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	97502	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	99162	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	97503	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	2	40	5.0	5.0	✓



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99185	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	97502	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	99162	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	97503	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99185	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	97502	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	99162	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	97503	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Total Mercury in Water by CVAAS	E508 Calgary - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order : VA20B6818

Page : 1 of 14

Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 726379
PO : 18001536
C-O-C number : ----
Sampler : E.Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
Program
No. of samples received : 7
No. of samples analysed : 7

Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginiski
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 30-Sep-2020 14:50
Date Analysis Commenced : 01-Oct-2020
Issue Date : 14-Oct-2020 17:14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
Matrix Spike (MS) Report; Recovery and Acceptance Limits
Reference Material (RM) Report; Recovery and Acceptance Limits
Method Blank (MB) Report; Recovery and Acceptance Limits
Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Bruna Botti, Caitlin Macey, Lindsay Gung, Robin Weeks, and Ruth Morrison.



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 95078)											
VA20B6816-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	286	286	0.0699%	20%	----
Physical Tests (QC Lot: 95079)											
VA20B6816-001	Anonymous	pH	----	E108	0.10	pH units	7.16	7.16	0.00%	4%	----
Physical Tests (QC Lot: 95080)											
VA20B6816-001	Anonymous	conductivity	----	E100	2.0	µS/cm	937	943	0.638%	10%	----
Physical Tests (QC Lot: 97253)											
KS2001981-009	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	3.4	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 97598)											
VA20B6689-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95081)											
VA20B6816-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95082)											
VA20B6816-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0307	0.0299	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95083)											
VA20B6816-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95084)											
VA20B6816-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	52.3	52.1	0.400%	20%	----
Anions and Nutrients (QC Lot: 95085)											
VA20B6816-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95086)											
VA20B6816-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	131	131	0.0160%	20%	----
Anions and Nutrients (QC Lot: 98304)											
VA20B6816-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	13.5	13.6	0.938%	20%	----
Anions and Nutrients (QC Lot: 98305)											
VA20B6816-001	Anonymous	nitrogen, total	7727-37-9	E366	0.300	mg/L	12.9	13.3	3.19%	20%	----
Anions and Nutrients (QC Lot: 98306)											
VA20B6816-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.102	0.0946	0.0069	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 98307)											
VA20B6816-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	12.8	12.5	2.87%	20%	----
Total Metals (QC Lot: 97502)											
VA20B6781-001	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.100	mg/L	0.30 µg/L	0.00030	0.000008	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 97503)											
VA20B6781-001	Anonymous	titanium, total	7440-32-6	E420	0.300	mg/L	1.19 µg/L	0.00122	0.00004	Diff <2x LOR	----
VA20B6781-001	Anonymous	aluminum, total	7429-90-5	E420	3.00	mg/L	52.4 µg/L	0.0524	0.124%	20%	----
		antimony, total	7440-36-0	E420	0.100	mg/L	0.16 µg/L	0.00015	0.000005	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.100	mg/L	0.56 µg/L	0.00060	0.00004	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.100	mg/L	15.4 µg/L	0.0154	0.159%	20%	----
		beryllium, total	7440-41-7	E420	0.100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	10.0	mg/L	12 µg/L	0.013	0.0005	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.00500	mg/L	0.0104 µg/L	0.0000086	0.0000019	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	50.0	mg/L	16700 µg/L	16.7	0.0397%	20%	----
		cesium, total	7440-46-2	E420	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.500	mg/L	1.62 µg/L	0.00154	0.00008	Diff <2x LOR	----
		iron, total	7439-89-6	E420	10.0	mg/L	180 µg/L	0.184	2.40%	20%	----
		lead, total	7439-92-1	E420	0.0500	mg/L	0.090 µg/L	0.000089	0.000001	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	1.00	mg/L	1.4 µg/L	0.0014	0.000004	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	5.00	mg/L	6380 µg/L	6.67	4.34%	20%	----
		manganese, total	7439-96-5	E420	0.100	mg/L	13.0 µg/L	0.0131	1.03%	20%	----
		molybdenum, total	7439-98-7	E420	0.0500	mg/L	0.303 µg/L	0.000309	0.000006	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	50.0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	50.0	mg/L	3480 µg/L	3.51	0.640%	20%	----
		rubidium, total	7440-17-7	E420	0.200	mg/L	1.12 µg/L	0.00106	0.00006	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.0500	mg/L	0.063 µg/L	0.000077	0.000014	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	100	mg/L	17300 µg/L	17.7	2.13%	20%	----
		silver, total	7440-22-4	E420	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	50.0	mg/L	11000 µg/L	10.7	3.08%	20%	----
		strontium, total	7440-24-6	E420	0.200	mg/L	132 µg/L	0.130	1.31%	20%	----
		sulfur, total	7704-34-9	E420	500	mg/L	6290 µg/L	6.87	8.81%	20%	----
		tellurium, total	13494-80-9	E420	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.0100	mg/L	0.227 µg/L	0.000232	2.20%	20%	----
		vanadium, total	7440-62-2	E420	0.500	mg/L	3.44 µg/L	0.00350	0.00006	Diff <2x LOR	----

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 Work Order : VA20B6818
 Client : Morrison Hershfield Limited
 Project : 726379



Sub-Matrix: Water					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Total Metals (QC Lot: 97503) - continued											
VA20B6781-001	Anonymous	zinc, total	7440-66-6	E420	3.00	mg/L	3.2 µg/L	<0.0030	0.0002	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 99162)											
KS2001981-021	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 99185)											
VA20B6818-001	SFC-1	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 95078)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 95080)						
conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 97253)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Physical Tests (QCLot: 97598)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 95081)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 95082)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 95083)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 95084)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 95085)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 95086)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 98304)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 98305)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 98306)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 98307)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Total Metals (QCLot: 97502)						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
Total Metals (QCLot: 97503)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	MBRR
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 97503) - continued						
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	MBRR
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	MBRR
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	---
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	---
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	---
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	---
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	---
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	---
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	---
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	---
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	---
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	---
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	MBRR
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	---
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	---
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	---
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	---
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	---
Total Metals (QCLot: 99162)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 99162) - continued						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 99185)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Qualifiers

Qualifier	Description
MBRR	Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 95078)									
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	98.4	85.0	115	----
Physical Tests (QCLot: 95079)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 95080)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
Physical Tests (QCLot: 97253)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	92.7	85.0	115	----
Physical Tests (QCLot: 97598)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	93.0	85.0	115	----
Anions and Nutrients (QCLot: 95081)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95082)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95083)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95084)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 95085)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 95086)									
sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 98304)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 98305)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.7	75.0	125	----
Anions and Nutrients (QCLot: 98306)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.1	80.0	120	----
Anions and Nutrients (QCLot: 98307)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	95.5	85.0	115	----
Total Metals (QCLot: 97502)									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 97503)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.3	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.9	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.4	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.6	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.9	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	96.0	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	112	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	97.2	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	110	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	91.1	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.2	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	94.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.4	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	94.8	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	99.6	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 99162)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	94.4	80.0	120	----
Aggregate Organics (QCLot: 99185)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	99.0	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1 \times$ spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 95081)										
VA20B6816-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 95082)										
VA20B6816-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 95083)										
VA20B6816-002	Anonymous	fluoride	16984-48-8	E235.F	1.04 mg/L	1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 95084)										
VA20B6816-002	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 95085)										
VA20B6816-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.544 mg/L	0.5 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 95086)										
VA20B6816-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 98304)										
VA20B6816-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
Anions and Nutrients (QCLot: 98305)										
VA20B6816-002	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 98306)										
VA20B6816-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0449 mg/L	0.05 mg/L	89.9	70.0	130	----
Anions and Nutrients (QCLot: 98307)										
VA20B6816-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	3.92 mg/L	4 mg/L	98.1	75.0	125	----
Total Metals (QCLot: 97502)										
VA20B6781-002	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
Total Metals (QCLot: 97503)										
VA20B6781-002	Anonymous	titanium, total	7440-32-6	E420	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
VA20B6781-002	Anonymous	aluminum, total	7429-90-5	E420	0.191 mg/L	0.2 mg/L	95.6	70.0	130	----
		antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		barium, total	7440-39-3	E420	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 97503) - continued										
VA20B6781-002	Anonymous	bismuth, total	7440-69-9	E420	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		boron, total	7440-42-8	E420	0.088 mg/L	0.1 mg/L	87.9	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		copper, total	7440-50-8	E420	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		iron, total	7439-89-6	E420	2.01 mg/L	2 mg/L	101	70.0	130	----
		lead, total	7439-92-1	E420	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0931 mg/L	0.1 mg/L	93.1	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		nickel, total	7440-02-0	E420	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.3 mg/L	10 mg/L	103	70.0	130	----
		potassium, total	7440-09-7	E420	4.04 mg/L	4 mg/L	101	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00413 mg/L	0.004 mg/L	103	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	19.8 mg/L	20 mg/L	99.1	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----
		thallium, total	7440-28-0	E420	0.00380 mg/L	0.004 mg/L	94.9	70.0	130	----
		thorium, total	7440-29-1	E420	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		uranium, total	7440-61-1	E420	0.00372 mg/L	0.004 mg/L	93.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
Total Metals (QCLot: 99162)										
KS2001981-022	Anonymous	mercury, total	7439-97-6	E508	0.000106 mg/L	0.0001 mg/L	106	70.0	130	----
Aggregate Organics (QCLot: 99185)										
VA20B6818-002	SFC-2	chemical oxygen demand [COD]	----	E559	473 mg/L	500 mg/L	94.7	75.0	125	----

Page : 14 of 14
Work Order : VA20B6818
Client : Morrison Hershfield Limited
Project : 726379



Qualifiers

Qualifier	Description
MS-B	<i>Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.</i>



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

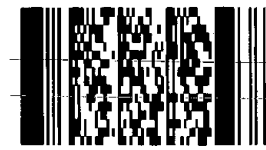
COC Number: 17 -

Page of

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Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)														
Contact and company name below will appear on the final report		Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply														
Company:	Morrison Hershfield Ltd.	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>					EMERGENCY	1 Business day [E1 - 100%] <input type="checkbox"/>							
Contact:	Josie Gilson	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>						Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>							
Phone:	778-837-9801	Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>						(Laboratory opening fees may apply)							
Company address below will appear on the final report		Email 1 or Fax jgilson@morrisonhershfield.com			Date and Time Required for all E&P TATs:														
Street:	310-4321 Still Creek Drive	Email 2 epeets@morrisonhershfield.com			For tests that can not be performed according to the service level selected, you will be contacted.														
City/Province:	Burnaby, BC	Email 3			Analysis Request														
Postal Code:	V5C 6S7	Invoice To			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below														
Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Invoice Distribution			Dissolved Metals & Mercury	Total Metals & Mercury	General Parameters	Nutrients, Anions & COD	PAH/PEH/LEPH/HEPH	VOC	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS						
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																	
Company:	Resort Municipality of Whistler (RMOW)	Email 1 or Fax atucker@whistler.ca																	
Contact:	Andrew Tucker	Email 2 ap@whistler.ca																	
Project Information		Oil and Gas Required Fields (client use)																	
ALS Account # / Quote #:		AFE/Cost Center:												PO#					
Job #: 18001536		Major/Minor Code:												Routing Code:					
PO / AFE: 726379		Requisitioner:												Location:					
LSD:		ALS Lab Work Order # (lab use only): B6818												ALS Contact: C. Funginski			Sampler: E. Peets		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type															
	SFC-1	29-Sep-20	9:30	Water			R	R								2			
	SFC-2	29-Sep-20	12:15	Water			R	R	R							4			
	SFC-2B	29-Sep-20	12:35	Water			R	R	R							4			
	SFC-3	29-Sep-20	11:40	Water			R	R	R							4			
	SFC-4B	30-Sep-20	8:30	Water			R	R	R							4			
	SFC-5	30-Sep-20	9:10	Water			R	R								2			
	SFC-11	29-Sep-20	11:50	Water			R	R	R							4			
Drinking Water (DW) Samples¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)														
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Contaminated Sites Regulation Stage 10 Amendment (NOV, 2017) - Fresh Water Aquatic Life BC Approved and Working Water Quality Guidelines (May, 2015) - Freshwater Aquatic Life			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>					Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>									
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					Cooling Initiated <input type="checkbox"/>					INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C				
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)														
Released by: E. Peets	Date: September 30 2020	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:			
									cm	30 Sept, 2020				2:50 pm					

Environmental Division
Vancouver
Work Order Reference
VA20B6818



Telephone : +1 604 253 4188

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SEPT 2020 FROM



CERTIFICATE OF ANALYSIS

Work Order : **VA20B6816**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
 Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 726379
PO : 18001536
C-O-C number : ----
Sampler : E.Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
 Program
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 12
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 30-Sep-2020 14:50
Date Analysis Commenced : 01-Oct-2020
Issue Date : 13-Oct-2020 13:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
James Diacon	Laboratory Analyst	Metals, Calgary, Alberta
Jeanie Mark		Organics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ruth Morrison		Metals, Calgary, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.
SMI	Surrogate recovery could not be measured due to sample matrix interference.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					29-Sep-2020 16:30	29-Sep-2020 15:30	29-Sep-2020 17:45	29-Sep-2020 14:40	29-Sep-2020 10:30
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-001	VA20B6816-002	VA20B6816-003	VA20B6816-004	VA20B6816-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	286	82.6	30.6	71.5	40.4
conductivity	----	E100	2.0	µS/cm	937	309	186	249	582
pH	----	E108	0.10	pH units	7.16	7.10	7.03	7.25	7.18
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	94.9	42.7	7.5	203	36.6
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	340	124	43.1	89.1	108
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	12.8	2.56	0.439	1.46	0.0126
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 ^{DLDS}	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	52.3	7.15	16.8	16.9	86.1
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 ^{DLDS}	0.110	0.029	0.067	0.062
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	13.5	2.82	0.476	1.63	0.279
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0307	0.0100	0.139	<0.0050	0.164
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0322	0.0103	0.140	<0.0051	0.165
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	12.9	2.83	0.541	1.59	0.399
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.102	0.0384	<0.0020	0.137	0.269
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	131	59.3	29.9	27.0	102
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0035	0.0029	0.0138	0.0045	0.0138
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0136	0.00741	<0.00010	0.00747	0.00019
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0417	0.0820	0.0720	0.100	0.0393
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.246	0.098	<0.010	0.033	0.016
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000100 ^{DLM}	<0.0000050	0.000241	0.0000695	0.0000333
calcium, dissolved	7440-70-2	E421	0.050	mg/L	114	38.8	13.2	29.4	36.7
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000022	0.000012	0.000054	0.000026	<0.000010
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0104	0.00210	0.00620	0.0154	0.00052



Analytical Results

Sub-Matrix: Water					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
(Matrix: Water)										
Client sampling date / time					29-Sep-2020 16:30	29-Sep-2020 15:30	29-Sep-2020 17:45	29-Sep-2020 14:40	29-Sep-2020 10:30	
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-001	VA20B6816-002	VA20B6816-003	VA20B6816-004	VA20B6816-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00248	0.0143	0.00291	0.00113	0.00198	
iron, dissolved	7439-89-6	E421	0.010	mg/L	47.5	38.4	0.015	26.6	0.272	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.00115	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.5	6.69	2.47	3.83	4.11	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.38	1.57	1.67	1.53	0.0849	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0122	0.00491	0.000754	0.0158	0.000898	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00203	0.00069	0.00137	0.00185	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.094	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	21.1	7.54	3.27	4.30	3.43	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0118	0.00450	0.00921	0.00333	0.00476	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000095	<0.000050	<0.000050	<0.000050	0.000058	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.9	9.10	6.84	9.71	5.40	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	41.6	7.98	13.9	12.4	77.1	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.564	0.224	0.117	0.164	0.396	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	45.4	20.8	9.12	8.89	36.6	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0.000078	<0.000010	0.000023	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	0.00074	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000146	0.000022	<0.000010	0.000065	0.000014	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0057	0.0028	0.0035	0.0040	0.0025	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
Aggregate Organics										



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					29-Sep-2020 16:30	29-Sep-2020 15:30	29-Sep-2020 17:45	29-Sep-2020 14:40	29-Sep-2020 10:30
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-001	VA20B6816-002	VA20B6816-003	VA20B6816-004	VA20B6816-005
					Result	Result	Result	Result	Result
Aggregate Organics									
chemical oxygen demand [COD]	----	E559	20	mg/L	48	<20	<20	<20	23
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.50	µg/L	2.57	<0.50	<0.50	<0.50	<0.50
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	0.64	<0.50	<0.50	<0.50	<0.50
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	<0.75	<0.75	<0.75
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					29-Sep-2020 16:30	29-Sep-2020 15:30	29-Sep-2020 17:45	29-Sep-2020 14:40	29-Sep-2020 10:30	
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-001	VA20B6816-002	VA20B6816-003	VA20B6816-004	VA20B6816-005	
					Result	Result	Result	Result	Result	
Volatile Organic Compounds [Drycleaning]										
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40	
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	94.0	97.8	98.0	97.2	98.4	
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	100	95.6	95.9	96.1	93.0	
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	<250	<250	
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	<250	<250	<250	
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	<100	
HEPHw	----	EC600A	250	µg/L	<250	<250	<250	<250	<250	
LEPHw	----	EC600A	250	µg/L	<250	<250	<250	<250	<250	
VPHw	----	EC580A	100	µg/L	<100	<100	<100	<100	<100	
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	91.6	89.5	98.0	98.0	101	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	82.5	90.1	92.5	91.0	100	
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010	



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					29-Sep-2020 16:30	29-Sep-2020 15:30	29-Sep-2020 17:45	29-Sep-2020 14:40	29-Sep-2020 10:30
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-001	VA20B6816-002	VA20B6816-003	VA20B6816-004	VA20B6816-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	99.0	99.6	91.6	ND ^{SMI}	81.2
chrysene-d12	1719-03-5	E641A	0.010	%	93.7	101	95.8	90.0	103
naphthalene-d8	1146-65-2	E641A	0.010	%	98.6	101	105	108	105
phenanthrene-d10	1517-22-2	E641A	0.010	%	98.6	104	107	99.3	103
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Field Blank	GW Int.	L1	GW Int. 2	----
Client sampling date / time					29-Sep-2020 11:15	29-Sep-2020 11:00	29-Sep-2020 17:00	29-Sep-2020 09:15	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-006	VA20B6816-007	VA20B6816-008	VA20B6816-009	-----	
					Result	Result	Result	Result	---	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	119	79.7	77.3	----	
conductivity	----	E100	2.0	µS/cm	<2.0	577	599	306	----	
pH	----	E108	0.10	pH units	5.38	6.83	7.25	7.45	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	13.6	<3.0	<3.0	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	<0.60	183	279	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	1.40	0.0284	0.0254	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	54.0	2.97	11.2	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.121	0.031	0.048	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	1.61	0.971 ^{TKNI}	0.514	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0100	22.2	0.810	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0051	0.0112	22.2	0.875	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	0.0012	0.0023	0.0650	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	1.54	23.7	1.26	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0096	0.0604	0.0422	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	90.5	127	53.0	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	0.0368	0.0216	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00020	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00079	0.00022	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	0.0591	0.0442	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	0.115	0.031	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000093	0.0000749	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	60.9	99.0	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	0.000011	<0.000010	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	0.00024	0.00025	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00438	0.00036	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00047	0.0359	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	GW Int.	L1	GW Int. 2	----
(Matrix: Water)										
Client sampling date / time					29-Sep-2020 11:15	29-Sep-2020 11:00	29-Sep-2020 17:00	29-Sep-2020 09:15	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-006	VA20B6816-007	VA20B6816-008	VA20B6816-009	-----	
					Result	Result	Result	Result	----	
Dissolved Metals										
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	21.1	0.021	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	7.59	7.84	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	2.10	0.00753	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	0.000733	0.000346	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	0.00259	0.00241	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0.055	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	6.20	3.63	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	0.00436	0.00224	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0.000192	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	9.19	11.8	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0.000011	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	<0.050	44.1	11.2	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	0.430	0.343	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	32.4	45.0	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00033	<0.00030	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000050	0.000028	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	0.00058	<0.00050	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0297	0.0405	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	45	50	<20	----	



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					Field Blank	GW Int.	L1	GW Int. 2	----
Client sampling date / time					29-Sep-2020 11:15	29-Sep-2020 11:00	29-Sep-2020 17:00	29-Sep-2020 09:15	----
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-006	VA20B6816-007	VA20B6816-008	VA20B6816-009	-----
					Result	Result	Result	Result	---
Volatile Organic Compounds									
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	<0.75	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	<0.20	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
Volatile Organic Compounds [BTEXS+MTBE]									
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	<0.40	----	----
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	<0.75	----	----
Volatile Organic Compounds [Drycleaning]									
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Field Blank	GW Int.	L1	GW Int. 2	----
Client sampling date / time					29-Sep-2020 11:15	29-Sep-2020 11:00	29-Sep-2020 17:00	29-Sep-2020 09:15	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-006	VA20B6816-007	VA20B6816-008	VA20B6816-009	-----	----
					Result	Result	Result	Result	----	----
Volatile Organic Compounds [Drycleaning]										
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	----
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	----
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	<0.40	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	98.1	95.6	97.8	----	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	95.9	94.2	94.3	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	<250	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	<250	----	----	----
VPHw	----	EC580A	100	µg/L	<100	<100	<100	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	100	97.4	99.1	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	96.9	90.8	102	----	----	----
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	1.11	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	0.019	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	0.177	<0.010	----	----	----



Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					Field Blank	GW Int.	L1	GW Int. 2	----
Client sampling date / time					29-Sep-2020 11:15	29-Sep-2020 11:00	29-Sep-2020 17:00	29-Sep-2020 09:15	----
Analyte	CAS Number	Method	LOR	Unit	VA20B6816-006	VA20B6816-007	VA20B6816-008	VA20B6816-009	-----
					Result	Result	Result	Result	---
Polycyclic Aromatic Hydrocarbons									
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	0.177	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	0.093	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
acridine-d9	34749-75-2	E641A	0.010	%	107	102	77.1	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	104	105	103	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	103	103	100	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	103	106	104	----	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----
chloroform	67-66-3	E611C	0.50	µg/L	1.25 ^{RRV}	<0.50	<0.50	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20B6816	Page	: 1 of 34
Client	: Morrison Hershfield Limited	Laboratory	: Vancouver - Environmental
Contact	: Emily Peets	Account Manager	: Carla Fuginski
Address	: 4321 Still Creek Dr Burnaby BC Canada V5C 6S7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 726379	Date Samples Received	: 30-Sep-2020 14:50
PO	: 18001536	Issue Date	: 13-Oct-2020 13:49
C-O-C number	: ----		
Sampler	: E.Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) GW Int.	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) GW Int. 2	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) L1	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-2D	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-2S	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-3	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) MW-4	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) MW-6	E559	29-Sep-2020	----	----	----		08-Oct-2020	28 days	8 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Field Blank	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) GW Int.	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) GW Int. 2	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) L1	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) MW-2D	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) MW-2S	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) MW-3	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-4	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-6	E298	29-Sep-2020	----	----	----		07-Oct-2020	28 days	7 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Field Blank	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE L1	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE MW-2D	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE MW-2S	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE MW-3	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE MW-4	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE GW Int.	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE GW Int. 2	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days		✔
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-6	E235.Br-L	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE L1	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-2D	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-2S	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-3	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-4	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days		✔
Anions and Nutrients : Chloride in Water by IC											
HDPE GW Int.	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days		✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE GW Int. 2	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE MW-6	E235.Cl	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE L1	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW-2D	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW-2S	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW-3	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW-4	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE GW Int.	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE GW Int. 2	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE MW-6	E235.F	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE L1	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW-2D	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW-2S	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW-3	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW-4	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE GW Int.	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE GW Int. 2	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-6	E235.NO3-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE L1	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-2D	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-2S	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-3	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-4	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE GW Int.	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE GW Int. 2	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-6	E235.NO2-L	29-Sep-2020	----	----	----		01-Oct-2020	3 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE L1	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-2D	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-2S	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-3	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-4	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE GW Int.	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE GW Int. 2	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE MW-6	E235.SO4	29-Sep-2020	----	----	----		01-Oct-2020	28 days	2 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Field Blank	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) GW Int.	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) GW Int. 2	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) L1	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) MW-2D	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) MW-2S	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) MW-3	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-4	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-6	E318	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) Field Blank	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) GW Int.	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) GW Int. 2	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) L1	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-2D	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-2S	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-3	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-4	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-6	E366	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	08-Oct-2020	20 days	1 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) Field Blank	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) GW Int.	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) GW Int. 2	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) L1	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-2D	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-2S	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-3	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-4	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-6	E372-U	29-Sep-2020	07-Oct-2020	28 days	7 days	✔	07-Oct-2020	20 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) L1	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-2D	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-2S	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-3	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-4	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) Field Blank	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) GW Int.	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid) MW-6	E421.Cr-L	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) Field Blank	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) GW Int.	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) L1	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW-2D	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW-2S	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW-3	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW-4	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW-6	E509	29-Sep-2020	08-Oct-2020	28 days	8 days	✔	08-Oct-2020	19 days	0 days	✔



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) L1	E421	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-2D	E421	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-2S	E421	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-3	E421	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-4	E421	29-Sep-2020	04-Oct-2020	180 days	4 days	✔	05-Oct-2020	175 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) Field Blank	E421	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) GW Int.	E421	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-6	E421	29-Sep-2020	04-Oct-2020	180 days	5 days	✔	05-Oct-2020	174 days	1 days	✔	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW-2D	E601A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	05-Oct-2020	40 days	0 days	✔	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW-2S	E601A	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	05-Oct-2020	40 days	0 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) L1	E601A	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW-3	E601A	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW-4	E601A	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) Field Blank	E601A	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) GW Int.	E601A	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : BC PHC - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW-6	E601A	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	40 days	1 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) L1	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	8 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) MW-2D	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	8 days	0 days	✓	



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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) MW-2S	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	8 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) MW-3	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	8 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) MW-4	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	5 days	✓	06-Oct-2020	8 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) Field Blank	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	7 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) GW Int.	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	7 days	0 days	✓	
Hydrocarbons : VH and F1 by Headspace GC-FID											
Glass vial (sodium bisulfate) MW-6	E581.VH+F1	29-Sep-2020	05-Oct-2020	14 days	6 days	✓	06-Oct-2020	7 days	0 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE L1	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW-2D	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	2 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW-2S	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE MW-3	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE MW-4	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	2 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE GW Int.	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE GW Int. 2	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE MW-6	E290	29-Sep-2020	----	----	----		02-Oct-2020	14 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE L1	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE MW-2D	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	2 days	✔
Physical Tests : Conductivity in Water										
HDPE MW-2S	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	2 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : Conductivity in Water										
HDPE MW-3	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-4	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE GW Int.	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE GW Int. 2	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-6	E100	29-Sep-2020	----	----	----		02-Oct-2020	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE MW-3	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	66 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE L1	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	67 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW-2D	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	68 hrs	* EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : pH by Meter										
HDPE MW-2S	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	69 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW-4	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	69 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE Field Blank	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	73 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE GW Int.	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	73 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW-6	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	74 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE GW Int. 2	E108	29-Sep-2020	----	----	----		02-Oct-2020	0.25 hrs	75 hrs	* EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Field Blank	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE GW Int.	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE GW Int. 2	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE L1	E160-H	29-Sep-2020	----	----	----		06-Oct-2020	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-2D	E160-H	29-Sep-2020	----	----	----		06-Oct-2020	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-2S	E160-H	29-Sep-2020	----	----	----		06-Oct-2020	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-3	E160-H	29-Sep-2020	----	----	----		06-Oct-2020	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-4	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-6	E160-H	29-Sep-2020	----	----	----		05-Oct-2020	7 days	6 days	✔
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) L1	E641A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	08-Oct-2020	40 days	2 days	✔
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) MW-2D	E641A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	08-Oct-2020	40 days	2 days	✔
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) MW-2S	E641A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	08-Oct-2020	40 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW-3	E641A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	08-Oct-2020	40 days	2 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW-4	E641A	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	08-Oct-2020	40 days	2 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) Field Blank	E641A	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	08-Oct-2020	40 days	2 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) GW Int.	E641A	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	08-Oct-2020	40 days	2 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW-6	E641A	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	08-Oct-2020	40 days	2 days	✔	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) Field Blank	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) GW Int.	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) L1	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) MW-2D	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-2S	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-3	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-4	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-6	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) L1	E611C	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	06-Oct-2020	8 days	0 days	✔
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-2D	E611C	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	06-Oct-2020	8 days	0 days	✔
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-2S	E611C	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	06-Oct-2020	8 days	0 days	✔
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-3	E611C	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	06-Oct-2020	8 days	0 days	✔
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-4	E611C	29-Sep-2020	05-Oct-2020	14 days	5 days	✔	06-Oct-2020	8 days	0 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) Field Blank	E611C	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	06-Oct-2020	7 days	0 days	✔	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) GW Int.	E611C	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	06-Oct-2020	7 days	0 days	✔	
Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) MW-6	E611C	29-Sep-2020	05-Oct-2020	14 days	6 days	✔	06-Oct-2020	7 days	0 days	✔	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) Field Blank	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) GW Int.	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) L1	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) MW-2D	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) MW-2S	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS											
Glass vial (sodium bisulfate) MW-3	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----		



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-4	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-6	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) Field Blank	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) GW Int.	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) L1	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-2D	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-2S	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-3	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-4	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-6	E611C	29-Sep-2020	05-Oct-2020	----	----		06-Oct-2020	----	----	

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99183	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	96958	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	99166	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	96957	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
pH by Meter	E108	95079	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	3	60	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	97392	1	15	6.6	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	97391	1	13	7.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	97114	2	35	5.7	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99183	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	96958	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	99166	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	96957	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	97115	2	39	5.1	5.0	✓
pH by Meter	E108	95079	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	3	60	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	97392	1	15	6.6	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	97391	1	13	7.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	95078	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	97114	2	35	5.7	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99183	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Conductivity in Water	E100	95080	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	96958	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	99166	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	96957	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	97115	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	97253	3	60	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	97392	1	15	6.6	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	97391	1	13	7.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	98307	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	95085	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	99183	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	95084	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	96958	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	99166	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	96957	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	95083	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	95082	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	95081	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	95086	1	16	6.2	5.0	✓



Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	98304	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	98305	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	98306	1	18	5.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	97392	1	15	6.6	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	97391	1	13	7.6	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Calgary - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Calgary - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Calgary - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Calgary - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Calgary - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.





QUALITY CONTROL REPORT

Work Order : VA20B6816

Page : 1 of 20

Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 726379
PO : 18001536
C-O-C number : ----
Sampler : E.Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
Program
No. of samples received : 9
No. of samples analysed : 9

Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 30-Sep-2020 14:50
Date Analysis Commenced : 01-Oct-2020
Issue Date : 13-Oct-2020 13:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
Matrix Spike (MS) Report; Recovery and Acceptance Limits
Reference Material (RM) Report; Recovery and Acceptance Limits
Method Blank (MB) Report; Recovery and Acceptance Limits
Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Brianna Allen, Bruna Botti, Caitlin Macey, James Diacon, Jeanie Mark, Kim Jensen, Lindsay Gung, Miles Gropen, Monica Ko, Ruth Morrison and their respective roles and departments.

Page : 2 of 20
Work Order : VA20B6816
Client : Morrison Hershfield Limited
Project : 726379



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 95078)											
VA20B6816-001	MW-2D	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	286	286	0.0699%	20%	----
Physical Tests (QC Lot: 95079)											
VA20B6816-001	MW-2D	pH	----	E108	0.10	pH units	7.16	7.16	0.00%	4%	----
Physical Tests (QC Lot: 95080)											
VA20B6816-001	MW-2D	conductivity	----	E100	2.0	µS/cm	937	943	0.638%	10%	----
Physical Tests (QC Lot: 97253)											
KS2001981-009	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	3.4	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 97598)											
VA20B6689-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 97835)											
KS2001981-003	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	148	143	3.17%	20%	----
Anions and Nutrients (QC Lot: 95081)											
VA20B6816-001	MW-2D	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95082)											
VA20B6816-001	MW-2D	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0307	0.0299	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95083)											
VA20B6816-001	MW-2D	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95084)											
VA20B6816-001	MW-2D	chloride	16887-00-6	E235.Cl	2.50	mg/L	52.3	52.1	0.400%	20%	----
Anions and Nutrients (QC Lot: 95085)											
VA20B6816-001	MW-2D	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 95086)											
VA20B6816-001	MW-2D	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	131	131	0.0160%	20%	----
Anions and Nutrients (QC Lot: 98304)											
VA20B6816-001	MW-2D	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	13.5	13.6	0.938%	20%	----
Anions and Nutrients (QC Lot: 98305)											
VA20B6816-001	MW-2D	nitrogen, total	7727-37-9	E366	0.300	mg/L	12.9	13.3	3.19%	20%	----
Anions and Nutrients (QC Lot: 98306)											
VA20B6816-001	MW-2D	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.102	0.0946	0.0069	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 98307)											
VA20B6816-001	MW-2D	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	12.8	12.5	2.87%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 96957)											
VA20B6816-001	MW-2D	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0035	0.0043	0.0008	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0136	0.0150	9.83%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0417	0.0442	5.81%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	0.246	0.249	1.04%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.0000100	mg/L	<0.0000100	<0.0000100	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	114	114	0.0798%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000022	0.000021	0.000002	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0104	0.0112	7.94%	20%	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00248	0.00268	7.64%	20%	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	47.5	48.9	2.95%	20%	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.5	14.9	9.50%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.38	3.58	5.62%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0122	0.0116	4.41%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00203	0.00223	0.00020	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.094	0.115	0.022	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	21.1	22.9	8.10%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0118	0.0129	8.76%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000095	0.000072	0.000023	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.9	14.2	2.14%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	41.6	45.0	8.03%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.564	0.535	5.24%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	45.4	46.1	1.61%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000146	0.000146	0.325%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 96957) - continued											
VA20B6816-001	MW-2D	zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0057	0.0063	0.0006	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 96958)											
VA20B6816-001	MW-2D	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00012	0.00015	0.00002	Diff <2x LOR	----
Dissolved Metals (QC Lot: 99166)											
KS2001981-021	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 99183)											
VA20B6816-001	MW-2D	chemical oxygen demand [COD]	----	E559	20	mg/L	48	47	0.5	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 97391)											
KS2001985-003	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----		



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 97391) - continued											
KS2001985-003	Anonymous	tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 97392)											
VA20B6816-001	MW-2D	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 95078)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 95080)						
conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 97253)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Physical Tests (QCLot: 97598)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Physical Tests (QCLot: 97835)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 95081)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 95082)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 95083)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 95084)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 95085)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 95086)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 98304)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 98305)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 98306)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 98307)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 96957)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 96957) - continued						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 96958)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 96958) - continued						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	---
Dissolved Metals (QCLot: 99166)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Aggregate Organics (QCLot: 99183)						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
Volatile Organic Compounds (QCLot: 97391)						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	---
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	---
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	---
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	---
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	---
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	---
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	---
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	---
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	---
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	---
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	---
styrene	100-42-5	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	---
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	---
toluene	108-88-3	E611C	0.4	µg/L	<0.40	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 97391) - continued						
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
Hydrocarbons (QCLot: 97114)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Hydrocarbons (QCLot: 97117)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Hydrocarbons (QCLot: 97392)						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
Polycyclic Aromatic Hydrocarbons (QCLot: 97115)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---
Polycyclic Aromatic Hydrocarbons (QCLot: 97116)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 97116) - continued						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 95078)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.4	85.0	115	----
Physical Tests (QCLot: 95079)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 95080)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
Physical Tests (QCLot: 97253)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	92.7	85.0	115	----
Physical Tests (QCLot: 97598)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	93.0	85.0	115	----
Physical Tests (QCLot: 97835)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 95081)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95082)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95083)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 95084)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 95085)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 95086)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 98304)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 98305)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.7	75.0	125	----
Anions and Nutrients (QCLot: 98306)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.1	80.0	120	----
Anions and Nutrients (QCLot: 98307)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	95.5	85.0	115	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 96957)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	116	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.4	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	110	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	106	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	113	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.7	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	96.9	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	111	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	111	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	112	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	112	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	111	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	111	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.7	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	103	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	115	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	115	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	108	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	111	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 96958)									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	111	80.0	120	----
Dissolved Metals (QCLot: 99166)									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	95.5	80.0	120	----
Aggregate Organics (QCLot: 99183)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	107	85.0	115	----
Volatile Organic Compounds (QCLot: 97391)									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	98.4	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	130	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	114	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	106	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	93.4	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	117	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	96.1	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	92.7	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	95.6	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	96.9	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	98.6	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	126	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	95.8	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	118	70.0	130	----
tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	103	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	97.8	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	102	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	96.3	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 97391) - continued									
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	107	60.0	140	----
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	112	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	102	70.0	130	----
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	99.6	70.0	130	----
Hydrocarbons (QCLot: 97114)									
EPH (C10-C19)	----	E601A	250	µg/L	8310 µg/L	77.4	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3570 µg/L	81.2	70.0	130	----
Hydrocarbons (QCLot: 97117)									
EPH (C10-C19)	----	E601A	250	µg/L	8310 µg/L	89.8	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3570 µg/L	74.0	70.0	130	----
Hydrocarbons (QCLot: 97392)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	83.2	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 97115)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	99.2	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	89.7	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	88.8	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	92.2	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	93.6	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	98.6	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	98.3	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	87.1	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	96.2	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	106	60.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	98.1	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	116	60.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 97116)									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 97116) - continued									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	99.2	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	95.6	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	92.5	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	92.5	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	95.7	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	93.6	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	94.6	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	96.2	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	97.3	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	99.8	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	91.8	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	118	60.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	100	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	96.7	60.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 95081)										
VA20B6816-002	MW-2S	nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 95082)										
VA20B6816-002	MW-2S	nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 95083)										
VA20B6816-002	MW-2S	fluoride	16984-48-8	E235.F	1.04 mg/L	1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 95084)										
VA20B6816-002	MW-2S	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 95085)										
VA20B6816-002	MW-2S	bromide	24959-67-9	E235.Br-L	0.544 mg/L	0.5 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 95086)										
VA20B6816-002	MW-2S	sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 98304)										
VA20B6816-002	MW-2S	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
Anions and Nutrients (QCLot: 98305)										
VA20B6816-002	MW-2S	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 98306)										
VA20B6816-002	MW-2S	phosphorus, total	7723-14-0	E372-U	0.0449 mg/L	0.05 mg/L	89.9	70.0	130	----
Anions and Nutrients (QCLot: 98307)										
VA20B6816-002	MW-2S	ammonia, total (as N)	7664-41-7	E298	3.92 mg/L	4 mg/L	98.1	75.0	125	----
Dissolved Metals (QCLot: 96957)										
VA20B6816-002	MW-2S	aluminum, dissolved	7429-90-5	E421	0.204 mg/L	0.2 mg/L	102	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00929 mg/L	0.01 mg/L	92.9	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	95.6	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00394 mg/L	0.004 mg/L	98.6	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 96957) - continued										
VA20B6816-002	MW-2S	calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00946 mg/L	0.01 mg/L	94.6	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0175 mg/L	0.02 mg/L	87.7	70.0	130	----
		iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.49 mg/L	10 mg/L	84.9	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00382 mg/L	0.004 mg/L	95.6	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00397 mg/L	0.004 mg/L	99.3	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0216 mg/L	0.02 mg/L	108	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00386 mg/L	0.004 mg/L	96.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.385 mg/L	0.4 mg/L	96.2	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
Dissolved Metals (QCLot: 96958)										
VA20B6816-002	MW-2S	chromium, dissolved	7440-47-3	E421.Cr-L	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 99166)										
KS2001981-022	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000975 mg/L	0.0001 mg/L	97.5	70.0	130	----
Aggregate Organics (QCLot: 99183)										
VA20B6816-002	MW-2S	chemical oxygen demand [COD]	----	E559	514 mg/L	500 mg/L	103	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 97391)										
VA20B6816-003	MW-3	benzene	71-43-2	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		bromodichloromethane	75-27-4	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		bromoform	75-25-2	E611C	135 µg/L	100 µg/L	135	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		chlorobenzene	108-90-7	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		chloroethane	75-00-3	E611C	106 µg/L	100 µg/L	106	50.0	150	----
		chloroform	67-66-3	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----
		chloromethane	74-87-3	E611C	112 µg/L	100 µg/L	112	50.0	150	----
		dibromochloromethane	124-48-1	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	98.7 µg/L	100 µg/L	98.7	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	97.8 µg/L	100 µg/L	97.8	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	98.3 µg/L	100 µg/L	98.3	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		dichloromethane	75-09-2	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	131 µg/L	100 µg/L	131	60.0	140	----
		ethylbenzene	100-41-4	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	97.4 µg/L	100 µg/L	97.4	60.0	140	----
		styrene	100-42-5	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		toluene	108-88-3	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	98.4 µg/L	100 µg/L	98.4	60.0	140	----
		trichloroethylene	79-01-6	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	119 µg/L	100 µg/L	119	50.0	150	----
		vinyl chloride	75-01-4	E611C	107 µg/L	100 µg/L	107	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	204 µg/L	200 µg/L	102	60.0	140	----
		xylene, o-	95-47-6	E611C	98.7 µg/L	100 µg/L	98.7	60.0	140	----
Hydrocarbons (QCLot: 97392)										



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Hydrocarbons (QCLot: 97392) - continued										
VA20B6816-002	MW-2S	VHw (C6-C10)	----	E581.VH+F1	5310 µg/L	6310 µg/L	84.1	60.0	140	----

Qualifiers

<i>Qualifier</i>	<i>Description</i>
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)														
Company:	Morrison Hershfield Ltd.	Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply														
Contact:	Josie Gilson	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Day)	4 day [P4-20%] <input type="checkbox"/>					EMERGENCY	1 Business day [E1 - 100%] <input type="checkbox"/>							
Phone:	778-837-9801	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>						Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>							
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>													
Street:	310-4321 Still Creek Drive	Email 1 or Fax: jgilson@morrisonhershfield.com			Date and Time Required for all E&P TATs:														
City/Province:	Burnaby, BC	Email 2: epeets@morrisonhershfield.com			For tests that can not be performed according to the service level selected, you will be contacted.														
Postal Code:	V5C 6S7	Email 3:			Analysis Request														
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below														
Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																	
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax: atucker@whistler.ca																	
Company: Resort Municipality of Whistler (RMOW)		Email 2: ap@whistler.ca																	
Contact: Andrew Tucker																			
Project Information				Oil and Gas Required Fields (client use)															
ALS Account # / Quote #:				AFE/Cost Center:				PO#:											
Job #: 18001536				Major/Minor Code:				Routing Code:											
PO / AFE: 726379				Requisitioner:															
LSD:				Location:															
ALS Lab Work Order # (lab use only): B 0516				ALS Contact: C. Funginski		Sampler: E. Peets													
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals & Mercury	Total Metals & Mercury	General Parameters	Nutrients, Anions & COD	PAH/EPH/LEPH/HEPH	VOC	SAMPLES ON HOLD		Sample is hazardous (please provide further details)		NUMBER OF CONTAINERS		
	MW-2D			29-Sep-20	16:30	Water	R	R	R	R	R	R							8
	MW-2S			29-Sep-20	15:30	Water	R	R	R	R	R	R							8
	MW-3			29-Sep-20	17:45	Water	R	R	R	R	R	R							8
	MW-4			29-Sep-20	14:40	Water	R	R	R	R	R	R							8
	MW-6			29-Sep-20	10:30	Water	R	R	R	R	R	R							8
	Field Blank			29-Sep-20	11:15	Water	R	R	R	R	R	R							8
	GW Int.			29-Sep-20	11:00	Water	R	R	R	R	R	R							8
	L1			29-Sep-20	17:00	Water	R	R	R	R	R	R							8
	GW Int. 2			29-Sep-20	9:15	Water			R	R									2
Drinking Water (DW) Samples¹ (client use)				Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)															
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				British Columbia Contaminated Sites Regulation Stage 10 Amendment (NOV, 2017) - Fresh Water Aquatic Life BC Approved and Working Water Quality Guidelines (May, 2015) - Freshwater Aquatic Life															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																			
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)						FINAL SHIPMENT RECEPTION (lab use only)									
Released by: E. Peets		Date: September 30 2020		Time:		Received by:		Date:		Time:		Received by:		Date:		Time:			
												err		30 Sept. 2020		RiSD jma			

Environmental Division
Vancouver
Work Order Reference
VA20B6816



Telephone : +1 804 253 4188

5.39

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SEPT 20 2020



CERTIFICATE OF ANALYSIS

Work Order : **VA20C3150**
Client : **Morrison Hershfield Limited**
Contact : Emily Peets
Address : 4321 Still Creek Dr
Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 18001536
PO : 726379
C-O-C number : ----
Sampler : E. Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 8
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 11-Dec-2020 10:00
Date Analysis Commenced : 12-Dec-2020
Issue Date : 22-Dec-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW2-S	MW-3	MW-4	MW-6
Client sampling date / time					10-Dec-2020 14:00	10-Dec-2020 14:30	10-Dec-2020 11:15	10-Dec-2020 09:45	10-Dec-2020 08:00
Analyte	CAS Number	Method	LOR	Unit	VA20C3150-001	VA20C3150-002	VA20C3150-003	VA20C3150-004	VA20C3150-005
					Result	Result	Result	Result	Result
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	300	114	28.5	120	20.5
conductivity	----	E100	2.0	µS/cm	924	428	179	387	545
pH	----	E108	0.10	pH units	6.78	6.82	6.72	6.93	6.84
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	888	138	44.9	406	133
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	334	151	43.3	145	94.6
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	13.1	4.24	0.434	2.14	0.0126
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 ^{DLDS}	0.053	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	53.8	21.2	12.7	25.2	77.4
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 ^{DLDS}	0.072	0.034	0.036	0.064
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	13.6	4.35	0.535	2.30	0.528
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 ^{DLDS}	0.0079	0.305	0.0057	0.277
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0255	0.0092	0.306	0.0072	0.278
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 ^{DLDS}	0.0012	0.0014	0.0015	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	13.6	4.54	0.852	2.39	0.757
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.967	0.175	0.0052	1.16	0.688
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	133	69.6	32.3	42.3	110
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0050	0.0072	0.0330	0.0775	0.0111
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0145	0.00890	0.00011	0.00924	0.00012
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0416	0.120	0.0677	0.184	0.0285
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.257	0.111	<0.010	0.062	0.015
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000181	0.000224	0.0000273
calcium, dissolved	7440-70-2	E421	0.050	mg/L	112	47.1	13.3	47.5	32.2
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000020	0.000018	0.000050	0.000036	<0.000010
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00015	0.00030	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0111	0.00230	0.00668	0.0271	<0.00010



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW-2D	MW2-S	MW-3	MW-4	MW-6
Client sampling date / time					10-Dec-2020 14:00	10-Dec-2020 14:30	10-Dec-2020 11:15	10-Dec-2020 09:45	10-Dec-2020 08:00
Analyte	CAS Number	Method	LOR	Unit	VA20C3150-001	VA20C3150-002	VA20C3150-003	VA20C3150-004	VA20C3150-005
					Result	Result	Result	Result	Result
Dissolved Metals									
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00069	0.00079	0.00400	0.00213	0.00208
iron, dissolved	7439-89-6	E421	0.010	mg/L	52.7	50.6	0.759	42.8	0.016
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000052	0.000055	0.000222	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.5	8.15	2.42	6.55	3.44
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.42	2.24	1.48	2.50	0.0112
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0122	0.00364	0.000568	0.0108	0.00107
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00193	0.00093	0.00104	0.00324	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.144	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L	20.6	10.2	2.94	5.75	2.80
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0112	0.00608	0.00838	0.00438	0.00429
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000079	0.000074	<0.000050	<0.000050	0.000062
silicon, dissolved	7440-21-3	E421	0.050	mg/L	15.6	11.2	7.42	12.4	5.30
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	17341-25-2	E421	0.050	mg/L	42.6	17.4	14.0	17.7	68.3
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.572	0.292	0.108	0.299	0.400
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	48.7	26.1	11.6	16.1	40.7
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0.000089	0.000023	0.000017
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00130	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000138	0.000029	<0.000010	0.000172	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0024	0.0052	0.0054	0.0077	0.0026
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Laboratory
Aggregate Organics									



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW2-S	MW-3	MW-4	MW-6
Client sampling date / time					10-Dec-2020 14:00	10-Dec-2020 14:30	10-Dec-2020 11:15	10-Dec-2020 09:45	10-Dec-2020 08:00	
Analyte	CAS Number	Method	LOR	Unit	VA20C3150-001	VA20C3150-002	VA20C3150-003	VA20C3150-004	VA20C3150-005	
					Result	Result	Result	Result	Result	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	44	26	<20	32	<20	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					10-Dec-2020 08:30	10-Dec-2020 11:15	10-Dec-2020 09:10	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20C3150-006	VA20C3150-007	VA20C3150-008	-----	-----	
					Result	Result	Result	---	---	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	19.4	<1.0	119	----	----	
conductivity	----	E100	2.0	µS/cm	573	<2.0	772	----	----	
pH	----	E108	0.10	pH units	6.79	5.53	6.76	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	140	<3.0	13.9	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	103	<0.60	318	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	1.12	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.250 ^{DLDS}	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	82.9	<0.50	48.0	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.065	<0.020	<0.100 ^{DLDS}	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.388	<0.050	1.34	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.206	<0.0050	<0.0250 ^{DLDS}	----	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.207	<0.0051	<0.0255	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 ^{DLDS}	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.491	<0.030	1.38	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.670	<0.0020	0.0306	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	120	<0.30	216	----	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0104	<0.0010	0.0478	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00020	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0.00076	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0267	<0.00010	0.0816	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.014	<0.010	0.176	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000337	<0.0000050	0.0000148	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	35.2	<0.050	109	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000010	<0.000010	0.000011	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0.00029	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0.00543	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00110	<0.00020	0.00029	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
(Matrix: Water)					Client sampling date / time	10-Dec-2020 08:30	10-Dec-2020 11:15	10-Dec-2020 09:10	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20C3150-006	VA20C3150-007	VA20C3150-008	-----	-----	
					Result	Result	Result	---	---	
Dissolved Metals										
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	29.0	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.72	<0.0050	10.8	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0140	<0.00010	2.50	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00107	<0.000050	0.000419	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0.00364	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.98	<0.050	5.15	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00500	<0.00020	0.00404	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.81	<0.050	10.6	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	76.1	<0.050	37.2	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.416	<0.00020	0.700	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	46.1	<0.50	81.7	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000023	<0.000010	<0.000010	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0.00015	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00060 ^{DLM}	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000011	<0.000010	0.000019	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0.00052	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0013	<0.0010	0.0184	----	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	24	----	----	



Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20C3150	Page	: 1 of 24
Client	: Morrison Hershfield Limited	Laboratory	: Vancouver - Environmental
Contact	: Emily Peets	Account Manager	: Carla Fuginski
Address	: 4321 Still Creek Dr Burnaby BC Canada V5C 6S7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 18001536	Date Samples Received	: 11-Dec-2020 10:00
PO	: 726379	Issue Date	: 22-Dec-2020 09:39
C-O-C number	: ----		
Sampler	: E. Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Duplicate	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) GW Int.	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-2D	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW2-S	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-3	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-4	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) MW-6	E559	10-Dec-2020	----	----	----		17-Dec-2020	28 days	7 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Duplicate	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) GW Int.	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-2D	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW2-S	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-3	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-4	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MW-6	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE Field Blank	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-2D	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW2-S	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-3	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-4	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE Duplicate	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE GW Int.	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE MW-6	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Field Blank	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-2D	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW2-S	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-3	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-4	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE Duplicate	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE GW Int.	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW-6	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Field Blank	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-2D	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW2-S	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-3	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-4	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Duplicate	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE GW Int.	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE MW-6	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Field Blank	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-2D	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW2-S	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-3	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-4	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Duplicate	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE GW Int.	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE MW-6	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-2D	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW2-S	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-3	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-4	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Duplicate	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE GW Int.	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW-6	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-2D	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW2-S	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-3	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-4	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE Duplicate	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE GW Int.	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE MW-6	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Duplicate	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) Field Blank	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) GW Int.	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-2D	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW2-S	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-3	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-4	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) MW-6	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) Duplicate	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) Field Blank	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) GW Int.	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-2D	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW2-S	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-3	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-4	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) MW-6	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) Duplicate	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) Field Blank	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) GW Int.	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-2D	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW2-S	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-3	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-4	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) MW-6	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE - dissolved (lab preserved) Duplicate	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE - dissolved (lab preserved) Field Blank	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) GW Int.	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-2D	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW2-S	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-3	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-4	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)											
HDPE dissolved (nitric acid) MW-6	E421.Cr-L	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-2D	E509	10-Dec-2020	13-Dec-2020	28 days	2 days	✔	13-Dec-2020	25 days	0 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW2-S	E509	10-Dec-2020	13-Dec-2020	28 days	2 days	✔	13-Dec-2020	25 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Duplicate	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Field Blank	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) GW Int.	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-3	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-4	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) MW-6	E509	10-Dec-2020	13-Dec-2020	28 days	3 days	✔	13-Dec-2020	24 days	0 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Duplicate	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) Field Blank	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✔	15-Dec-2020	175 days	0 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) GW Int.	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-2D	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW2-S	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-3	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-4	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW-6	E421	10-Dec-2020	14-Dec-2020	180 days	4 days	✓	15-Dec-2020	175 days	0 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE Field Blank	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW-2D	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE MW2-S	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE MW-3	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE Duplicate	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE GW Int.	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE MW-4	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE MW-6	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE MW-2D	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE MW2-S	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✔
Physical Tests : Conductivity in Water										
HDPE MW-3	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
Physical Tests : Conductivity in Water										
HDPE Duplicate	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE GW Int.	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-4	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-6	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE MW-2D	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	91 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW2-S	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	91 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE Field Blank	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	94 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE MW-3	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	94 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE GW Int.	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	96 hrs	* EHTR-FM



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE MW-4	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	96 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Duplicate	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	97 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE MW-6	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	97 hrs	*	EHTR-FM
Physical Tests : TSS by Gravimetry											
HDPE Field Blank	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE MW-2D	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE MW2-S	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE MW-3	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE Duplicate	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✓	
Physical Tests : TSS by Gravimetry											
HDPE GW Int.	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE MW-4	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔
Physical Tests : TSS by Gravimetry										
HDPE MW-6	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	129817	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132476	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	129812	1	15	6.6	5.0	✓
Conductivity in Water	E100	129818	1	15	6.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	130640	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	130190	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	130639	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	1	15	6.6	5.0	✓
pH by Meter	E108	129816	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	129817	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132476	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	129812	1	15	6.6	5.0	✓
Conductivity in Water	E100	129818	1	15	6.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	130640	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	130190	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	130639	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	1	15	6.6	5.0	✓
pH by Meter	E108	129816	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	129817	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132476	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	129812	1	15	6.6	5.0	✓
Conductivity in Water	E100	129818	1	15	6.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	130640	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	130190	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	130639	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132476	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	129812	1	15	6.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	130640	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	130190	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	130639	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



QUALITY CONTROL REPORT

Work Order : VA20C3150

Page : 1 of 14

Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 18001536
PO : 726379
C-O-C number : ----
Sampler : E. Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
Program
No. of samples received : 8
No. of samples analysed : 8

Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginiski
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 11-Dec-2020 10:00
Date Analysis Commenced : 12-Dec-2020
Issue Date : 22-Dec-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
• Matrix Spike (MS) Report; Recovery and Acceptance Limits
• Reference Material (RM) Report; Recovery and Acceptance Limits
• Method Blank (MB) Report; Recovery and Acceptance Limits
• Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Angela Ren (Team Leader - Metals), Annabelle Prasad (Analyst), Bruna Botti (Team Leader - Inorganics), Caitlin Macey (Team Leader - Inorganics), Kim Jensen (Department Manager - Metals), Lindsay Gung (Supervisor - Water Chemistry), Robin Weeks (Team Leader - Metals), and Woochan Song (Lab Assistant).

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Work Order : VA20C3150
Client : Morrison Hershfield Limited
Project : 18001536



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 129816)											
VA20C3150-003	MW-3	pH	----	E108	0.10	pH units	6.72	6.73	0.149%	4%	----
Physical Tests (QC Lot: 129817)											
VA20C3150-003	MW-3	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	28.5	28.4	0.351%	20%	----
Physical Tests (QC Lot: 129818)											
VA20C3150-003	MW-3	conductivity	----	E100	2.0	µS/cm	179	179	0.168%	10%	----
Physical Tests (QC Lot: 130448)											
VA20C3150-001	MW-2D	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	888	896	0.919%	20%	----
Anions and Nutrients (QC Lot: 129810)											
VA20C3150-001	MW-2D	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129811)											
VA20C3150-001	MW-2D	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129812)											
VA20C3150-001	MW-2D	chloride	16887-00-6	E235.Cl	2.50	mg/L	53.8	52.4	2.60%	20%	----
Anions and Nutrients (QC Lot: 129813)											
VA20C3150-001	MW-2D	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129814)											
VA20C3150-001	MW-2D	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129815)											
VA20C3150-001	MW-2D	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	133	130	2.46%	20%	----
Anions and Nutrients (QC Lot: 131262)											
VA20C3150-003	MW-3	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.535	0.539	0.647%	20%	----
Anions and Nutrients (QC Lot: 131263)											
VA20C3150-001	MW-2D	nitrogen, total	7727-37-9	E366	0.300	mg/L	13.6	13.6	0.386%	20%	----
Anions and Nutrients (QC Lot: 131264)											
VA20C3150-001	MW-2D	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.967	0.972	0.613%	20%	----
Anions and Nutrients (QC Lot: 131265)											
VA20C3150-001	MW-2D	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	13.1	13.3	1.11%	20%	----
Dissolved Metals (QC Lot: 130190)											
VA20C3010-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 130191)											
VA20C3150-002	MW2-S	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 130639)											
FJ2000119-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	0.0012	0.0002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00028	0.00028	0.0000006	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	1.44	1.38	4.31%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	0.146	0.158	7.23%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	70.7	74.5	5.27%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000076	0.000076	0.00000007	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00012	0.00011	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.442	0.437	1.08%	20%	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0366	0.0374	2.03%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	30.5	29.0	5.00%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0307	0.0302	1.60%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000076	0.000072	0.000003	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.17	1.12	4.21%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00229	0.00232	1.26%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.21	3.24	1.13%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	5.64	5.30	6.12%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.575	0.588	2.33%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000170	0.000169	0.416%	20%	----

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 Work Order : VA20C3150
 Client : Morrison Hershfield Limited
 Project : 18001536



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Dissolved Metals (QC Lot: 130639) - continued											
FJ2000119-001	Anonymous	vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 130640)											
FJ2000119-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 132476)											
VA20C3080-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 129817)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 129818)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 130448)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 129810)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 129811)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 129812)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 129813)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 129814)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 129815)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 131262)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 131263)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 131264)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 131265)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Dissolved Metals (QCLot: 130190)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 130191)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 130639)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 130639) - continued						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 130640)						

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Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 130640) - continued						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
Aggregate Organics (QCLot: 132476)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 129816)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 129817)									
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	98.3	85.0	115	----
Physical Tests (QCLot: 129818)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
Physical Tests (QCLot: 130448)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	89.5	85.0	115	----
Anions and Nutrients (QCLot: 129810)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	94.0	90.0	110	----
Anions and Nutrients (QCLot: 129811)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	92.0	90.0	110	----
Anions and Nutrients (QCLot: 129812)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	93.5	90.0	110	----
Anions and Nutrients (QCLot: 129813)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	89.4	85.0	115	----
Anions and Nutrients (QCLot: 129814)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	93.3	90.0	110	----
Anions and Nutrients (QCLot: 129815)									
sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	94.5	90.0	110	----
Anions and Nutrients (QCLot: 131262)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 131263)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 131264)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.2	80.0	120	----
Anions and Nutrients (QCLot: 131265)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	97.9	85.0	115	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	91.7	80.0	120	----
Dissolved Metals (QCLot: 130639)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	107	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	108	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 130639) - continued									
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	105	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	114	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	113	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	112	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	108	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	104	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----

Dissolved Metals (QCLot: 130640)

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Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 130640) - continued									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 132476)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	99.6	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Anions and Nutrients (QCLot: 129810)										
VA20C3150-002	MW2-S	nitrate (as N)	14797-55-8	E235.NO3-L	2.40 mg/L	2.5 mg/L	96.0	75.0	125	----
Anions and Nutrients (QCLot: 129811)										
VA20C3150-002	MW2-S	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 129812)										
VA20C3150-002	MW2-S	chloride	16887-00-6	E235.Cl	95.8 mg/L	100 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 129813)										
VA20C3150-002	MW2-S	bromide	24959-67-9	E235.Br-L	0.516 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 129814)										
VA20C3150-002	MW2-S	nitrite (as N)	14797-65-0	E235.NO2-L	0.474 mg/L	0.5 mg/L	94.8	75.0	125	----
Anions and Nutrients (QCLot: 129815)										
VA20C3150-002	MW2-S	sulfate (as SO4)	14808-79-8	E235.SO4	93.0 mg/L	100 mg/L	93.0	75.0	125	----
Anions and Nutrients (QCLot: 131262)										
VA20C3150-004	MW-4	Kjeldahl nitrogen, total [TKN]	----	E318	2.54 mg/L	2.5 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 131263)										
VA20C3150-002	MW2-S	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 131264)										
VA20C3150-002	MW2-S	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 131265)										
VA20C3150-002	MW2-S	ammonia, total (as N)	7664-41-7	E298	9.75 mg/L	10 mg/L	97.5	75.0	125	----
Dissolved Metals (QCLot: 130190)										
VA20C3010-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 130191)										
VA20C3150-003	MW-3	mercury, dissolved	7439-97-6	E509	0.0000907 mg/L	0.0001 mg/L	90.7	70.0	130	----
Dissolved Metals (QCLot: 130639)										
FJ2000119-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 130639) - continued										
FJ2000119-002	Anonymous	beryllium, dissolved	7440-41-7	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00788 mg/L	0.01 mg/L	78.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00392 mg/L	0.004 mg/L	98.0	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00975 mg/L	0.01 mg/L	97.5	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0186 mg/L	0.02 mg/L	92.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	89.9	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.85 mg/L	2 mg/L	92.5	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0330 mg/L	0.04 mg/L	82.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.7 mg/L	10 mg/L	107	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.75 mg/L	4 mg/L	93.7	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.60 mg/L	10 mg/L	96.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00374 mg/L	0.004 mg/L	93.5	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	22.3 mg/L	20 mg/L	111	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00360 mg/L	0.004 mg/L	90.1	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.382 mg/L	0.4 mg/L	95.6	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 130640)										
FJ2000119-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----

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Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Aggregate Organics (QCLot: 132476)										
VA20C3080-002	Anonymous	chemical oxygen demand [COD]	----	E559	494 mg/L	500 mg/L	98.7	75.0	125	----



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **VA20C3155**
Client : **Morrison Hershfield Limited**
Contact : Josie Gilson
Address : 4321 Still Creek Dr
Burnaby BC Canada V5C 6S7
Telephone : 604-454-0402
Project : 18001536
PO : 726379
C-O-C number : ----
Sampler : E. Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 7
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 11-Dec-2020 10:00
Date Analysis Commenced : 12-Dec-2020
Issue Date : 21-Dec-2020 15:03

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-1	SFC-2	SFC-2B	SFC-3	SFC-4B
(Matrix: Water)					Client sampling date / time	10-Dec-2020 09:30	10-Dec-2020 12:15	10-Dec-2020 12:35	10-Dec-2020 11:40	10-Dec-2020 08:30
Analyte	CAS Number	Method	LOR	Unit	VA20C3155-001	VA20C3155-002	VA20C3155-003	VA20C3155-004	VA20C3155-005	
					Result	Result	Result	Result	Result	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	6.7	50.8	13.1	25.4	27.2	
conductivity	----	E100	2.0	µS/cm	27.0	296	365	159	167	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	107	148	37.5	49.5	
pH	----	E108	0.10	pH units	6.77	7.40	6.31	7.39	7.52	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	7.9	34.1	6.9	8.9	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.197	0.114	0.0067	0.0296	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050 ^{RRV}	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	1.53	13.1	2.43 ^{RRV}	15.8	11.4	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.080	0.174 ^{RRV}	0.046	0.055	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.179	0.578	1.05	0.096	0.160	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0346	1.94	7.38 ^{HTD, RRV}	0.348	0.568	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0360	1.94	7.40	0.349	0.571	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0013	0.0042	0.0145 ^{HTD, RRV}	<0.0010	0.0029	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.214	2.39	8.02	0.411	0.657	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0160	0.0177	0.0512	0.0338	0.0539	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.68	64.5	124 ^{RRV}	21.5	28.6	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	1.36	4.80	0.801	1.59	
antimony, total	7440-36-0	E420	0.00010	mg/L	----	<0.00010	0.00012	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	0.00013	0.00028	0.00016	0.00021	
barium, total	7440-39-3	E420	0.00010	mg/L	----	0.0381	0.0249	0.0204	0.0253	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	<0.000100	0.000142	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	----	0.020	0.019	<0.010	0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	0.0000714	0.000250	0.0000330	0.0000280	
calcium, total	7440-70-2	E420	0.050	mg/L	----	37.0	49.3	12.3	16.2	
cesium, total	7440-46-2	E420	0.000010	mg/L	----	<0.000010	0.000010	0.000019	0.000030	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	0.00024	0.00104	0.00030	0.00054	
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	0.00621	0.0214	0.00034	0.00129	



Analytical Results

Sub-Matrix: Water					Client sample ID	SFC-1	SFC-2	SFC-2B	SFC-3	SFC-4B
(Matrix: Water)										
Client sampling date / time					10-Dec-2020 09:30	10-Dec-2020 12:15	10-Dec-2020 12:35	10-Dec-2020 11:40	10-Dec-2020 08:30	
Analyte	CAS Number	Method	LOR	Unit	VA20C3155-001	VA20C3155-002	VA20C3155-003	VA20C3155-004	VA20C3155-005	
					Result	Result	Result	Result	Result	
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	----	0.0318	0.113	0.00619	0.0117	
iron, total	7439-89-6	E420	0.010	mg/L	----	1.90	7.04	0.494	1.09	
lead, total	7439-92-1	E420	0.000050	mg/L	----	<0.000050	<0.000050	0.000332	0.000592	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	0.0020	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	3.67	6.20	1.63	2.21	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.327	0.532	0.0224	0.116	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.00527	0.000267	0.00140	0.00140	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	0.00320	0.0118	0.00053	0.00119	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	<0.050	0.053	<0.050	0.056	
potassium, total	7440-09-7	E420	0.050	mg/L	----	3.74	3.14	1.37	1.69	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00327	0.00252	0.00126	0.00181	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	0.000096	0.000119	0.000053	0.000057	
silicon, total	7440-21-3	E420	0.10	mg/L	----	5.06	9.72	6.44	7.18	
silver, total	7440-22-4	E420	0.000010	mg/L	----	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	----	12.6	5.54	14.6	10.9	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.203	0.191	0.101	0.132	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	22.5	45.0	7.10	9.59	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	<0.00010	0.00053	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	0.00078	0.00178	0.0188	0.0329	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	0.000116	0.000283	0.000029	0.000042	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	<0.00050	<0.00050	0.00116	0.00164	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0136	0.0465	0.0074	0.0073	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	<0.00020	<0.00020	0.00024	0.00037	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		<20	<20	22	<20	<20



Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-5	SFC-11	GW-Interceptor 2	----	----
Client sampling date / time					10-Dec-2020 09:10	10-Dec-2020 11:50	10-Dec-2020 09:10	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20C3155-006	VA20C3155-007	VA20C3155-008	-----	-----	
					Result	Result	Result	---	---	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	26.0	19.5	46.5	----	----	
conductivity	----	E100	2.0	µS/cm	161	80.4	176	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	27.6	----	----	----	
pH	----	E108	0.10	pH units	7.54	7.36	7.45	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	9.5	9.9	<3.0	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0211	<0.0050	0.0051	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0.088	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	11.9	2.68	9.42	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.053	0.051	0.025	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.160	0.114	0.095	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.540	0.338	0.259	----	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.544	0.339	0.260	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0034	<0.0010	<0.0010	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.634	0.388	0.293	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0439	0.0462	0.0052	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	27.2	12.2	24.4	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	----	1.32	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	----	0.00010	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	----	0.00020	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	----	0.0169	----	----	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	<0.000100	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	----	<0.000050	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	----	<0.010	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	----	0.0000195	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	----	8.52	----	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	----	0.000026	----	----	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	----	0.00044	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	----	0.00039	----	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	----	0.00724	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-5	SFC-11	GW-Interceptor 2	----	----
Client sampling date / time					10-Dec-2020 09:10	10-Dec-2020 11:50	10-Dec-2020 09:10	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20C3155-006	VA20C3155-007	VA20C3155-008	-----	-----	
					Result	Result	Result	---	---	
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L	----	0.759	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	----	0.000528	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	----	<0.0010	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	----	1.55	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.0242	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	----	<0.0000050	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	----	0.000443	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	----	<0.00050	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	----	<0.050	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	----	0.878	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	----	0.00099	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	----	<0.000050	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	----	7.72	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	----	0.000013	----	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	----	5.72	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	----	0.0894	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	----	4.24	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	----	<0.00020	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	----	<0.000010	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	----	<0.00010	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	----	<0.00010	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	----	0.0305	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	----	<0.00010	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	----	0.000028	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	----	0.00180	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	----	0.0055	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	----	0.00046	----	----	----	
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	<20	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20C3155	Page	: 1 of 23
Client	: Morrison Hershfield Limited	Laboratory	: Vancouver - Environmental
Contact	: Josie Gilson	Account Manager	: Carla Fuginski
Address	: 4321 Still Creek Dr Burnaby BC Canada V5C 6S7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 18001536	Date Samples Received	: 11-Dec-2020 10:00
PO	: 726379	Issue Date	: 21-Dec-2020 15:03
C-O-C number	: ----		
Sampler	: E. Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-2B	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) GW-Interceptor 2	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-1	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-11	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-2	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-3	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SFC-4B	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Aggregate Organics : Chemical Oxygen Demand by Colourimetry											
Amber glass total (sulfuric acid) SFC-5	E559	10-Dec-2020	----	----	----		18-Dec-2020	28 days	8 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) GW-Interceptor 2	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-1	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-11	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-2	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-2B	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-3	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-4B	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) SFC-5	E298	10-Dec-2020	----	----	----		16-Dec-2020	28 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE GW-Interceptor 2	E235.Br-L	10-Dec-2020	----	----	----		12-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-11	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-2	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-2B	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-3	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-1	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-4B	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Bromide in Water by IC (Low Level)											
HDPE SFC-5	E235.Br-L	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE GW-Interceptor 2	E235.Cl	10-Dec-2020	----	----	----		12-Dec-2020	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-11	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-2	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-2B	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-3	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-1	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-4B	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Chloride in Water by IC											
HDPE SFC-5	E235.Cl	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE GW-Interceptor 2	E235.F	10-Dec-2020	----	----	----		12-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-11	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-2	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-2B	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-3	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-1	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-4B	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Fluoride in Water by IC											
HDPE SFC-5	E235.F	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE GW-Interceptor 2	E235.NO3-L	10-Dec-2020	----	----	----		12-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-11	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-2	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-2B	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-3	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-1	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-4B	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SFC-5	E235.NO3-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE GW-Interceptor 2	E235.NO2-L	10-Dec-2020	----	----	----		12-Dec-2020	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-11	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-2	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-2B	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-3	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	2 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-1	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-4B	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SFC-5	E235.NO2-L	10-Dec-2020	----	----	----		13-Dec-2020	3 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE GW-Interceptor 2	E235.SO4	10-Dec-2020	----	----	----		12-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-11	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-2	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-2B	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-3	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-1	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-4B	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE SFC-5	E235.SO4	10-Dec-2020	----	----	----		13-Dec-2020	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) GW-Interceptor 2	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-1	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-11	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-2	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-2B	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-3	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-4B	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) SFC-5	E318	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) GW-Interceptor 2	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-1	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-11	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-2	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-2B	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-3	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-4B	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (sulfuric acid) SFC-5	E366	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	17-Dec-2020	22 days	1 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) GW-Interceptor 2	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-1	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-11	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-2	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-2B	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-3	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-4B	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)											
Amber glass total (sulfuric acid) SFC-5	E372-U	10-Dec-2020	16-Dec-2020	28 days	5 days	✔	16-Dec-2020	22 days	0 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-11	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-2	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-2B	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-3	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	3 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE GW-Interceptor 2	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-1	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-4B	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Alkalinity Species by Titration										
HDPE SFC-5	E290	10-Dec-2020	----	----	----		14-Dec-2020	14 days	4 days	✔
Physical Tests : Conductivity in Water										
HDPE SFC-11	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Conductivity in Water											
HDPE SFC-2	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-2B	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-3	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	3 days	✓	
Physical Tests : Conductivity in Water											
HDPE GW-Interceptor 2	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-1	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-4B	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE SFC-5	E100	10-Dec-2020	----	----	----		14-Dec-2020	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE GW-Interceptor 2	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	100 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE SFC-2	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	93 hrs	* EHTR-FM	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : pH by Meter										
HDPE SFC-2B	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	93 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-11	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	94 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-3	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	94 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-1	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	96 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-5	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	96 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE SFC-4B	E108	10-Dec-2020	----	----	----		14-Dec-2020	0.25 hrs	97 hrs	* EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE SFC-11	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-2	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE SFC-2B	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : TSS by Gravimetry											
HDPE SFC-3	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	3 days	✔	
Physical Tests : TSS by Gravimetry											
HDPE GW-Interceptor 2	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔	
Physical Tests : TSS by Gravimetry											
HDPE SFC-1	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔	
Physical Tests : TSS by Gravimetry											
HDPE SFC-4B	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔	
Physical Tests : TSS by Gravimetry											
HDPE SFC-5	E160-H	10-Dec-2020	----	----	----		14-Dec-2020	7 days	4 days	✔	
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)											
HDPE total (nitric acid) SFC-11	E420.Cr-L	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✔	
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)											
HDPE total (nitric acid) SFC-2	E420.Cr-L	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✔	
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)											
HDPE total (nitric acid) SFC-2B	E420.Cr-L	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✔	
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)											
HDPE total (nitric acid) SFC-3	E420.Cr-L	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)											
HDPE total (nitric acid) SFC-4B	E420.Cr-L	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SFC-11	E508	10-Dec-2020	----	----	----		15-Dec-2020	28 days	4 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SFC-2	E508	10-Dec-2020	----	----	----		15-Dec-2020	28 days	4 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SFC-2B	E508	10-Dec-2020	----	----	----		15-Dec-2020	28 days	4 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SFC-3	E508	10-Dec-2020	----	----	----		15-Dec-2020	28 days	5 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) SFC-4B	E508	10-Dec-2020	----	----	----		15-Dec-2020	28 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SFC-11	E420	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SFC-2	E420	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) SFC-2B	E420	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-3	E420	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SFC-4B	E420	10-Dec-2020	----	----	----		15-Dec-2020	180 days	5 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	129817	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	2	22	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132867	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	129812	2	23	8.7	5.0	✓
Conductivity in Water	E100	129818	2	22	9.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	2	24	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	2	33	6.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	2	28	7.1	5.0	✓
pH by Meter	E108	129816	2	24	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	2	23	8.7	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	130738	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	130948	2	35	5.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	130737	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	129817	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	2	22	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132867	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	129812	2	23	8.7	5.0	✓
Conductivity in Water	E100	129818	2	22	9.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	2	24	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	2	33	6.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	2	28	7.1	5.0	✓
pH by Meter	E108	129816	2	24	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	2	23	8.7	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	130738	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	130948	2	35	5.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	130737	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	129817	2	23	8.7	5.0	✓
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	2	22	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132867	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	129812	2	23	8.7	5.0	✓
Conductivity in Water	E100	129818	2	22	9.0	5.0	✓
Fluoride in Water by IC	E235.F	129811	2	24	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	2	33	6.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	2	28	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	2	23	8.7	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	130738	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	130948	2	35	5.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	130737	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓
TSS by Gravimetry	E160-H	130448	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	131265	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	129813	2	22	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	132867	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	129812	2	23	8.7	5.0	✓
Fluoride in Water by IC	E235.F	129811	2	24	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	129810	2	33	6.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	129814	2	28	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	129815	2	23	8.7	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	130738	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	131262	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	130948	2	35	5.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	130737	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	131263	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	131264	1	16	6.2	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order : **VA20C3155**

Page : 1 of 14

Client : Morrison Hershfield Limited
 Contact : Josie Gilson
 Address : 8001 Hwy 99
 Whistler BC Canada V0N 1B8
 Telephone : ----
 Project : 18001536
 PO : 726379
 C-O-C number : ----
 Sampler : E. Peets
 Site :
 Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
 Program
 No. of samples received : 8
 No. of samples analysed : 8

Laboratory : Vancouver - Environmental
 Account Manager : Carla Fuginski
 Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
 Telephone : +1 604 253 4188
 Date Samples Received : 11-Dec-2020 10:00
 Date Analysis Commenced : 12-Dec-2020
 Issue Date : 21-Dec-2020 15:03

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 129816)											
VA20C3150-003	Anonymous	pH	----	E108	0.10	pH units	6.72	6.73	0.149%	4%	----
Physical Tests (QC Lot: 129817)											
VA20C3150-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	28.5	28.4	0.351%	20%	----
Physical Tests (QC Lot: 129818)											
VA20C3150-003	Anonymous	conductivity	----	E100	2.0	µS/cm	179	179	0.168%	10%	----
Physical Tests (QC Lot: 129953)											
KS2002853-001	Anonymous	pH	----	E108	0.10	pH units	8.41	8.41	0.00%	4%	----
Physical Tests (QC Lot: 129954)											
KS2002853-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	259	262	1.23%	20%	----
Physical Tests (QC Lot: 129955)											
KS2002853-001	Anonymous	conductivity	----	E100	2.0	µS/cm	744	734	1.35%	10%	----
Physical Tests (QC Lot: 130448)											
VA20C3150-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	888	896	0.919%	20%	----
Anions and Nutrients (QC Lot: 129810)											
VA20C3150-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129811)											
VA20C3150-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129812)											
VA20C3150-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	53.8	52.4	2.60%	20%	----
Anions and Nutrients (QC Lot: 129813)											
VA20C3150-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129814)											
VA20C3150-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129815)											
VA20C3150-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	133	130	2.46%	20%	----
Anions and Nutrients (QC Lot: 129947)											
KS2002851-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0120	0.0070	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129948)											
KS2002851-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129949)											
KS2002851-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.289	0.290	0.256%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 129950)											
KS2002851-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129951)											
KS2002851-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 129952)											
KS2002851-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	41.4	41.4	0.0685%	20%	----
Anions and Nutrients (QC Lot: 131262)											
VA20C3150-003	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.535	0.539	0.647%	20%	----
Anions and Nutrients (QC Lot: 131263)											
VA20C3150-001	Anonymous	nitrogen, total	7727-37-9	E366	0.300	mg/L	13.6	13.6	0.386%	20%	----
Anions and Nutrients (QC Lot: 131264)											
VA20C3150-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.967	0.972	0.613%	20%	----
Anions and Nutrients (QC Lot: 131265)											
VA20C3150-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	13.1	13.3	1.11%	20%	----
Total Metals (QC Lot: 130737)											
VA20C3155-002	SFC-2	aluminum, total	7429-90-5	E420	0.0030	mg/L	1.36	1.37	0.520%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00013	0.00012	0.000005	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0381	0.0385	0.977%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.020	0.019	0.0008	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000714	0.0000723	1.34%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	37.0	36.4	1.64%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00621	0.00619	0.319%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0318	0.0319	0.423%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	1.90	1.91	0.520%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	3.67	3.56	3.14%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.327	0.328	0.512%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00527	0.00537	1.86%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00320	0.00317	0.00002	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	3.74	3.74	0.0258%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 130737) - continued											
VA20C3155-002	SFC-2	rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00327	0.00317	3.01%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000096	0.000158	0.000062	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	5.06	5.15	1.62%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	12.6	12.4	1.37%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.203	0.204	0.241%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	22.5	22.9	1.84%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	0.00010	0.000005	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00078	0.00082	0.00005	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000116	0.000117	0.305%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0136	0.0134	0.0002	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 130738)											
VA20C3155-002	SFC-2	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00024	0.00026	0.00002	Diff <2x LOR	----
Total Metals (QC Lot: 130948)											
VA20C3124-007	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000075	0.0000074	0.00000009	Diff <2x LOR	----
Total Metals (QC Lot: 130949)											
VA20C3155-003	SFC-2B	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 132867)											
VA20C3124-007	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 129817)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 129818)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 129954)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 129955)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 130448)						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 129810)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 129811)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 129812)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 129813)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 129814)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 129815)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 129947)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 129948)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 129949)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 129950)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 129951)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 129952)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 131262)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 131263)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	---
Anions and Nutrients (QCLot: 131264)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
Anions and Nutrients (QCLot: 131265)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Total Metals (QCLot: 130737)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	---
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	---
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	---
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	---
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	---
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 130737) - continued						
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 130738)						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
Total Metals (QCLot: 130948)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 130949)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 132867)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 129816)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 129817)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.3	85.0	115	----
Physical Tests (QCLot: 129818)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
Physical Tests (QCLot: 129953)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 129954)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 129955)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	104	90.0	110	----
Physical Tests (QCLot: 130448)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	89.5	85.0	115	----
Anions and Nutrients (QCLot: 129810)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	94.0	90.0	110	----
Anions and Nutrients (QCLot: 129811)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	92.0	90.0	110	----
Anions and Nutrients (QCLot: 129812)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	93.5	90.0	110	----
Anions and Nutrients (QCLot: 129813)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	89.4	85.0	115	----
Anions and Nutrients (QCLot: 129814)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	93.3	90.0	110	----
Anions and Nutrients (QCLot: 129815)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	94.5	90.0	110	----
Anions and Nutrients (QCLot: 129947)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	97.3	90.0	110	----
Anions and Nutrients (QCLot: 129948)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	94.9	90.0	110	----
Anions and Nutrients (QCLot: 129949)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.3	90.0	110	----
Anions and Nutrients (QCLot: 129950)									



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		
						Low	High		
Anions and Nutrients (QCLot: 129950) - continued									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	94.4	90.0	110	----
Anions and Nutrients (QCLot: 129951)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	98.2	85.0	115	----
Anions and Nutrients (QCLot: 129952)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	95.7	90.0	110	----
Anions and Nutrients (QCLot: 131262)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 131263)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 131264)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.2	80.0	120	----
Anions and Nutrients (QCLot: 131265)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	97.9	85.0	115	----
Total Metals (QCLot: 130737)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	98.9	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	97.7	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.2	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.8	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.2	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	95.1	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.6	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.7	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	95.8	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	101	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	95.7	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.6	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.1	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 130737) - continued									
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.1	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	101	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	99.2	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.4	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.0	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.6	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	98.9	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.0	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	96.4	80.0	120	----
Total Metals (QCLot: 130738)									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
Total Metals (QCLot: 130948)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	96.6	80.0	120	----
Total Metals (QCLot: 130949)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.1	80.0	120	----
Aggregate Organics (QCLot: 132867)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	97.8	85.0	115	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 129810)										
VA20C3150-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.40 mg/L	2.5 mg/L	96.0	75.0	125	----
Anions and Nutrients (QCLot: 129811)										
VA20C3150-002	Anonymous	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 129812)										
VA20C3150-002	Anonymous	chloride	16887-00-6	E235.Cl	95.8 mg/L	100 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 129813)										
VA20C3150-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.516 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 129814)										
VA20C3150-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.474 mg/L	0.5 mg/L	94.8	75.0	125	----
Anions and Nutrients (QCLot: 129815)										
VA20C3150-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	93.0 mg/L	100 mg/L	93.0	75.0	125	----
Anions and Nutrients (QCLot: 129947)										
KS2002851-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 129948)										
KS2002851-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 129949)										
KS2002851-002	Anonymous	fluoride	16984-48-8	E235.F	0.992 mg/L	1 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 129950)										
KS2002851-002	Anonymous	chloride	16887-00-6	E235.Cl	99.6 mg/L	100 mg/L	99.6	75.0	125	----
Anions and Nutrients (QCLot: 129951)										
KS2002851-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.500 mg/L	0.5 mg/L	100.0	75.0	125	----
Anions and Nutrients (QCLot: 129952)										
KS2002851-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	97.2 mg/L	100 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 131262)										
VA20C3150-004	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.54 mg/L	2.5 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 131263)										
VA20C3150-002	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 131264)										
VA20C3150-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 131265)										
VA20C3150-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	9.75 mg/L	10 mg/L	97.5	75.0	125	----
Total Metals (QCLot: 130737)										
VA20C3155-003	SFC-2B	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00960 mg/L	0.01 mg/L	96.0	70.0	130	----
		boron, total	7440-42-8	E420	0.094 mg/L	0.1 mg/L	94.4	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00386 mg/L	0.004 mg/L	96.5	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00992 mg/L	0.01 mg/L	99.2	70.0	130	----
		cobalt, total	7440-48-4	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		lithium, total	7439-93-2	E420	0.0995 mg/L	0.1 mg/L	99.5	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		nickel, total	7440-02-0	E420	0.0368 mg/L	0.04 mg/L	92.0	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, total	7440-09-7	E420	3.86 mg/L	4 mg/L	96.4	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		selenium, total	7782-49-2	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	10.00 mg/L	10 mg/L	100.0	70.0	130	----
		silver, total	7440-22-4	E420	0.00385 mg/L	0.004 mg/L	96.3	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		thallium, total	7440-28-0	E420	0.00367 mg/L	0.004 mg/L	91.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		tin, total	7440-31-5	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Total Metals (QCLot: 130737) - continued										
VA20C3155-003	SFC-2B	titanium, total	7440-32-6	E420	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		uranium, total	7440-61-1	E420	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, total	7440-66-6	E420	0.377 mg/L	0.4 mg/L	94.3	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
Total Metals (QCLot: 130738)										
VA20C3155-003	SFC-2B	chromium, total	7440-47-3	E420.Cr-L	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
Total Metals (QCLot: 130948)										
VA20C3138-001	Anonymous	mercury, total	7439-97-6	E508	0.0000964 mg/L	0.0001 mg/L	96.4	70.0	130	----
Total Metals (QCLot: 130949)										
VA20C3155-004	SFC-3	mercury, total	7439-97-6	E508	0.0000967 mg/L	0.0001 mg/L	96.7	70.0	130	----
Aggregate Organics (QCLot: 132867)										
VA20C3155-001	SFC-1	chemical oxygen demand [COD]	----	E559	467 mg/L	500 mg/L	93.5	75.0	125	----



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17--

Page of

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Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																																																	
Company:	Morrison Hershfield Ltd.	Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					EMERGENCY																																																												
Contact:	Josie Gilson	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business days)		4 day [P4-20%] <input type="checkbox"/>			3 day [P3-25%] <input type="checkbox"/>			1 Business day [E1 - 100%] <input type="checkbox"/>																																																									
Phone:	778-837-9801	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked					2 day [P2-50%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																												
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs:																																																																	
Street:	310-4321 Still Creek Drive	Email 1 or Fax jgilson@morrisonhershfield.com			For tests that can not be performed according to the service level selected, you will be contacted.																																																																	
City/Province:	Burnaby, BC	Email 2 epeets@morrisonhershfield.com			Analysis Request																																																																	
Postal Code:	V5C 6S7	Email 3			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																	
Invoice To	Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Invoice Distribution			<table border="1"> <tr> <td rowspan="5">Disolved Metals & Mercury</td> <td rowspan="5">Total Metals & Mercury</td> <td rowspan="5">General Parameters</td> <td rowspan="5">Nutrients, Anions & COD</td> <td rowspan="5">PAH/EPH/LEPH/HEPH</td> <td rowspan="5">VOC</td> <td colspan="10">SAMPLES ON HOLD</td> </tr> <tr> <td colspan="10">Sample is hazardous (please provide further details)</td> </tr> <tr> <td colspan="10">NUMBER OF CONTAINERS</td> </tr> <tr> <td colspan="10"></td> </tr> <tr> <td colspan="10"></td> </tr> </table>										Disolved Metals & Mercury	Total Metals & Mercury	General Parameters	Nutrients, Anions & COD	PAH/EPH/LEPH/HEPH	VOC	SAMPLES ON HOLD										Sample is hazardous (please provide further details)										NUMBER OF CONTAINERS																													
Disolved Metals & Mercury	Total Metals & Mercury	General Parameters	Nutrients, Anions & COD	PAH/EPH/LEPH/HEPH																	VOC	SAMPLES ON HOLD																																																
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Company:	Resort Municipality of Whistler (RMOW)	Email 1 or Fax atucker@whistler.ca																																																																				
Contact:	Andrew Tucker	Email 2 ap@whistler.ca																																																																				
Project Information		Oil and Gas Required Fields (client use)																																																																				
ALS Account # / Quote #:		AFE/Cost Center:		PO#																																																																		
Job #:		Major/Minor Code:		Routing Code:																																																																		
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LSD:		Location:																																																																				
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																																																																		
C3155		C. Funginski		E. Peets																																																																		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																																
	SFC-1			10-Dec-20	9:30	Water																																																																
	SFC-2			10-Dec-20	12:15	Water																																																																
	SFC-2B			10-Dec-20	12:35	Water																																																																
	SFC-3			10-Dec-20	11:40	Water																																																																
	SFC-4B			10-Dec-20	8:30	Water																																																																
	SFC-5			10-Dec-20	9:10	Water																																																																
	SFC-11			10-Dec-20	11:50	Water																																																																
	GW-Interceptor 2			10-Dec-20	9:10	Water																																																																
Drinking Water (DW) Samples¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																																																	
Are samples taken from a Regulated DW System? (I) YES (N) NO		British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																												
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Contaminated Sites Regulation Stage 10 Amendment (NOV, 2017)			Cooling Initiated <input type="checkbox"/>					INITIAL COOLER TEMPERATURES °C																																																												
										FINAL COOLER TEMPERATURES °C																																																												
										4.6°C (Avg of 8)																																																												
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																																																	
Released by: E. Peets	Date: Dec 11 2020	Time: 10:00	Received by:	Date:	Time:	Received by: RK	Date: 11/12/20	Time: 10am																																																														



APPENDIX B: Field Data Collection Results for Leachate, Groundwater, and Surface Water Monitoring

Groundwater and Leachate Monitoring Field Data

Sample ID	MW-2D				MW-2S				MW-3				MW-4				MW-6				Leachate Manhole				GW Interceptor				
Date Sampled																													
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Analyte																													
Units																													
Field Parameters																													
Field Conductivity	uS/cm	718.0	754.0	728.0	1076.0	276.8	268.1	283.5	552.8	129.6	119.1	132.2	185.8	346.3	335.9	221.8	479.2	495.8	469.9	413.6	556.8	256.9	-	452.4	-	236.9	537	435.4	814.0
Temperature	C	7.7	9.2	8.8	7.6	7.4	8.5	8.7	7.3	7.8	8.5	9.9	8.4	8.5	9.1	8.9	7.1	8.3	9.3	10.8	9.3	6.9	-	12.9	-	8.6	9.1	9.0	8.0
pH	-	6.38	6.51	6.68	6.62	6.35	6.75	6.88	6.68	5.84	6.06	6.03	5.84	6.6	6.52	6.79	6.62	6.3	6.33	6.2	5.9	6.51	-	6.37	-	6.74	6.23	6.29	6.38
Dissolved Oxygen	mg/L	2.53	3.33	3.00	1.15	2.15	2.81	1.83	1.44	1.41	3.51	3.09	1.22	0.37	1.12	5.66	2.58	0.54	4.35	2.99	6.25	5.34	-	7.29	-	5.10	0.32	1.05	1.15
Oxidation Reduction Potential	mV	40.2	167.8	92.2	-11.6	70.3	139.3	58.9	23.4	117.4	216.1	127.0	42.4	138.9	221.7	114.9	39.3	191.6	146.0	115.2	88.5	123.5	-	106.2	-	108.9	153.4	98.7	26.5

Groundwater Monitoring Well Water Levels

Well ID	Ground Surface Elevation	Top of Well Riser Elevation	Date	Depth to Water	Static Water Level Elevation	Date	Depth to Water	Static Water Level Elevation	Date	Depth to Water	Static Water Level Elevation	Date	Depth to Water	Static Water Level Elevation
	mASML	mASML	Q1	mbtowr	mASL	Q2	mbtowr	mASL	Q3	mbtowr	mASL	Q4	mbtowr	mASL
MW2S	603.84	604.94	23-Apr-20	6.01	598.93	23-Jun-20	6.35	598.59	29-Sep-20	6.31	598.63	10-Dec-20	5.65	599.29
MW2D	603.84	604.9		6.05	598.85		6.39	598.51		6.35	598.55		5.69	599.21
MW3	600.61	601.47	23-Apr-20	1.57	599.90	23-Jun-20	1.72	599.75	29-Sep-20	1.57	599.90	10-Dec-20	1.37	600.10
MW4	596.54	677.54		4.05	673.49		3.89	673.65		4.01	673.53		3.82	673.72
MW6	610.88	610.88		4.4	606.48		4.91	605.97		4.51	606.37		3.96	606.92

Surface Water Monitoring Field Data

Sample ID	SFC-2B				SFC-2				SFC-3				SFC-4B				SFC-11				
Date Sampled																					
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Analyte																					
Units																					
Field Parameters																					
Field Conductivity	uS/cm	608.0	850.0	461.7	376.4	179.1	241.2	259.5	306.6	67.5	115.4	158.1	119.6	110.1	233.8	169.6	165.8	53.0	89.2	74.9	84.2
Temperature	C	11.3	12.1	11.9	5.4	6.4	8.0	9.8	8.0	5.5	8.4	9.4	4.7	7.2	9.9	9.1	4.9	5.2	6.8	8.5	4.5
pH	-	3.43	3.12	4.44	5.63	6.71	6.65	6.54	6.57	6.92	6.95	7.02	7.35	7.1	6.81	7.43	7.58	6.38	6.73	6.97	7.47
Dissolved Oxygen	mg/L	2.87	5.87	4.86	5.79	0.79	6.55	8.97	8.07	2.58	9.69	11.77	10.82	0.4	8.15	12.37	10.39	2.45	8.03	11.79	10.46
Oxidation Reduction Potential	mV	450.8	408.6	184.7	51.7	111.1	136.4	119.0	39.9	220.9	172.2	89.1	-11.3	172.6	212.6	91.0	-29.0	262.4	173.7	84.7	-7.8

APPENDIX C: Surface Water Monitoring Photos

Surface Water Monitoring Photos



Photo 1 - SFC-2B Upstream (Q1)



Photo 2 - SFC-2B Downstream (Q1)



Photo 3 - SFC-2 Upstream (Q2)



Photo 4 - SFC-2 Downstream (Q1)

Surface Water Monitoring Photos



Photo 5 - SFC-3 Upstream (Q3)



Photo 6 - SFC-3 Downstream (Q2)



Photo 7 - SFC-11 Upstream (Q2)



Photo 8 - SFC-11 Downstream (Q2)

Surface Water Monitoring Photos



Photo 9 - SFC-4B Upstream (Q3)



Photo 10 - SFC-4B Downstream (Q1)