



MORRISON HERSHFIELD

# Resort Municipality of Whistler Landfill Annual Monitoring Report 2021

Presented to:

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and  
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March 11, 2022

Ministry of Environment  
Coast Region  
200, 10470 152nd Street,  
Surrey, BC, V3R 0Y3

To Whom It May Concern:

**Re: Resort Municipality of Whistler Landfill Annual Monitoring Report, 2021**

Please accept our submission of the *Resort Municipality of Whistler Landfill Annual Monitoring Report, 2021*. The report presents the results and a summary of environmental issues and actions taken based on the surface water, groundwater, and landfill gas monitoring data collected in 2021, and has been completed to meet the requirements as set out in Section 3.31 of the 2005 Whistler Landfill Operational Certificate (MR-04693).

If you have any further questions or concerns, please contact me at 604-203-1783.

Yours truly,

Ian McKeachie  
Resort Municipality of Whistler

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# 1. INTRODUCTION

This annual report incorporates monitoring data collected in 2021 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 2021 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 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 2021; and
- Summary of maintenance activities that were completed on site in 2021, as well as any planned activities in 2022.

## 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 m<sup>3</sup> 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



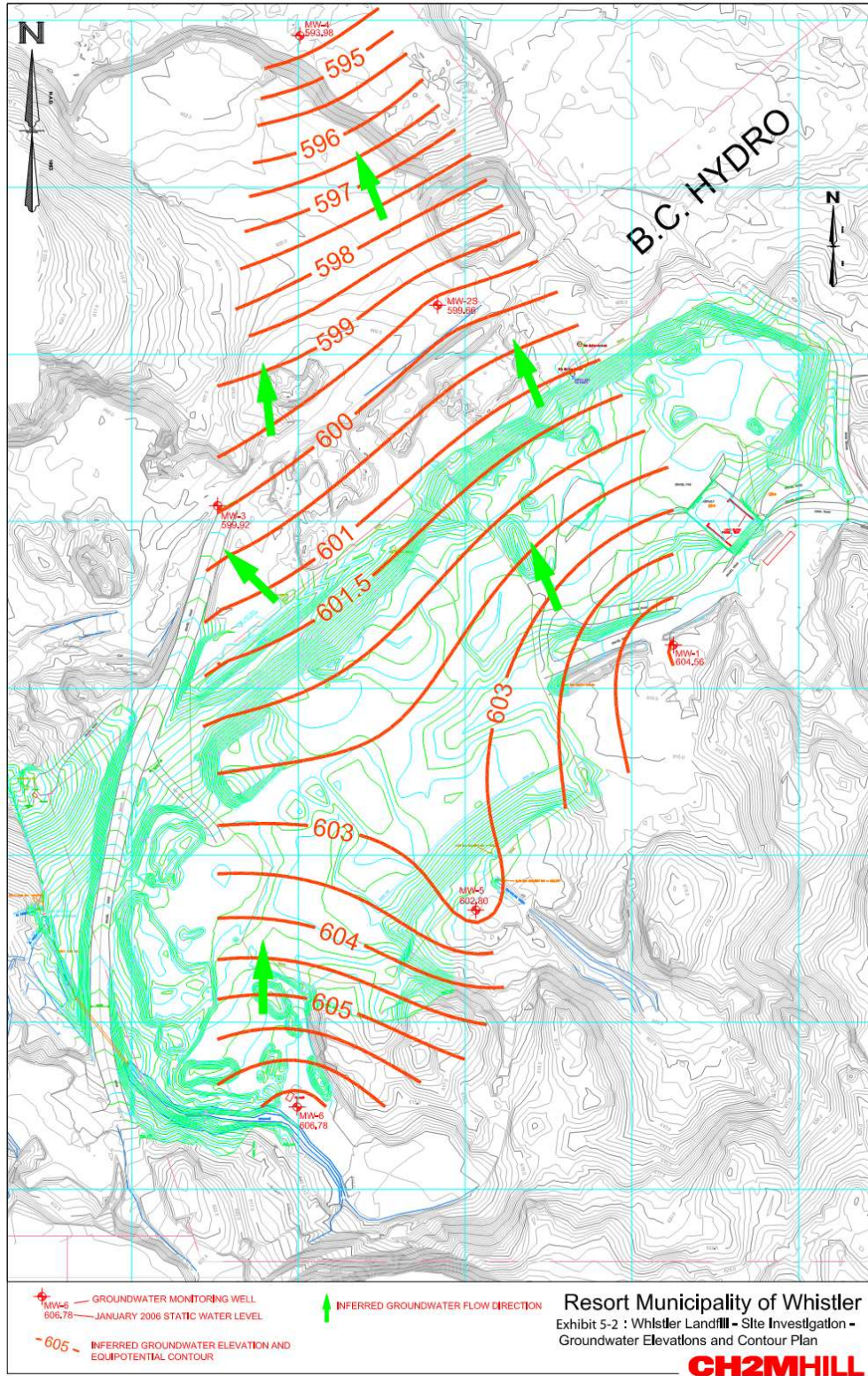


Figure 2: Groundwater Elevations and Flow Pattern at the Former Whistler Landfill Site (from CH2M Hill, 2006a)

### 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 2020 (Morrison Hershfield, 2020)
- Resort Municipality of Whistler Landfill Revised Monitoring Program (Morrison Hershfield, 2021)
- Whistler Landfill Gas Wellfield Investigation Report (ISWM Consulting Ltd., 2021)

Monitoring and reporting requirements established in the Closure Plan (CH2MHill 2008c) and the 2012 Revised Monitoring Program (Morrison Hershfield) were amended in the 2021 Revised Monitoring Program (Morrison Hershfield) based on a review of long-term monitoring data. The 2021 Revised Monitoring Program that was approved and implemented in November 2021 involves a reduction in the groundwater and surface water monitoring frequency from quarterly to semi-annually. A summary of the revised monitoring programs is provided in Table 1.

Table 1: Monitoring Program Summary for Groundwater, Surface Water, Leachate

Monitoring Program	Sampling Locations	Event 1 (Spring)	Event 2 (Fall)	Standards for Results Comparison (as per Landfill Closure Plan)	Guidelines for Results Discussion Comparison	Reporting Requirements
Groundwater	MW-2D MW-2S MW-3 MW-4 MW-6	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	BC Contaminated Sites Regulation, Column II, Freshwater Aquatic Life	BC Approved and Working Criteria for Water Quality	Annually
Surface Water	SFC-2 SFC-2B SFC-3 SFC-4B SFC-11	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Total Metals.  <i>Visual Assessment:</i> Assess the algal moss growth in the surface water streams.	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Total Metals.  <i>Visual Assessment:</i> Assess the algal moss growth in the surface water streams.	BC Contaminated Sites Regulation, Column II, Freshwater Aquatic Life	BC Approved and Working Criteria for Water Quality	Annually
Leachate	L1 (Leachate Collection Manhole)	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	BC Contaminated Sites Regulation, Column II, Freshwater Aquatic Life	BC Approved and Working Criteria for Water Quality	Annually
Groundwater Interceptor	GW Int (Upstream of Leachate Pump Station)	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	<i>Field Measurements:</i> Temperature, pH, D.O., Conductivity, and ORP.  <i>Laboratory Analysis:</i> Physical parameters, Anions & Nutrients, COD, Dissolved Metals, VOCs, PAHs, and Hydrocarbons.	BC Contaminated Sites Regulation, Column II, Freshwater Aquatic Life	BC Approved and Working Criteria for Water Quality	Annually



## 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.

Groundwater and surface water sampling was conducted quarterly in accordance with the 2012 Revised Monitoring Program until the Fall of 2021, at which point the 2021 Revised Monitoring Program was approved and implemented. Therefore, only the first three quarterly monitoring events were conducted in 2021 (Q1 – Q3) and the last quarterly event (Q4) was not required in accordance with the new requirements. All sampling events are tracked and reported based on a calendar year. In future years, groundwater and surface water sampling will be conducted semi-annually. The first sampling event in 2022 will be completed in the Spring (Q1) and the last will be completed in the Fall (Q3).



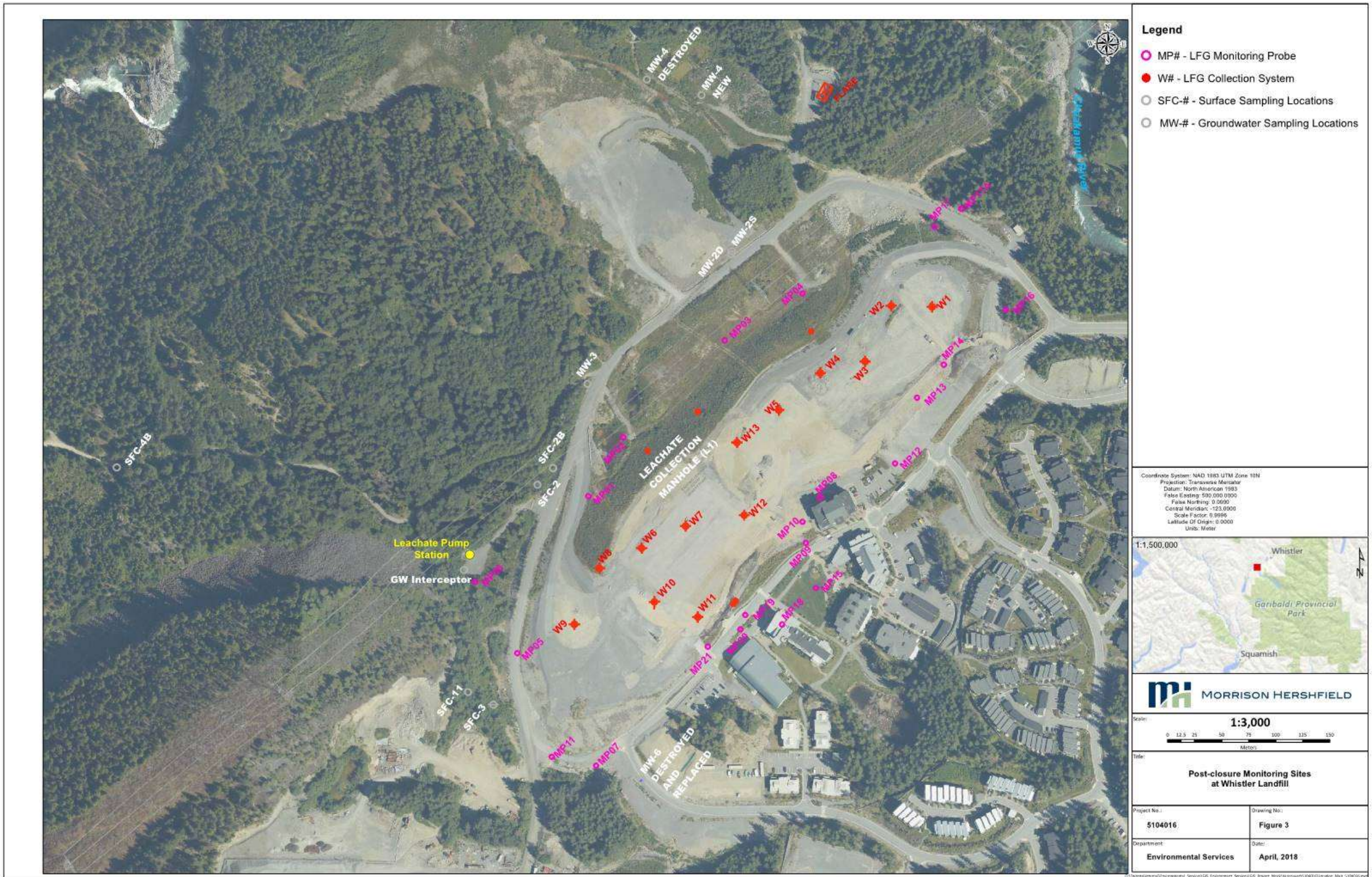


Figure 3: Post-Closure Monitoring Sites at the Closed Whistler Landfill



The 2021 leachate, groundwater and surface water monitoring program was completed by Morrison Hershfield staff. Samples were collected on the dates shown in Table 2.

Table 2: 2021 Quarterly Sample Collection Dates

Sample Collection Dates 2020	
Quarter 1 (Q1 2021)	March 24, 2021
Quarter 2 (Q2 2021)	June 16, 2021
Quarter 3 (Q3 2021)	September 23, 2021
Quarter 4 (Q4 2021)	Not applicable

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).

#### 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. Table 3 provides a summary of groundwater wells monitored in 2021.

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 sampling event in 2021. Complete laboratory results can be found in Appendix A.

Table 3: 2021 Leachate Monitoring Events and Locations

Site	Site Description	Q1	Q2	Q3
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 4 provides a summary of groundwater wells monitored in 2021.

Table 4: 2021 Groundwater Monitoring Events and Locations

Site	Site Description	Q1	Q2	Q3
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 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 5 provides a summary of the surface water sites sampled in 2021. 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 5: 2021 Surface Water Monitoring Events and Locations*

Site	Site Description	Q1	Q2	Q3
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, 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 of the Q1 and Q2 surface and groundwater sampling events, 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 during all three sampling events. 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 8 and Table 9. Detailed laboratory results can be found in Appendix A.

The following summarizes the groundwater exceedances of the standards and the guidelines for 2021.

### **BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life**

- No parameters exceeded the standards in 2021.

### **BC Ambient Water Quality Guidelines**

- pH was outside of the range of the guideline at MW-3 in all quarters.
- Arsenic concentrations exceeded the guideline at MW-2D, MW-2S, and MW-4 in all quarters.
- 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 Q1 and Q2.
- Iron concentrations exceeded the guideline at MW-2D, MW-2S and MW-4 in all quarters, at MW-3 in Q1, and at MW-6 in Q2.
- Manganese concentrations exceeded the guideline at MW-3 in all quarters, and at MW-4 in Q1 and Q2.
- Chlorobenzene concentrations exceeded the guideline at MW-2D in all quarters.

#### **5.1.1 Discussion**

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 2021. 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. This finding is consistent with previous years (2018 – 2020).

## **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. Algae was generally more pronounced at SFC-2B, and SFC-2 had increased algae presence in Q1 and Q3 compared to Q2. Downstream at SFC-4B there is some algae visible, which increased later in the year into the Q2 and Q3 sampling events. 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 2021 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 10. Detailed laboratory results can be found in Appendix A.

The following summarizes the surface water exceedances of the standards and the guidelines for 2021.

### **BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life**

- Cobalt concentrations exceeded the standard at SFC-2B in Q3.
- Copper concentrations exceeded the standard at SFC-2B in all quarters, and at SFC-11 in Q1 for the first time since 2017.

### **BC Ambient Water Quality Guidelines**

- pH was outside the range of the guideline at SFC-2B in all quarters.
- Alkalinity was below the working guideline at SFC-2B in Q2 and Q3.
- Aluminum concentrations exceeded the guideline at SFC-2 and SFC-2B in all quarters, and at SFC-3, SFC-4B and SFC-11 in Q1 and Q2.
- Beryllium concentrations exceeded the guideline at SFC-2B in Q2 and Q3.
- Chromium concentrations exceeded the guidelines at SFC-2B in all quarters, and at SFC-11 in Q1.
- Cobalt concentrations exceeded the guideline at SFC-2B in Q3.
- Copper concentrations exceeded the guideline at SFC-2 in all quarters, at SFC-2B in all quarters, and at SFC-3, SFC-4B, and SFC-11 in Q1.
- Iron concentrations exceeded the guideline at SFC-2 and SFC-2B in all quarters, at SFC-4B and SFC-11 in Q1, and at SFC-4B in Q1 and Q2.
- Manganese concentrations exceeded the guideline at SFC-2B in Q3.
- Nickel exceeded guidelines at SFC-2B in 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. The most notable exception to this was the presence of elevated copper at SFC-11 during the Q1 sampling event.

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, and iron 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-11, suspended solids levels recorded during the Q1 event were higher than normal (45 mg/L compared to < 3 mg/L in Q2 and Q3) which likely contributed to the higher copper concentrations and at this location. At sample location SFC-2B, the concentration of cobalt exceeded the BCCSR standards during Q3, but because this exceedance was only evident for one sampling event, no further action is triggered. The concentration of copper at sample

location SFC-2B was in exceedance of the BCCSR standards for more than two sampling events in a row, which as per the Closure Plan indicates that contingency planning should be initiated. This result is consistent with the outcome of 2020 monitoring, so the assessment of the environmental risks established in 2020 was updated based on monitoring results and conditions observed in 2021, the findings of which are discussed below. 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 in Table 6 and Table 7 below. 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 6 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 7 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 11 and Table 12. Detailed laboratory results can be found in Appendix A.

The following summarizes the leachate exceedances of the standards and the guidelines for 2021.

#### BC Contaminated Sites Regulation, Schedule 3.2 Aquatic Life

- No parameters exceeded the standards in 2021.

#### BC Ambient Water Quality Guidelines

- pH was outside the range of the guideline at the Leachate Manhole in Q1, and at the Groundwater Interceptor in Q2 and Q3.
- Copper concentrations exceeded the guideline at the Leachate Manhole in Q1.
- Iron concentrations exceeded the guideline at the Groundwater Interceptor in all quarters.
- Zinc concentrations exceeded the guideline at the Leachate Manhole in Q1.
- Fluoranthene concentrations exceeded the guideline at the Groundwater Interceptor in all quarters.
- Pyrene concentrations exceeded the guideline at the Groundwater Interceptor in all quarters.

#### 5.3.1 Discussion

The concentrations of aluminum, copper and zinc were higher at the Leachate Manhole than at the Groundwater Interceptor in 2021. Compared to 2020, concentrations of indicator parameters at the Groundwater Interceptor were generally higher than the Leachate Manhole. The concentration of iron in the Groundwater Interceptor was still consistently higher than that in the Leachate Manhole in 2021. Concentrations of some polycyclic aromatic hydrocarbons (PAHs) were also higher at the Groundwater Interceptor than at the Leachate Manhole. In particular, measurable concentrations of fluoranthene and 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 13.

On August 30<sup>th</sup>, methane was detected in trace amounts at monitoring point (MP) #12, located next to the Podium Building on Legacy Way. Remedial action was taken immediately, as outlined in Section 5.4.1. (Norseman Engineering, Report #148, 2021).

Methane was not detected at any other monitoring points in 2021. Based on 2021 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 August 30<sup>th</sup> 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.

- Blower #301 was installed in December 2020, and as of January 2021 it appeared to be ready for service. The cold sensitive parts of the flare station were well insulated to protect the system from freezing (Norseman Engineering, Report #141, 2021).
- Winter 2020 adjustments to the flare and wells to control offsite migration continued to be effective into 2021 and no offsite migration was detected throughout the winter seasons.
- On April 30, 2021, RMOW staff calibrated the methane analyzer at the flare which brought values down from 30% to 28%, in closer agreement with the handheld NP204 instrument and the rental Gem 2000.
- Oscillation in the vacuum, as observed during monitoring in late November and December 2020, continued into 2021. This oscillation is indicative that the low spot in the landfill gas transmission line is almost full again. Throughout January-March, there was still vacuum in the south end wells (#11, 12, and 13), and the oscillations did not affect operation of the flare, so the situation was not deemed critical and was delayed until snow melt made access to the area possible. Vacuum in the south end wells dropped and there was very little remaining by April and May, so pump out occurred on June 9, 2021 and a significant amount of condensate was removed. Norseman fabricated a new pumping apparatus such that the low spot can be pumped out even with relatively little water accumulated, allowing pumping to take place in the future when the oscillations in the vacuum first begin. there was very little remaining by April and May, so pump out occurred on June 9, 2021. As a result, vacuum was restored to the south end wells such that methane content in those wells was reduced from near 50% (due to high accumulation from lack of suction) to normal levels (Norseman Engineering, Report #146, 2021). Oscillations in the vacuum and flow were reduced substantially and stopped completely by the July site visit (Norseman Engineering, Report #147, 2021). Another pump-out was conducted on November 19, 2021, with smaller amounts of liquid yielded. This reduced volume is suspected to be due to the June pump-out increasing the pipes' capacity to hold water, and the hot, dry summer of 2021 producing a limited amount of liquid (Norseman Engineering, Report #151, 2021).
- Following pump-out of the LFG transmission line, it was noted during the July site visit that the methane content of the south end wells (#11, 12, and 13) was lower than the previous month, and in the case of #11 and 12, lower than the flare methane level. The vacuum to those wells was reduced slightly. During the August site visit, a trace amount of off-site migration was detected at Monitoring Point #12. In response, the wells were adjusted and the flow to the flare was increased from 97 cfm to 100 cfm, increasing the



vacuum from 2.7 "w.c. to 3.0"w.c. This adjustment directed more vacuum to the north end of the landfill and thus reduced vacuum in the south end wells (Norseman Engineering, Report #148, 2021). Offsite migration was not detected during the site visit for September (conducted October 1), and the flare flow was slightly increased again from 102 cfm to 104 cfm to ensure any migration had been eliminated (Norseman Engineering, Report #149, 2021).

- It was noted in May that some well screens may have become plugged with debris or growth and need to be cleaned in order to increase gas flow. Alternative methods for deployment of a pressure hose for cleaning while preventing air intrusion were suggested, and the proximity of wells to surrounding water sources was evaluated. Three water supply points were identified for well cleaning purposes and it was determined that all active wells except Well #4 could feasibly be serviced by utilizing up to 300 ft of hose. (Norseman Engineering, Report #145, 2021). Norseman provided assistance with camera inspection of several wells on June 24. The details, findings and recommendations of this well inspection are outlined in a separate report (ISMW Consulting Ltd., 2021).
- In June, it was noted the oxygen level measured by the cabinet instrument was unusually high (2.4%) with the high level appearing suddenly a few days prior to the site visit. The rental Gem 5000 was used to test the flare gas and recorded 0.5% oxygen, which matched the oxygen levels in the wells, indicating that the cabinet oxygen analyzer required calibration (Norseman Engineering, Report #146, 2021). This was still the case in July and August, but during the site visit for September (conducted October 1), the cabinet instrument's oxygen measurement returned to normal indicating that a calibration had been performed and the instrument was reading properly again (Norseman Engineering, Report #149, 2021).
- In July, it was noted that the flare methane content was 26%, lower than the desirable 30% to ensure combustion. This reading was supported by the NP2-4 (27%) and the Gem 5000 (27%). Attempts began to slowly increase methane to the desired level prior to winter (Norseman Engineering, Report #147, 2021), and it was read as 28%, which was considered acceptable, in September and October.
- In November, a drop in flare methane content was again noted with measurements between 25-26%, a level where continuous combustion may be compromised. These measurements are likely due to dropping temperatures reducing the respiration rate of methane-producing bacteria in the landfill. As a result, flow was reduced from 94 cfm to 85 cfm over the month, which was deemed acceptable as no offsite migration of methane had been detected at any monitoring points since August. Well #11 was also opened up slightly to allow higher quality gas to enter the pipeline, so that combustion could become steady with fewer flame failures (Norseman Engineering, Report #151, 2021).
- In December, due to unusually cold weather, the methane content dropped from 28% to 25%, which impacted flare operations as of December 29. It was found that the inlet temperature of 18°F (-8°C), combined with high vacuum, low flow, and landfill gas saturated with water, caused the inlet blower to become plugged with ice. RMOW staff

were notified and responded quickly with heaters, tarps and insulation. The situation was quickly resolved (Norseman Engineering, Report #152, 2021).

## **5.5 Settlement & Erosion**

During the 2021 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 2021 monitoring results are generally consistent with the results from previous years' monitoring. Concentrations of cobalt and copper at SFC-2B were also consistently elevated.

Overall, we have recommended continued monitoring according to the revised program, which reduces the frequency of monitoring events from quarterly to bi-annual. This revised program will continue to be implemented in 2022.

#### Groundwater

- 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.
- Down-gradient of the landfill there are no groundwater points of diversion / users.

Based on the elements noted above, continued monitoring of groundwater in 2022 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 2020, 2018, and 2017.
- For the first time since 2017, surface water sampled at SFC-11 exceeded the standard for copper.
- 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 occasionally elevated at SFC-4B and 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 2022 is recommended and required as per the Closure Plan.

## Leachate

- Metals such as copper, iron, and zinc continue to exceed the guidelines.
- Pyrene continues to exceed the guideline at the Groundwater Interceptor location, and a new exceedance of the guideline for fluoranthene was noted at the Groundwater Interceptor during all sampling events in 2021.

Continued monitoring is recommended in 2022 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 2022.

## 6.2 Landfill Gas

### 6.2.1 Monitoring & Maintenance

As per recommendations from 2020, site investigations were conducted in 2021 for assessment of fugitive methane emissions, as well as wellfield inspection and cleanup. A full letter report on these field programs is available (ISWM Consulting Ltd., 2021). The major conclusions and recommendations of this program were as follows:

- Investigations showed that the Whistler Landfill closure system is effectively eliminating methane emissions from this site. The estimated methane emission rate is considered very low with no risk to vegetation and/or public.
- During the methane emission surface scan, a methane emission hotspot was identified, approximately a 3m by 5m area northeast of Well #1 responsible for about 20% of the site overall GHG emissions. Mitigation measures for minimizing methane emissions were suggested.
- Well inspection identified two main issues: (i) long length of the 2" PVC pipe located inside the well's 4" HDPE pipe; and (ii) high water table in gas wells flooding the screen section of the wells. Recommendations included shortening of the 2" PVC pipe (particularly in Well #1) and assessing feasibility of lowering the perched water level within the landfill (particularly in the vicinity of Well #3).
- Taking into account that the LFG blower flare system is programmed to continue operating even at low gas quality conditions, it was recommended that those abandoned wells with well-maintained structure (such as Well #9) be connected to the header line and gas quality and flow rate be monitored.
- A full round of well inspection and maintenance could potentially further increase the systems collection efficiency. However, taking into account that the system is meeting its objectives of controlling gas migration and emission, it was recommended that system improvement efforts to focus on improving Gas Wells #1 and #2 and mitigating methane emission from the identified hotspot.

## **6.3 Settlement & Erosion**

### **6.3.1 Monitoring & Maintenance**

Continued monitoring for any settlement or erosions issues is recommended to continue in 2022. 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.

Morrison Hershfield does not accept responsibility for the use of this report for any purpose other than that stated above and does not accept responsibility to any third party for the use, in whole or in part, of the contents of this document. This report should be understood in its entirety, since sections taken out of context could lead to misinterpretation.

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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.

Forms verifying the competency of the team and disclosure of any potential conflicts of interest have been provided in Appendix C.

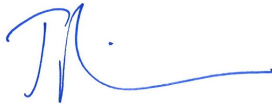
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Analyte	Units	LOR	Sch. 3.2 Water FAW*	Sample ID Date Sampled Quarter	MW-2D			MW-2S			MW-3			MW-4			MW-6			
					24-Mar-21 Q1	16-Jun-21 Q2	23-Sep-21 Q3	24-Mar-21 Q1	16-Jun-21 Q2	23-Sep-21 Q3	24-Mar-21 Q1	16-Jun-21 Q2	23-Sep-21 Q3	24-Mar-21 Q1	16-Jun-21 Q2	23-Sep-21 Q3	24-Mar-21 Q1	16-Jun-21 Q2	23-Sep-21 Q3	
<b>Field Parameters</b>																				
Field Conductivity	uS/cm	-	-	-	890.0	730.0	1155.0	419.7	271	440.4	178.6	115.1	152.9	509	323.8	339.8	745.0	474.8	511.5	
Temperature	C	-	-	-	7.2	8.4	8.3	6.9	8.1	8.5	6.9	9.4	9.8	7.6	8.5	8.8	7.1	9.2	11.4	
pH	-	-	-	-	6.51	6.8	6.51	7.03	6.86	6.64	6.12	5.41	5.76	6.46	6.84	6.67	6.17	6.55	6.5	
Dissolved Oxygen	mg/L	-	-	-	-0.47	3.22	2.13	1.49	1.3	1.3	-	1.87	0.82	-	1.02	2.21	8.33	4.52	3.37	
Oxidation Reduction Potential	-	-	-	-	62.8	101.6	104.2	111.2	120.4	23.4	102.7	153.6	222.8	33.1	116.7	121.9	133.8	131.7	112.3	
<b>General Chemistry</b>																				
Conductivity	uS/cm	2	-	-	953	1030	1020	328	324	351	179	168	144	419	408	270	714	704	525	
Hardness (as CaCO3)	mg/L	0.5	-	-	302	306	303	118	95.3	119	39.3	37.7	32.0	142	127	81.2	136	139	92.1	
pH	-	0.1	-	6.5 - 9.0	6.82	6.65	6.51	6.85	6.71	6.55	6.50	6.23	6.32	6.73	6.55	6.62	6.63	6.52	6.64	
Total Suspended Solids	mg/L	3	-	-	205	118	90.1	62.4	37.1	88.3	7.0	11.1	4.3	129	139	85.3	226	92.1	106	
COD	mg/L	20	-	-	48	42	68	<20	<20	<20	<20	<20	<20	<20	28	<20	31	26	33	
<b>Anions and Nutrients</b>																				
Alkalinity, Total (as CaCO3)	mg/L	1.0	-	Ca based <10 @ Ca < 4 mg/L 10-20 @ Ca 5-8 mg/L >20 @ Ca > 8 mg/L	338	326	338	97.3	105	107	31.3	30.9	30.3	143	127	82.4	22.8	35.8	66.1	
pH	-	-	-	pH & Temp based 0.681 - 28.7	6.82	6.65	6.51	6.85	6.71	6.55	6.50	6.23	6.32	6.73	6.55	6.62	6.63	6.52	6.64	
Temperature	-	-	-	-	7.20	8.40	8.30	6.90	8.10	8.50	6.90	9.40	9.80	7.60	8.50	8.80	7.10	9.20	11.40	
Ammonia, Total (as N)	mg/L	0.0050	-	pH & Temp based 1.31 @ pH >= 8.5 3.7 @ pH 8.0-8.5 11.3 @ pH 7.5-8.0 18.5 @ pH 7.0-7.5 18.4 @ pH < 7.0	13.3	14.5	14.2	4.62	3.13	2.74	0.440	0.389	0.400	2.42	2.37	1.37	0.0076	0.0511	0.0219	
Bromide (Br)	mg/L	0.050	-	-	<0.250	<0.250	0.268	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	0.059	<0.050	<0.050	<0.250	<0.250	<0.050	
Chloride (Cl)	mg/L	0.50	-	-	54.1	55.8	57.5	12.2	5.52	7.79	10.2	9.62	6.76	24.0	23.0	16.4	141	124	66.1	
Fluoride (F)	mg/L	0.020	-	H based 2 @ H < 50 3 @ H >= 50	<0.100	<0.100	<0.100	0.075	<0.155	0.107	0.023	0.031	<0.020	0.034	<0.025	0.044	<0.100	<0.100	0.069	
Nitrate and Nitrite (as N)	mg/L	0.0051	-	-	0.0366	<0.0255	<0.0255	0.0156	0.0244	0.0108	0.309	0.478	0.0591	0.0674	0.0232	0.0100	0.488	0.194	0.163	
Nitrate (as N)	mg/L	0.0050	-	-	0.0366	<0.0250	<0.0250	0.0156	0.0244	0.0108	0.309	0.478	0.0591	0.0674	0.0232	0.0100	0.488	0.194	0.162	
Nitrite (as N)	mg/L	0.0010	-	Cl based 0.2 @ Cl < 2 mg/L 0.4 @ Cl 2-4 mg/L 0.6 @ Cl 4-6 mg/L 0.8 @ Cl 6-8 mg/L 1.0 @ Cl 8-10 mg/L 1.2 @ Cl > 10 mg/L	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.0013
Total Kjeldahl Nitrogen	mg/L	0.050	-	-	13.4	14.6	15.1	4.61	3.22	2.89	0.544	0.444	0.457	2.58	2.49	1.50	0.766	0.339	0.261	
Total Nitrogen	mg/L	0.030	-	-	13.1	14.6	14.9	4.77	3.34	2.81	0.802	0.872	0.457	2.58	2.47	1.42	1.26	0.501	0.388	
Phosphorus (P)-Total	mg/L	0.0020	-	-	0.311	0.134	1.10	0.128	0.0380	0.0557	<0.0020	0.0133	0.0175	0.145	0.224	0.0861	0.878	0.351	0.822	
Sulfate (SO4)	mg/L	0.30	-	H based 1280 @ H <= 30 2180 @ H 31-75 3090 @ H 76-180 4290 @ H > 180	131	122	113	49.3	47.7	55.8	36.6	27.0	24.2	44.0	39.5	24.4	101	92.6	81.6	
<b>Dissolved Metals</b>																				
Aluminum (Al)-Dissolved	mg/L	0.0010	-	pH based 0.1 @ pH >= 6.5 Equation @ pH < 6.5	0.0028	0.0092	0.0161	0.0027	0.0046	0.0041	0.0189	0.0117	0.0120	0.0074	0.0027	0.0046	0.0115	0.0172	0.0244	
Antimony (Sb)-Dissolved	mg/L	0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)-Dissolved	mg/L	0.00010	-	-	0.0140	0.0148	0.0127	0.00706	0.00691	0.00716	<0.00010	<0.00010	<0.00010	0.00879	0.00917	0.00651	<0.00010	0.00026	<0.00010	
Barium (Ba)-Dissolved	mg/L	0.00010	-	-	0.0447	0.0427	0.0422	0.103	0.0714	0.0922	0.0668	0.0622	0.0630	0.214	0.173	0.0933	0.0352	0.0460	0.0326	
Beryllium (Be)-Dissolved	mg/L	0.00010	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<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	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved	mg/L	0.010	-	-	0.234	0.224	0.230	0.112	0.092	0.091	<0.010	<0.010	<0.010	0.064	0.051	0.032	0.013	0.012	0.016	
Cadmium (Cd)-Dissolved	mg/L	0.0000050	-	H based 0.0005 @ H < 30 0.0015 @ H 30-90 0.0025 @ H 90-150 0.0035 @ H 150-210 0.004 @ H > 210	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000233	0.000165	0.000125	0.000274	0.000130	0.0000926	0.0000411	0.0000439	0.0000239	
Calcium (Ca)-Dissolved	mg/L	0.050	-	-	100	102	101	37.4	30.3	37.2	11.9	11.8	9.77	45.3	41.4	26.8	45.9	47.3	31.1	
Cesium (Cs)-Dissolved	mg/L	0.000010	-	-	0.000019	0.000020	0.000020	0.000026	0.000014	0.000015	0.000047	0.000040	0.000039	0.000035	0.000030	0.000023	0.000012	<0.000010	0.000012	
Chromium (Cr)-Dissolved	mg/L	0.00010	-	-	0.00014	<0.00050	<0.00050	<0.00010	<0.00050	<0.00050	<0.00010	<0.00050	<0.00050	<0.00010	<0.00050	<0.00050	<0.00010	<0.00050	<0.00050	
Cobalt (Co)-Dissolved	mg/L	0.00010	-	-	0.0110	0.0109	0.0101	0.0106	0.00150	0.00162	0.00782	0.00557	0.00378	0.0285	0.0243	0.0146	<0.00010	0.00194	0.00011	
Copper (Cu)-Dissolved	mg/L	0.00020	-	H based 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	0.00090	0.00211	0.00024	<0.00020	0.00229	0.00185	0.00347	0.00409	0.00222	0.00064	0.00118	0.00106	0.00160	0.00401	0.00203	
Iron (Fe)-Dissolved	mg/L	0.010	-	-	47.8	48.1	49.1	31.0	29.5	39.1	0.449	<0.010	0.046	38.8	37.8	23.8	0.032	2.47	0.130	
Lead (Pb)-Dissolved	mg/L	0.000050	-	H based 0.04 @ H < 50 0.05 @ H 50 - < 100 0.06 @ H 100 - < 200 0.10 @ H 200 - < 300 0.16 @ H >= 300	<0.000050	0.000062	<0.000050	<0.000050	0.000074	0.000054	<0.000050	0.000053	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000054	<0.000050	
Lithium (Li)-Dissolved	mg/L	0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)-Dissolved	mg/L	0.0050	-	-	12.6	12.5	12.3	5.90	4.78	6.44	2.33	2.01	1.86	7.06	5.78	3.48	5.33	5.19	3.50	
Manganese (Mn)-Dissolved	mg/L	0.00010	-	H based 0.01102*H+0.54	3.11	3.19	3.14	1.67	1.28	1.62	1.67	1.25	1.33	2.62	2.06	1.39	0.0116	0.210	0.0107	
Mercury (Hg)-Dissolved	mg/L	0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000089	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved	mg/L	0.000050	-	-	0.0130	0.0122	0.0107	0.00303	0.00410	0.00319	0.000602	0.000770	0.000666	0.00928	0.0138	0.0141	0.000980	0.00146	0.00219	
Nickel (Ni)-Dissolved	mg/L	0.00050	-	H based 0.25 @ H < 60 0.65 @ H 60 - < 120 1.1 @ H 120 - < 180 1.5 @ H >= 180	0.00209	0.00210	0.00184	0.00059	0.00069	0.00074	0.00111	0.00105	0.00089	0.00321	0.00256	0.00156	<0.00050	<0.00050	<0.00050	
Phosphorus (P)-Dissolved	mg/L	0.050	-	-	0.120	0.104	0.081	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.053	<0.050	
Potassium (K)-Dissolved	mg/L	0.050	-	-	20.2	20.9	19.5	9.63	6.74	7.41	2.60	2.95	2.90	6.24	5.95	3.87	3.32	4.08	2.99	
Rubidium (Rb)-Dissolved	mg/L	0.00020	-	-	0.0108	0.0110	0.0111	0.00618	0.00398	0.00451	0.00736	0.00724	0.00715	0.00429	0.00394	0.00267	0.00500	0.00470	0.00457	
Selenium (Se)-Dissolved	mg/L	0.000050	-	-	0.000051	0.00007														

TABLE 9: 2021 GROUNDWATER QUALITY - PETROLEUM HYDROCARBONS

Analyte	Units	LOR	Sch. 3.2 Water FAW*	Sample ID Date Sampled Quarter	MW-2D			MW-2S			MW-3			MW-4			MW-6		
					24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21
					Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3
<b>Volatile Organic Compounds</b>																			
Benzene	mg/L	0.00050	0.4	0.04	0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Bromodichloromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Bromoform	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Carbon Tetrachloride	mg/L	0.00050	0.13	0.0133	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Chlorobenzene	mg/L	0.0010	0.013	0.0013	0.00228	0.00274	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Dibromochloromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Chloroethane	mg/L	0.0010	-	-	0.00064	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Chloroform	mg/L	0.0010	0.02	0.0018	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Chloromethane	mg/L	0.0050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,2-Dichlorobenzene	mg/L	0.00050	0.007	0.0007	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,3-Dichlorobenzene	mg/L	0.0010	1.5	0.15	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,4-Dichlorobenzene	mg/L	0.0010	0.26	0.026	0.00058	0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,1-Dichloroethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,2-Dichloroethane	mg/L	0.0010	1	0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,1-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cis-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
trans-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Dichloromethane	mg/L	0.0050	0.98	0.0981	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
1,2-Dichloropropane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cis-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
trans-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,3-Dichloropropene (cis & trans)	mg/L	0.0010	-	-	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	
Ethylbenzene	mg/L	0.0010	2	0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Methyl t-butyl ether (MTBE)	mg/L	0.00050	34	3.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Styrene	mg/L	0.00050	0.72	0.072	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,1,1,2-Tetrachloroethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,1,2,2-Tetrachloroethane	mg/L	0.00020	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Tetrachloroethylene	mg/L	0.0010	1.1	0.11	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Toluene	mg/L	0.00045	0.005	0.0005	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
1,1,1-Trichloroethane	mg/L	0.0010	-	11.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
1,1,2-Trichloroethane	mg/L	0.00050	-	0.021	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Trichloroethylene	mg/L	0.0010	0.2	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Trichlorofluoromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Vinyl Chloride	mg/L	0.00040	-	-	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
ortho-Xylene	mg/L	0.00050	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
meta- & para-Xylene	mg/L	0.00050	-	-	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	
Xylenes	mg/L	0.00075	0.3	0.03	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
4-Bromofluorobenzene (SS)	%	Surrogate	-	-	101	92.5	98.5	93.8	101	94.5	101	94.5	101	92.4	98.9	90.8	98.9	90.8	
1,4-Difluorobenzene (SS)	%	Surrogate	-	-	125	83.4	126	74.4	128	71.6	128	78.1	125	76.3	125	76.3	125	76.3	
<b>Hydrocarbons</b>																			
EPH10-19	mg/L	0.25	5	-	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	
EPH19-32	mg/L	0.25	-	-	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	
LEPH	mg/L	0.25	0.5	-	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	
HEPH	mg/L	0.25	-	-	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	
Volatile Hydrocarbons (VH6-10)	mg/L	0.10	15	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	
VPH (C6-C10)	mg/L	0.10	1.5	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	
2-Bromobenzotrifluoride	%	Surrogate	-	-	101	102	86.2	103	86.3	100	86.3	100	84.4	108	88				



TABLE 10: 2021 SURFACE WATER QUALITY - GENERAL CHEMISTRY AND METALS

Analyte	Units	LOR	Sch. 3.2 Water FAW*	Sample ID Date Sampled Quarter	SFC-2			SFC-2B			SFC-3			SFC-4B			SFC-11		
					24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21
					Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3
<b>Field Parameters</b>																			
Field Conductivity	uS/cm	-	-	-	324.7	248.1	370.7	339.3	147.3	873	218.6	102.3	180.5	190.5	131.7	260.4	79.2	37.1	107.8
Temperature	C	-	-	-	6.3	8.7	10.7	4.6	10.7	11	4.4	7.3	9.1	3.9	8.8	9.9	4.4	6.8	8.1
pH	pH	-	-	-	6.32	6.4	6.55	5.92	4.43	3.38	6.9	7	6.8	7.23	7.36	7.32	7.07	6.77	6.6
Dissolved Oxygen	mg/L	-	-	-	6.33	7.92	3.97	3.22	5.89	2.36	12.88	11.84	9.18	9.74	11.37	8.84	12.85	11.56	9.25
Oxidation Reduction Potential	-	-	-	-	160.4	67.6	19.0	180.9	90.0	113.4	68.5	131.6	73.5	129.5	103.6	68.1	40.7	120.2	58.7
<b>General Chemistry</b>																			
Conductivity	uS/cm	2	-	-	320	390	372	332	339	868	224	158	258	190	195	256	86.4	104	131
Hardness (as CaCO3)	mg/L	0.5	-	-	112	130	135	136	116	272	44.6	38.6	52.5	53.6	60.7	78.5	38.1	34.4	44.3
pH	pH	0.1	-	6.5 - 9.0	7.15	6.66	6.96	6.24	4.57	3.31	7.08	7.26	7.14	7.35	7.45	7.55	7.25	7.17	7.05
Total Suspended Solids	mg/L	3	-	-	4.2	10.5	4.1	27.0	47.3	27.9	20.0	3.5	<3.0	3.8	3.5	<3.0	45.0	<3.0	<3.0
COD	mg/L	20	-	-	<20	<20	<20	47	41	33	57	<20	<20	<20	<20	<20	55	<20	<20
<b>Anions and Nutrients</b>																			
Alkalinity, Total (as CaCO3)	mg/L	1.0	-	Ca based <10 @ Ca < 4 mg/L 10-20 @ Ca 5-8 mg/L >20 @ Ca > 8 mg/L	55.8	47.2	73.9	19.9	<1.0	<1.0	27.2	29.1	31.6	26.3	28.6	40.9	23.1	26.3	30.6
Ammonia, Total (as N)	mg/L	0.0050	pH & Temp based 1.31 @ pH >= 8.5 3.7 @ pH 8.0-8.5 11.3 @ pH 7.5-8.0 18.5 @ pH 7.0-7.5 18.4 @ pH < 7.0	pH & Temp based 0.681 - 28.7	0.224	0.178	0.140	0.157	0.119	1.08	<0.0050	<0.0050	0.0099	0.0264	0.0122	0.0079	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	0.050	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.250	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	0.50	1500	600	27.2	31.6	23.3	4.43	4.99	7.54	37.8	16.2	39.9	21.4	17.1	27.2	4.15	5.26	7.34
Fluoride (F)	mg/L	0.020	H based 2 @ H < 50 3 @ H >= 50	H based 0.4 @ H < 10 Equation @ H > 10	0.069	0.083	0.062	0.116	0.310	0.483	0.045	0.041	0.042	0.059	0.056	0.051	0.054	0.043	0.044
Nitrate and Nitrite (as N)	mg/L	0.0051	400	-	1.30	1.11	1.21	5.57	0.230	0.0503	0.286	0.302	0.258	0.618	0.393	0.399	0.320	0.247	0.217
Nitrate (as N)	mg/L	0.0050	400	33	1.30	1.11	1.21	5.56	0.228	0.0503	0.285	0.302	0.258	0.616	0.392	0.399	0.318	0.247	0.217
Nitrite (as N)	mg/L	0.0010	CI based 0.2 @ CI < 2 mg/L 0.4 @ CI 2-4 mg/L 0.6 @ CI 4-6 mg/L 0.8 @ CI 6-8 mg/L 1.0 @ CI 8-10 mg/L 1.2 @ CI > 10 mg/L	CI based 0.06 @ CI < 2 mg/L 0.12 @ CI 2-4 mg/L 0.18 @ CI 4-6 mg/L 0.24 @ CI 6-8 mg/L 0.30 @ CI 8-10 mg/L 0.60 @ CI > 10 mg/L	0.0021	0.0011	0.0011	0.0094	0.0019	<0.0050	0.0012	<0.0010	<0.0010	0.0021	0.0011	<0.0010	0.0019	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.050	-	-	0.613	0.371	0.464	0.942	0.714	1.38	0.120	0.072	0.092	0.206	0.108	0.107	0.158	0.063	0.053
Total Nitrogen	mg/L	0.030	-	-	1.60	1.46	1.47	6.09	0.928	1.33	0.360	0.372	0.347	0.710	0.511	0.482	0.386	0.343	0.268
Phosphorus (P)-Total	mg/L	0.0020	-	15	0.0201	0.0112	<0.0020	0.0953	0.139	<0.0020	0.0878	0.0190	0.0089	0.0182	0.0094	0.0021	0.183	0.0089	0.0039
Sulfate (SO4)	mg/L	0.30	H based 1280 @ H <= 30 2180 @ H 31-75 3090 @ H 76-180 4290 @ H >180	H based 128 @ H <= 30 218 @ H 31-75 309 @ H 76-180 429 @ H >180	57.5	79.3	63.4	112	144	386	19.5	16.5	26.0	29.0	31.9	35.7	12.5	12.2	18.6
<b>Total Metals</b>																			
Aluminum (Al)-Total	mg/L	0.0010	-	pH based 0.1 @ pH >= 6.5 Equation @ pH < 6.5	1.22	2.57	0.665	4.18	8.92	11.2	2.08	0.142	0.0776	0.845	0.472	0.0711	4.97	0.169	0.0820
Antimony (Sb)-Total	mg/L	0.00010	0.09	-	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.00010	0.05	0.005	0.00020	0.00023	0.00013	0.00050	0.00052	0.00085	0.00034	0.00012	<0.00010	0.00016	0.00012	<0.00010	0.00012	0.00015	0.00011
Barium (Ba)-Total	mg/L	0.00010	10	1	0.0385	0.0514	0.0591	0.0211	0.0221	0.0316	0.0351	0.0156	0.0261	0.0180	0.0189	0.0239	0.0488	0.0110	0.0148
Beryllium (Be)-Total	mg/L	0.00010	0.0015	0.00013	<0.00010	<0.00010	<0.00010	0.00010	0.00012	0.00034	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	0.010	12	1.2	0.019	0.021	0.023	0.018	0.018	0.021	<0.010	<0.010	<0.010	<0.010	0.012	0.016	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000050	H based 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 0.00002 @ H < 7 mg/L Equation @ H < 7 mg/L	0.0000568	0.0000844	0.0000588	0.0000210	0.000271	0.000324	0.0000627	0.0000201	0.0000362	0.0000229	0.0000165	0.0000079	0.0000515	0.0000125	0.0000121
Calcium (Ca)-Total	mg/L	0.050	-	-	39.1	44.4	46.9	45.5	37.4	75.7	14.4	12.9	17.2	18.2	20.5	26.3	10.7	11.1	13.9
Cesium (Cs)-Total	mg/L	0.000010	-	-	<0.000010	<0.000010	0.000011	<0.000010	0.000014	0.000068	0.000042	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000102	<0.000010	<0.000010
Chromium (Cr)-Total	mg/L	0.00010	0.01	0.001	0.00018	<0.00050	<0.00050	0.00104	0.00273	0.00100	0.00090	<0.00050	<0.00050	0.00020	<0.00050	<0.00050	0.00212	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	0.00010	0.04	0.11	0.00549	0.0111	0.00523	0.0185	0.0327	0.0707	0.00087	<0.00010	0.00034	0.00136	0.00113	0.00038	0.00186	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.00020	H based 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	0.0254	0.0440	0.0147	0.103	0.171	0.168	0.0111	0.00233	0.00230	0.0115	0.00760	0.00229	0.0218	0.00168	0.00100
Iron (Fe)-Total	mg/L	0.010	-	0.35	1.91	2.87	1.30	7.82	26.3	29.7	1.37	0.155	0.101	1.01	0.560	0.128	3.41	0.147	0.058
Lead (Pb)-Total	mg/L	0.000050	H based 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	0.00101	0.000059	<0.000050	0.000095	0.000066	<0.000050	0.00255	0.000074	<0.000050
Lithium (Li)-Total	mg/L	0.0010	-	-	<0.0010	<0.0010	<0.0010	0.0014	0.0026	0.0050	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0026	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	0.0050	-	-	3.37	4.63	4.29	5.45	5.50	20.1	2.10	1.54	2.31	1.98	2.32	3.11	2.77	1.62	2.33
Manganese (Mn)-Total	mg/L	0.00010	-	H based 0.01102H+0.54	0.347	0.624	0.550	0.519	0.899	4.78	0.0606	0.00966	0.0199	0.0966	0.126	0.100	0.116	0.00969	0.00984
Mercury (Hg)-Total	mg/L	0.000050	0.00025	0.00001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000055	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	0.000050	10	2	0.00465	0.00545	0.00728	0.000252	0.000270	0.000116	0.00137	0.00116	0.000476	0.00129	0.00116	0.00136	0.000854	0.000349	0.000278
Nickel (Ni)-Total	mg/L	0.00050	H based 0.25 @ H < 60 0.65 @ H 60 - <120 1.1 @ H 120 - <180 1.5 @ H >= 180	0.025	0.00265	0.00534	0.00212	0.00967	0.0170	0.0308	0.00122	<0.00050	0.00055	0.00118	0.00104	0.00050	0.00209	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	0.050	-	-	<0.050	<0.050	<0.050	0.078	0.120	<0.050	0.059	<0.050	<0.050	<0.050	<0.050	<0.050	0.162	<0.050	<0.050
Potassium (K)-Total	mg/L	0.050	-	-	3.52	3.95	4.66	2.59	0.869	3.28	1.61	1.04	1.56	1.47	1.51	2.21	1.30	0.646	0.733
Rubidium (Rb)-Total	mg/L	0.00020	-	-	0.00308	0.00400	0.00490	0.00216	0.00146	0.00535	0.00209	0.00094	0.00134	0.00128	0.00158	0.00212	0.00279	0.00052	0.00055
Selenium (Se)-Total	mg/L	0.000050	0.02	0.002	0.000086	0.000103	0.000073	0.000093	0.000137	0.000106	<0.000050	<0.000050	<0.000050	&lt					



TABLE 11: 2021 LEACHATE MANHOLE/GW INTERCEPTOR WATER QUALITY - GENERAL CHEMISTRY AND METALS

			Sample ID		LEACHATE MANHOLE		GW INTERCEPTOR		
			Date Sampled	Quarter	24-Mar-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21
Analyte	Units	LOR	Sch. 3.2 Water FAW*	BCAWWWQG-FAL**	Q1	Q3	Q1	Q2	Q3
<b>Field Parameters</b>									
Field Conductivity	uS/cm	-	-	-	212.9	722	815.0	546	774
Temperature	C	-	-	-	4.6	12.1	6.9	8.7	9.2
pH	-	-	-	-	5.9	6.34	6.61	6.42	6.2
Dissolved Oxygen	mg/L	-	-	-	5.5	3.86	1.65	0.66	0.93
Oxidation Reduction Potential	-	-	-	-	104.9	36.6	117.7	61.1	50.4
<b>General Chemistry</b>									
Conductivity	uS/cm	2	-	-	253	685	767	778	703
Hardness (as CaCO3)	mg/L	0.5	-	-	98.8	278	257	214	177
pH	pH	0.1	-	6.5 - 9.0	6.49	6.63	6.72	6.47	6.27
Total Suspended Solids	mg/L	3	-	-	<3.0	<3.0	5.6	41.7	16.1
COD	mg/L	20	-	-	21	33	24	25	21
<b>Anions and Nutrients</b>									
Alkalinity, Total (as CaCO3)	mg/L	1.0	-	Ca based <10 @ Ca < 4 mg/L 10-20 @ Ca 5-8 mg/L >20 @ Ca > 8 mg/L	52.5	114	130	141	143
Ammonia, Total (as N)	mg/L	0.0050	pH & Temp based 1.31 @ pH >= 8.5 3.7 @ pH 8.0-8.5 11.3 @ pH 7.5-8.0 18.5 @ pH 7.0-7.5 18.4 @ pH < 7.0	pH & Temp based 0.681 - 28.7	0.0055	0.812	0.884	1.01	0.925
Bromide (Br)	mg/L	0.050	-	-	<0.050	<0.050	<0.250	<0.250	<0.050
Chloride (Cl)	mg/L	0.50	1500	600	1.63	5.05	63.9	96.9	79.7
Fluoride (F)	mg/L	0.020	H based 2 @ H < 50 3 @ H >= 50	H based 0.4 @ H < 10 Equation @ H > 10	0.022	0.042	0.102	<0.100	0.108
Nitrate and Nitrite (as N)	mg/L	0.0051	400	-	8.08	20.3	<0.0255	0.0363	0.0275
Nitrate (as N)	mg/L	0.0050	400	33	8.08	20.3	<0.0250	0.0363	0.0275
Nitrite (as N)	mg/L	0.0010	Cl based 0.2 @ Cl < 2 mg/L 0.4 @ Cl 2-4 mg/L 0.6 @ Cl 4-6 mg/L 0.8 @ Cl 6-8 mg/L 1.0 @ Cl 8-10 mg/L 1.2 @ Cl > 10 mg/L	Cl based 0.06 @ Cl < 2 mg/L 0.12 @ Cl 2-4 mg/L 0.18 @ Cl 4-6 mg/L 0.24 @ Cl 6-8 mg/L 0.30 @ Cl 8-10 mg/L 0.60 @ Cl > 10 mg/L	0.0049	0.0438	<0.0050	<0.0050	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.050	-	-	1.09	1.45	1.05	1.14	1.05
Total Nitrogen	mg/L	0.030	-	-	8.56	22.1	0.993	1.17	1.01
Phosphorus (P)-Total	mg/L	0.0020	-	15	0.0503	0.0404	0.0073	0.0398	0.0193
Sulfate (SO4)	mg/L	0.30	H based 1280 @ H <= 30 2180 @ H 31-75 3090 @ H 76-180 4290 @ H >180	H based 128 @ H <= 30 218 @ H 31-75 309 @ H 76-180 429 @ H >180	34.8	142	172	98.4	85.0
<b>Dissolved Metals</b>									
Aluminum (Al)-Dissolved	mg/L	0.0010	-	pH based 0.1 @ pH >= 6.5 Equation @ pH < 6.5	0.0499	0.0142	0.0359	0.0345	0.0383
Antimony (Sb)-Dissolved	mg/L	0.00010	0.09	-	0.00017	0.00030	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.00010	0.05	0.005	0.00016	0.00018	0.00067	0.00061	0.00052
Barium (Ba)-Dissolved	mg/L	0.00010	10	1	0.0186	0.0484	0.0744	0.0683	0.0622
Beryllium (Be)-Dissolved	mg/L	0.00010	0.0015	0.00013	<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
Boron (B)-Dissolved	mg/L	0.010	12	1.2	0.014	0.066	0.132	0.113	0.105
Cadmium (Cd)-Dissolved	mg/L	0.0000050	H based 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 0.00002 @ H < 7 mg/L Equation @ H < 7 mg/L	0.0000406	0.0000608	<0.0000050	0.0000068	<0.0000050
Calcium (Ca)-Dissolved	mg/L	0.050	-	-	35.4	96.9	87.8	73.7	60.3
Cesium (Cs)-Dissolved	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	0.000011	0.000011
Chromium (Cr)-Dissolved	mg/L	0.00010	0.01	0.001	0.00024	<0.00050	0.00024	<0.00050	<0.00050
Cobalt (Co)-Dissolved	mg/L	0.00010	0.04	0.004	0.00018	0.00054	0.00283	0.00174	0.00113
Copper (Cu)-Dissolved	mg/L	0.00020	H based 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	0.0372	0.0222	<0.00020	<0.00020	<0.00020
Iron (Fe)-Dissolved	mg/L	0.010	-	0.35	0.038	0.033	24.2	22.6	21.7
Lead (Pb)-Dissolved	mg/L	0.000050	H based 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	0.000136	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	0.0010	-	-	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	mg/L	0.0050	-	-	2.54	8.82	9.09	7.33	6.49
Manganese (Mn)-Dissolved	mg/L	0.00010	-	H based 0.01102*H +0.54	0.00203	0.0523	2.28	2.01	1.90
Mercury (Hg)-Dissolved	mg/L	0.0000050	0.00025	0.00001	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.000050	10	2	0.000207	0.000503	0.000616	0.000780	0.00200
Nickel (Ni)-Dissolved	mg/L	0.00050	H based 0.25 @ H < 60 0.65 @ H 60 - <120 1.1 @ H 120 - < 180 1.5 @ H >= 180	0.025	0.00212	0.00227	0.00177	0.00122	0.00069
Phosphorus (P)-Dissolved	mg/L	0.050	-	-	<0.050	<0.050	<0.050	<0.050	<0.050

				Sample ID	LEACHATE MANHOLE		GW INTERCEPTOR		
				Date Sampled	24-Mar-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21
				Quarter	Q1	Q3	Q1	Q2	Q3
Analyte	Units	LOR	Sch. 3.2 Water FAW*	BCAWWQG-FAL**					
Potassium (K)-Dissolved	mg/L	0.050	-	-	1.76	5.17	5.22	6.49	5.67
Rubidium (Rb)-Dissolved	mg/L	0.00020	-	-	0.00106	0.00338	0.00344	0.00394	0.00373
Selenium (Se)-Dissolved	mg/L	0.000050	0.02	0.002	0.000109	0.000165	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved	mg/L	0.050	-	-	7.64	11.1	9.17	8.73	9.29
Silver (Ag)-Dissolved	mg/L	0.000010	H based 0.0005 @ H <= 100 0.015 @ H > 100	0.00005	0.000022	<0.000010	<0.000010	0.000012	<0.000010
Sodium (Na)-Dissolved	mg/L	0.050	-	-	4.26	13.4	38.5	59.2	48.0
Strontium (Sr)-Dissolved	mg/L	0.00020	-	-	0.132	0.383	0.635	0.539	0.454
Sulfur (S)-Dissolved	mg/L	0.50	-	-	11.8	49.5	58.2	35.4	29.4
Tellurium (Te)-Dissolved	mg/L	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
Thorium (Th)-Dissolved	mg/L	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	0.00012	<0.00010
Titanium (Ti)-Dissolved	mg/L	0.00030	1	-	<0.00030	<0.00030	0.00039	0.00037	0.00037
Tungsten (W)-Dissolved	mg/L	0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	mg/L	0.000010	0.085	0.0085	0.000017	0.000046	0.000036	0.000035	0.000024
Vanadium (V)-Dissolved	mg/L	0.00050	-	-	<0.00050	<0.00050	0.00053	0.00067	0.00070
Zinc (Zn)-Dissolved	mg/L	0.0010	H based 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 0.033 @ H =< 90 Equation @ H > 90	0.0432	0.0343	0.0245	0.0124	0.0050
Zirconium (Zr)-Dissolved	mg/L	0.000060	-	-	<0.00020	<0.00020	<0.00020	0.00036	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

**TABLE 12: 2021 LEACHATE MANHOLE/GW INTERCEPTOR WATER QUALITY - PETROLEUM HYDROCARBONS**

Analyte	Units	LOR	Sch. 3.2 Water FAW*	Sample ID	LEACHATE MANHOLE		GW INTERCEPTOR		
				Date Sampled	24-Mar-21	23-Sep-21	24-Mar-21	16-Jun-21	23-Sep-21
				Quarter	Q1	Q3	Q1	Q2	Q3
<b>Volatile Organic Compounds</b>				<b>BCAWWQG-FAL**</b>					
Benzene	mg/L	0.00050	0.4	0.04	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bromodichloromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bromoform	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Carbon Tetrachloride	mg/L	0.00050	0.13	0.0133	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0010	0.013	0.0013	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dibromochloromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chloroethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chloroform	mg/L	0.0010	0.02	0.0018	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chloromethane	mg/L	0.0050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,2-Dichlorobenzene	mg/L	0.00050	0.007	0.0007	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,3-Dichlorobenzene	mg/L	0.0010	1.5	0.15	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,4-Dichlorobenzene	mg/L	0.0010	0.26	0.026	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1-Dichloroethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,2-Dichloroethane	mg/L	0.0010	1	0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cis-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
trans-1,2-Dichloroethylene	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dichloromethane	mg/L	0.0050	0.98	0.0981	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloropropane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cis-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
trans-1,3-Dichloropropylene	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
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	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Methyl t-butyl ether (MTBE)	mg/L	0.00050	34	3.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.00050	0.72	0.072	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1,1,2-Tetrachloroethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1,2,2-Tetrachloroethane	mg/L	0.00020	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tetrachloroethylene	mg/L	0.0010	1.1	0.11	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.00045	0.005	0.0005	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
1,1,1-Trichloroethane	mg/L	0.0010	-	11.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1,2-Trichloroethane	mg/L	0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Trichloroethylene	mg/L	0.0010	0.2	0.021	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Trichlorofluoromethane	mg/L	0.0010	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Vinyl Chloride	mg/L	0.00040	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
ortho-Xylene	mg/L	0.00050	-	0.03	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
meta- & para-Xylene	mg/L	0.00050	-	0.03	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Xylenes	mg/L	0.00075	0.3	0.03	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
4-Bromofluorobenzene (SS)	%	Surrogate	-	-	95.6	90.1	95.6	91.6	89.3
1,4-Difluorobenzene (SS)	%	Surrogate	-	-	125	71.1	127	94.9	74.1
<b>Hydrocarbons</b>									
EPH10-19	mg/L	0.25	5	-	<0.250	<0.250	<0.250	<0.250	<0.250
EPH19-32	mg/L	0.25	-	-	<0.250	<0.250	<0.250	<0.250	<0.250
LEPH	mg/L	0.25	0.5	-	<0.250	<0.250	<0.250	<0.250	<0.250
HEPH	mg/L	0.25	-	-	<0.250	<0.250	<0.250	<0.250	<0.250
Volatile Hydrocarbons (VH6-10)	mg/L	0.10	15	-	<0.100	<0.100	<0.100	<0.100	<0.100
VPH (C6-C10)	mg/L	0.10	-	-	<0.100	<0.100	<0.100	<0.100	<0.100
2-Bromobenzotrifluoride	%	Surrogate	-	-	104	87.2	103	90.2	83.9
3,4-Dichlorotoluene (SS)	%	Surrogate	-	-	89.5	91.3	88.4	93.8	104
<b>Polycyclic Aromatic Hydrocarbons</b>									
Acenaphthene	mg/L	0.000010	0.06	0.006	<0.000010	<0.000010	0.000971	0.00100	0.00103
Acenaphthylene	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	0.000010	0.0005	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	0.000010	0.001	0.0001	<0.000010	<0.000010	0.000024	<0.000025	<0.000019
Benz(a)anthracene	mg/L	0.000010	0.001	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.0000050	0.0001	0.00001	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b&j)fluoranthene	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
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	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	0.000010	0.001	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	0.000010	0.002	0.0002	<0.000010	<0.000010	0.000215	0.000210	0.000225
Fluorene	mg/L	0.000010	0.12	0.012	<0.000010	<0.000010	0.000244	0.000155	0.000106
Indeno(1,2,3-c,d)pyrene	mg/L	0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
1-Methylnaphthalene	mg/L	0.000050	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
2-Methylnaphthalene	mg/L	0.000050	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.000050	0.01	0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.000020	0.003	0.0003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	0.000010	0.0002	0.00002	<0.000010	<0.000010	0.000113	0.000110	0.000118
Quinoline	mg/L	0.000050	0.034	0.0034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	Surrogate	-	-	-	-	-	-	-
Chrysene d12	%	Surrogate	-	-	85.5	89.0	81.4	97.8	96.0
Naphthalene d8	%	Surrogate	-	-	94.8	92.6	93.6	108	121
Phenanthrene d10	%	Surrogate	-	-	103	111	108	111	116

\*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**

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CERTIFICATE OF ANALYSIS

Work Order : **VA21A5571**  
Client : **Morrison Hershfield Limited**  
Contact : Emily Peets  
Address : 4321 Still Creek Dr  
Burnaby BC Canada V5C 6S7  
Telephone : 604-454-0402  
Project : 2100168  
PO : 726379  
C-O-C number : ----  
Sampler : E.Peets  
Site :  
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program  
No. of samples received : 5  
No. of samples analysed : 5

Page : 1 of 5  
Laboratory : Vancouver - Environmental  
Account Manager : Carla Fuginski  
Address : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
Telephone : +1 604 253 4188  
Date Samples Received : 25-Mar-2021 10:40  
Date Analysis Commenced : 25-Mar-2021  
Issue Date : 01-Apr-2021 15:48

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
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	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

Sub-Matrix: Water					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-11
(Matrix: Water)										
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A5571-001	VA21A5571-002	VA21A5571-003	VA21A5571-004	VA21A5571-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	55.8	19.9	27.2	26.3	23.1	
conductivity	----	E100	2.0	µS/cm	320	332	224	190	86.4	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	112	136	44.6	53.6	38.1	
pH	----	E108	0.10	pH units	7.15	6.24	7.08	7.35	7.25	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	4.2	27.0	20.0	3.8	45.0	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.224	0.157	<0.0050	0.0264	<0.0050	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	27.2	4.43	37.8	21.4	4.15	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.069	0.116	0.045	0.059	0.054	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.613	0.942	0.120	0.206	0.158	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.30	5.56	0.285	0.616	0.318	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	1.30	5.57	0.286	0.618	0.320	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0021	0.0094	0.0012	0.0021	0.0019	
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.60	6.09	0.360	0.710	0.386	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0201	0.0953	0.0878	0.0182	0.183	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	57.5	112	19.5	29.0	12.5	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	1.22	4.18	2.08	0.845	4.97	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	0.00011	<0.00010	<0.00010	0.00011	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00020	0.00050	0.00034	0.00016	0.00072	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0385	0.0211	0.0351	0.0180	0.0488	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000102	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	0.019	0.018	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.000050	mg/L	0.0000568	0.000210	0.0000627	0.0000229	0.0000515	
calcium, total	7440-70-2	E420	0.050	mg/L	39.1	45.5	14.4	18.2	10.7	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0.000042	<0.000010	0.000102	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00018	0.00104	0.00090	0.00020	0.00212	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00549	0.0185	0.00087	0.00136	0.00186	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0254	0.103	0.0111	0.0115	0.0218	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-11
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A5571-001	VA21A5571-002	VA21A5571-003	VA21A5571-004	VA21A5571-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
iron, total	7439-89-6	E420	0.010	mg/L	1.91	7.82	1.37	1.01	3.41	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0.00101	0.000095	0.00255	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0014	0.0011	<0.0010	0.0026	
magnesium, total	7439-95-4	E420	0.0050	mg/L	3.37	5.45	2.10	1.98	2.77	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.347	0.519	0.0606	0.0966	0.116	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000055	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00465	0.000252	0.00137	0.00129	0.000854	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00265	0.00967	0.00122	0.00118	0.00209	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.078	0.059	<0.050	0.162	
potassium, total	7440-09-7	E420	0.050	mg/L	3.52	2.59	1.61	1.47	1.30	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00308	0.00216	0.00209	0.00128	0.00279	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000086	0.000093	<0.000050	<0.000050	0.000072	
silicon, total	7440-21-3	E420	0.10	mg/L	4.45	7.79	7.43	5.50	11.6	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0.000010	<0.000010	0.000026	
sodium, total	17341-25-2	E420	0.050	mg/L	15.9	5.89	25.3	14.0	6.77	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.217	0.168	0.123	0.136	0.122	
sulfur, total	7704-34-9	E420	0.50	mg/L	20.0	38.6	6.47	9.09	3.94	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<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	0.000020	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	0.00052	<0.00010	<0.00010	0.00016	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00064	0.00140	0.0597	0.00719	0.145	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000092	0.000219	0.000044	0.000038	0.000076	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00275	0.00060	0.00672	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0110	0.0482	0.0124	0.0043	0.0196	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0.00036	<0.00020	0.00047	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	47	57	<20	55	

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



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21A5571</b>	Page	: 1 of 19
Client	: <b>Morrison Hershfield Limited</b>	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	: 2100168	Date Samples Received	: 25-Mar-2021 10:40
PO	: 726379	Issue Date	: 01-Apr-2021 15:48
C-O-C number	: ----		
Sampler	: E.Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 5		
No. of samples analysed	: 5		

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 Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- 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.







**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Laboratory Control Sample (LCS) Recoveries</b>								
Total Metals	QC-MRG3-1691430 02	----	zinc, total	7440-66-6	E420	123 % <sup>MES</sup>	80.0-120%	Recovery greater than upper control limit

**Result Qualifiers**

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



## 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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-11	E559	24-Mar-2021	----	----	----		31-Mar-2021	28 days	7 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2	E559	24-Mar-2021	----	----	----		31-Mar-2021	28 days	7 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E559	24-Mar-2021	----	----	----		31-Mar-2021	28 days	7 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-3	E559	24-Mar-2021	----	----	----		31-Mar-2021	28 days	7 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E559	24-Mar-2021	----	----	----		31-Mar-2021	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-11	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	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		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-11	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-2	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-2B	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-3	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-4B	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> SFC-11	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	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	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-2	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-2B	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-3	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-4B	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-11	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-2	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-2B	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-3	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-4B	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-11	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-2	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-2B	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-3	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-4B	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-11	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-2	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-2B	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-3	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-4B	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-11	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-2	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-2B	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-3	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-4B	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-11	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-2	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-2B	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-11	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-11	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	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		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-11	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-2	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-2B	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-3	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-4B	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> SFC-11	E100	24-Mar-2021	----	----	----		26-Mar-2021	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
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC-2	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC-2B	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC-3	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC-4B	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : pH by Meter</b>										
HDPE SFC-11	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC-2	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC-2B	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC-3	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC-4B	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 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		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-11	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-2	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-2B	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-3	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-4B	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE total (nitric acid) SFC-11	E420.Cr-L	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE total (nitric acid) SFC-2	E420.Cr-L	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE total (nitric acid) SFC-2B	E420.Cr-L	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE total (nitric acid) SFC-3	E420.Cr-L	24-Mar-2021	----	----	----		26-Mar-2021	180 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
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SFC-4B	E420.Cr-L	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC-11	E508	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC-2	E508	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC-2B	E508	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC-3	E508	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC-4B	E508	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC-11	E420	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC-2	E420	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC-2B	E420	24-Mar-2021	----	----	----		26-Mar-2021	180 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	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC-3	E420	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC-4B	E420	24-Mar-2021	----	----	----		26-Mar-2021	180 days	2 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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171934	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
pH by Meter	E108	169362	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	169143	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	171479	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	169144	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168988	1	12	8.3	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171934	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
pH by Meter	E108	169362	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	169143	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	171479	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	169144	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168988	1	12	8.3	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	
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171934	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	169143	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	171479	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	169144	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168988	1	12	8.3	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171934	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	169143	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	171479	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	169144	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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>
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
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 : VA21A5571

Page : 1 of 14

Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 2100168
PO : 726379
C-O-C number : ----
Sampler : E.Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program
No. of samples received : 5
No. of samples analysed : 5

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 : 25-Mar-2021 10:40
Date Analysis Commenced : 25-Mar-2021
Issue Date : 01-Apr-2021 15:48

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), Bruna Botti (Team Leader - Inorganics), Dee Lee (Analyst), Kim Jensen (Department Manager - Metals), and Miles Gropen (Department Manager - Inorganics).



Page : 2 of 14  
Work Order : VA21A5571  
Client : Morrison Hershfield Limited  
Project : 2100168

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## **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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 168988)</b>											
VA21A5569-006	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	236	254	7.36%	20%	----
<b>Physical Tests (QC Lot: 169362)</b>											
VA21A5558-001	Anonymous	pH	----	E108	0.10	pH units	7.66	7.69	0.391%	4%	----
<b>Physical Tests (QC Lot: 169363)</b>											
VA21A5558-001	Anonymous	conductivity	----	E100	2.0	µS/cm	115	115	0.174%	10%	----
<b>Physical Tests (QC Lot: 169364)</b>											
VA21A5558-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	51.3	52.3	1.93%	20%	----
<b>Anions and Nutrients (QC Lot: 169231)</b>											
VA21A5569-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.250	mg/L	13.4	13.0	3.07%	20%	----
<b>Anions and Nutrients (QC Lot: 169232)</b>											
VA21A5569-001	Anonymous	nitrogen, total	7727-37-9	E366	0.300	mg/L	13.1	13.5	3.06%	20%	----
<b>Anions and Nutrients (QC Lot: 169233)</b>											
VA21A5569-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.311	0.346	10.6%	20%	----
<b>Anions and Nutrients (QC Lot: 169234)</b>											
VA21A5569-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.100	mg/L	13.3	13.2	0.800%	20%	----
<b>Anions and Nutrients (QC Lot: 169355)</b>											
VA21A5558-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.94	4.81	2.69%	20%	----
<b>Anions and Nutrients (QC Lot: 169356)</b>											
VA21A5558-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.89	2.89	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169357)</b>											
VA21A5558-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169359)</b>											
VA21A5558-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.031	0.032	0.0007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169360)</b>											
VA21A5569-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169361)</b>											
VA21A5569-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0366	0.0353	0.0013	Diff <2x LOR	----
<b>Total Metals (QC Lot: 169143)</b>											
VA21A5571-001	SFC-2	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00018	0.00019	0.00001	Diff <2x LOR	----
<b>Total Metals (QC Lot: 169144)</b>											
VA21A5571-001	SFC-2	aluminum, total	7429-90-5	E420	0.0030	mg/L	1.22	1.21	1.00%	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
<b>Total Metals (QC Lot: 169144) - continued</b>											
VA21A5571-001	SFC-2	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	0.00020	0.00022	0.00002	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0385	0.0377	2.16%	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	0.019	0.019	0.0004	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.000050	mg/L	0.0000568	0.0000514	9.87%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	39.1	39.3	0.668%	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	0.00549	0.00538	1.95%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0254	0.0246	3.52%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	1.91	1.84	4.03%	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	3.37	3.27	2.84%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.347	0.337	2.82%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00465	0.00458	1.49%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00265	0.00252	0.00013	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	3.52	3.47	1.62%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00308	0.00310	0.551%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000086	0.000096	0.000009	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	4.45	4.37	1.82%	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	15.9	15.2	4.04%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.217	0.214	1.58%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	20.0	19.4	2.92%	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	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	0.00064	0.00060	0.00004	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	0.000092	0.000097	0.000005	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----



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>
<b>Total Metals (QC Lot: 169144) - continued</b>											
VA21A5571-001	SFC-2	zinc, total	7440-66-6	E420	0.0030	mg/L	0.0110	0.0104	0.0005	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 171479)</b>											
KS2100865-008	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 171934)</b>											
VA21A5571-001	SFC-2	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
<b>Physical Tests (QCLot: 168988)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 169363)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 169364)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Anions and Nutrients (QCLot: 169231)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 169232)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 169233)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 169234)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 169355)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 169356)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 169357)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 169359)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 169360)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 169361)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Total Metals (QCLot: 169143)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 169144)</b>						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 169144) - continued</b>						
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	---
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	---
<b>Total Metals (QCLot: 171479)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 171934)</b>						

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Work Order : VA21A5571  
Client : Morrison Hershfield Limited  
Project : 2100168



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>
<b>Aggregate Organics (QCLot: 171934) - continued</b>						
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	
<b>Physical Tests (QCLot: 168988)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	92.0	85.0	115	----
<b>Physical Tests (QCLot: 169362)</b>									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
<b>Physical Tests (QCLot: 169363)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 169364)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	92.5	85.0	115	----
<b>Anions and Nutrients (QCLot: 169231)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169232)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 169233)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.9	80.0	120	----
<b>Anions and Nutrients (QCLot: 169234)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 169355)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 169356)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 169357)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 169359)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 169360)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	----
<b>Anions and Nutrients (QCLot: 169361)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
<b>Total Metals (QCLot: 169143)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
<b>Total Metals (QCLot: 169144)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	95.4	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	
<b>Total Metals (QCLot: 169144) - continued</b>									
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	98.9	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	98.7	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	96.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.4	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	97.7	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.7	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	91.4	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.9	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.1	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.6	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	93.6	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	97.2	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	97.2	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	98.2	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	91.5	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	97.6	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.2	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	95.6	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	94.8	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	98.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.4	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	# 123	80.0	120	MES
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	94.0	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
<b>Total Metals (QCLot: 171479)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
<b>Aggregate Organics (QCLot: 171934)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	93.8	85.0	115	----

### Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



### 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
<b>Anions and Nutrients (QCLot: 169231)</b>										
VA21A5569-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
<b>Anions and Nutrients (QCLot: 169232)</b>										
VA21A5569-002	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 169233)</b>										
VA21A5569-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 169234)</b>										
VA21A5569-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	2 mg/L	ND	75.0	125	MS-B
<b>Anions and Nutrients (QCLot: 169355)</b>										
VA21A5569-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	98.5 mg/L	100 mg/L	98.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 169356)</b>										
VA21A5569-002	Anonymous	chloride	16887-00-6	E235.Cl	99.8 mg/L	100 mg/L	99.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169357)</b>										
VA21A5569-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.479 mg/L	0.5 mg/L	95.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169359)</b>										
VA21A5569-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 169360)</b>										
VA21A5569-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.498 mg/L	0.5 mg/L	99.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 169361)</b>										
VA21A5569-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.47 mg/L	2.5 mg/L	99.0	75.0	125	----
<b>Total Metals (QCLot: 169143)</b>										
VA21A5571-001	SFC-2	chromium, total	7440-47-3	E420.Cr-L	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
<b>Total Metals (QCLot: 169144)</b>										
VA21A5571-001	SFC-2	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	98.8	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	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00945 mg/L	0.01 mg/L	94.5	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
<b>Total Metals (QCLot: 169144) - continued</b>										
VA21A5571-001	SFC-2	boron, total	7440-42-8	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00393 mg/L	0.004 mg/L	98.4	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	0.00976 mg/L	0.01 mg/L	97.6	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.2	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	1.80 mg/L	2 mg/L	90.0	70.0	130	----
		lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		lithium, total	7439-93-2	E420	0.100 mg/L	0.1 mg/L	100	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	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		nickel, total	7440-02-0	E420	0.0370 mg/L	0.04 mg/L	92.4	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.72 mg/L	10 mg/L	97.2	70.0	130	----
		potassium, total	7440-09-7	E420	3.72 mg/L	4 mg/L	93.1	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		selenium, total	7782-49-2	E420	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	8.81 mg/L	10 mg/L	88.1	70.0	130	----
		silver, total	7440-22-4	E420	0.00376 mg/L	0.004 mg/L	94.1	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	19.0 mg/L	20 mg/L	95.3	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00359 mg/L	0.004 mg/L	89.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0216 mg/L	0.02 mg/L	108	70.0	130	----
		tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		titanium, total	7440-32-6	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0197 mg/L	0.02 mg/L	98.3	70.0	130	----
		uranium, total	7440-61-1	E420	0.00404 mg/L	0.004 mg/L	101	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0999 mg/L	0.1 mg/L	99.9	70.0	130	----
		zinc, total	7440-66-6	E420	0.411 mg/L	0.4 mg/L	103	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
<b>Total Metals (QCLot: 171479)</b>										
KS2100865-009	Anonymous	mercury, total	7439-97-6	E508	0.0000935 mg/L	0.0001 mg/L	93.5	70.0	130	----
<b>Aggregate Organics (QCLot: 171934)</b>										
VA21A5571-002	SFC-2B	chemical oxygen demand [COD]	----	E559	472 mg/L	500 mg/L	94.5	75.0	125	----



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## Qualifiers

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

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Chain of Custody (COC) / Analytical Request Form

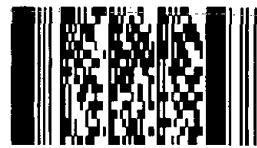
Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																	
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																	
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"/>		EMERGENCY	1 Business day [E1 - 100%] <input type="checkbox"/>													
Phone:	778-837-9801	<input 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 _____		<b>Analysis Request</b>																	
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<b>Invoice Distribution</b>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																	
	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		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									
Company:	Resort Municipality of Whistler (RMOW)	Email 1 or Fax atucker@whistler.ca																			
Contact:	Andrew Tucker	Email 2 ap@whistler.ca																			
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																			
ALS Account # / Quote #:		AFF/Coast Center:	PO#																		
Job #:	2100168	Major/Minor Code:	Routing Code:																		
PO / AFE:	726379	Requisitioner:																			
LSD:		Location:																			
ALS Lab Work Order # (lab use only):	5571	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								
	Environmental Division Vancouver Work Order Reference <b>VA21A5571</b>  Telephone : +1 604 253 4188	24-Mar-21		Water	R	R	R					4									
SFC-2		24-Mar-21		Water	R	R	R					4									
SFC-2B		24-Mar-21		Water	R	R	R					4									
SFC-3		24-Mar-21		Water	R	R	R					4									
SFC-4B		24-Mar-21		Water	R	R	R					4									
SFC-11	24-Mar-21		Water	R	R	R					4										
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																	
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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													
								7 8 6 8													
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																	
Released by: Emily Peets	Date: March 25 2021	Time:	Received by:	Date:	Time:	Received by: JC	Date: MAR 25 2021	Time: 10:40													

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.





CERTIFICATE OF ANALYSIS

Work Order : **VA21A5569**  
Client : **Morrison Hershfield Limited**  
Contact : Emily Peets  
Address : 4321 Still Creek Dr  
Burnaby BC Canada V5C 6S7  
Telephone : 604-454-0402  
Project : 210016800  
PO : 726379  
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 : 25-Mar-2021 10:40  
Date Analysis Commenced : 25-Mar-2021  
Issue Date : 01-Apr-2021 15:44

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>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Gloria Chan	Lab Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Woochan Song	Lab Analyst	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.

## 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	MW-2D	MW-2S	MW-3	MW-4	MW-6
(Matrix: Water)										
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-001	VA21A5569-002	VA21A5569-003	VA21A5569-004	VA21A5569-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	338	97.3	31.3	143	22.8	
conductivity	----	E100	2.0	µS/cm	953	328	179	419	714	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	302	118	39.3	142	136	
pH	----	E108	0.10	pH units	6.82	6.85	6.50	6.73	6.63	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	205	62.4	7.0	129	226	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	13.3	4.62	0.440	2.42	0.0076	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 <sup>DLDS</sup>	0.056	<0.050	0.059	<0.250 <sup>DLDS</sup>	
chloride	16887-00-6	E235.Cl	0.50	mg/L	54.1	12.2	10.2	24.0	141	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 <sup>DLDS</sup>	0.075	0.023	0.034	<0.100 <sup>DLDS</sup>	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	13.4	4.61	0.544	2.58	0.766	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0366	0.0156	0.309	0.0674	0.488	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0366	0.0156	0.309	0.0674	0.488	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	<0.0010	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	
nitrogen, total	7727-37-9	E366	0.030	mg/L	13.1	4.77	0.802	2.58	1.26	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.311	0.128	<0.0020	0.145	0.878	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	131	49.3	36.6	44.0	101	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0028	0.0027	0.0189	0.0074	0.0115	
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	0.0140	0.00706	<0.00010	0.00879	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0447	0.103	0.0668	0.214	0.0352	
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	0.234	0.112	<0.010	0.064	0.013	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000233	0.000274	0.0000411	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	100	37.4	11.9	45.3	45.9	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000019	0.000026	0.000047	0.000035	0.000012	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0110	0.00106	0.00782	0.0285	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00090	<0.00020	0.00347	0.00064	0.00160	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-001	VA21A5569-002	VA21A5569-003	VA21A5569-004	VA21A5569-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
iron, dissolved	7439-89-6	E421	0.010	mg/L	47.8	31.0	0.449	38.8	0.032	
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	12.6	5.90	2.33	7.06	5.33	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.11	1.67	1.67	2.62	0.0116	
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	0.0130	0.00303	0.000602	0.00928	0.000980	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00209	0.00059	0.00111	0.00321	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.120	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	20.2	9.63	2.60	6.24	3.32	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0108	0.00618	0.00736	0.00429	0.00500	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000051	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	14.6	9.35	6.24	11.6	5.12	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000020 <sup>DLM</sup>	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	38.7	13.1	11.5	17.0	78.6	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.544	0.243	0.0972	0.288	0.552	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	46.3	19.5	10.2	15.1	37.2	
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	0.000082	0.000024	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	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<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	0.000143	0.000021	<0.000010	0.000157	0.000011	
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	0.0078	0.0011	0.0029	0.0055	<0.0010	
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	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	48	<20	<20	<20	31	
<b>Volatile Organic Compounds</b>										



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-001	VA21A5569-002	VA21A5569-003	VA21A5569-004	VA21A5569-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	2.28	<0.50	<0.50	0.60	<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	0.58	<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	
<b>Volatile Organic Compounds [Drycleaning]</b>										
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	0.64	<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	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
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	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611C	0.50	µg/L	0.60	<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	





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-001	VA21A5569-002	VA21A5569-003	VA21A5569-004	VA21A5569-005	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons</b>										
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	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.010	%	77.5	82.9	84.1	80.9	88.4	
naphthalene-d8	1146-65-2	E641A	0.010	%	89.4	89.6	94.3	89.8	98.9	
phenanthrene-d10	1517-22-2	E641A	0.010	%	103	102	102	102	112	
<b>Volatile Organic Compounds [THMs]</b>										
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	Duplicate	Field Blank	GW Int.	L1	----
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-006	VA21A5569-007	VA21A5569-008	VA21A5569-009	-----	
					Result	Result	Result	Result	----	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	112	<1.0	130	52.5	----	
conductivity	----	E100	2.0	µS/cm	384	<2.0	767	253	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	116	<0.60	257	98.8	----	
pH	----	E108	0.10	pH units	6.94	5.32	6.72	6.49	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	236	<3.0	5.6	<3.0	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	6.24	<0.0050	0.884	0.0055	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.071	<0.050	<0.250 <sup>DLDS</sup>	<0.050	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	16.4	<0.50	63.9	1.63	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.070	<0.020	0.102	0.022	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	6.65	<0.050	1.05	1.09	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0072	<0.0050	<0.0250 <sup>DLDS</sup>	8.08	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0072	<0.0051	<0.0255	8.08	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	0.0049	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	6.29	<0.030	0.993	8.56	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.304	<0.0020	0.0073	0.0503	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	56.2	<0.30	172	34.8	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0034	<0.0010	0.0359	0.0499	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00017	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00697	<0.00010	0.00067	0.00016	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.102	<0.00010	0.0744	0.0186	----	
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	0.111	<0.010	0.132	0.014	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000406	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	37.0	<0.050	87.8	35.4	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000026	<0.000010	<0.000010	<0.000010	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0.00024	0.00024	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00108	<0.00010	0.00283	0.00018	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.0372	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	30.8	<0.010	24.2	0.038	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	L1	----
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-006	VA21A5569-007	VA21A5569-008	VA21A5569-009	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<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	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.72	<0.0050	9.09	2.54	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.60	<0.00010	2.28	0.00203	----	
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	0.00304	<0.000050	0.000616	0.000207	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00056	<0.00050	0.00177	0.00212	----	
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	9.48	<0.050	5.22	1.76	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00603	<0.00020	0.00344	0.00106	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000109	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	9.31	<0.050	9.17	7.64	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	0.000022	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	12.4	<0.050	38.5	4.26	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.236	<0.00020	0.635	0.132	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.3	<0.50	58.2	11.8	----	
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	<0.000010	<0.000010	<0.000010	<0.000010	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
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	<0.00030	<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	0.000022	<0.000010	0.000036	0.000017	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0.00053	<0.00050	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0.0245	0.0432	----	
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	Field	Field	Field	----	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	21	<20	24	21	----	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	0.60	<0.50	<0.50	<0.50	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	L1	----
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-006	VA21A5569-007	VA21A5569-008	VA21A5569-009	-----	
					Result	Result	Result	Result	----	
<b>Volatile Organic Compounds</b>										
chloromethane	74-87-3	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	----	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<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	----	
dichloropropylene, cis-1,3-	10061-01-5	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	----	
trichloroethane, 1,1,2-	79-00-5	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	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<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	----	
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	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<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	----	
trichloroethane, 1,1,1-	71-55-6	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	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	----	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	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	----	
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	----	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	L1	----
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-006	VA21A5569-007	VA21A5569-008	VA21A5569-009	-----	
					Result	Result	Result	Result	----	
<b>Volatile Organic Compounds [Fuels]</b>										
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	<0.30	<0.30	----	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	97.2	101	95.6	95.6	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	127	126	127	125	----	
<b>Hydrocarbons</b>										
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	<100	<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	<100	<100	<100	<100	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	104	105	103	104	----	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	95.9	108	88.4	89.5	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	0.971	<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	<0.010	<0.010	<0.010	<0.010	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	0.024	<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	<0.0050	<0.0050	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<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	----	
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	<0.010	<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	0.215	<0.010	----	
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	0.244	<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	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	L1	----
Client sampling date / time					24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A5569-006	VA21A5569-007	VA21A5569-008	VA21A5569-009	-----	
					Result	Result	Result	Result	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
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	0.113	<0.010	----	
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.010	%	84.0	91.7	81.4	85.5	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	93.4	96.0	93.6	94.8	----	
phenanthrene-d10	1517-22-2	E641A	0.010	%	107	108	108	103	----	
<b>Volatile Organic Compounds [THMs]</b>										
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	----	
chloroform	67-66-3	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	----	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21A5569</b>	Page	: 1 of 35
Client	: <b>Morrison Hershfield Limited</b>	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	: 210016800	Date Samples Received	: 25-Mar-2021 10:40
PO	: 726379	Issue Date	: 01-Apr-2021 15:44
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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> Duplicate	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> Field Blank	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> GW Int.	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> L1	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW-2D	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW-2S	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW-3	E559	24-Mar-2021	----	----	----		30-Mar-2021	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		
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✔	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E559	24-Mar-2021	----	----	----		30-Mar-2021	28 days	6 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> L1	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	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 Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E298	24-Mar-2021	26-Mar-2021	28 days	2 days	✓	26-Mar-2021	25 days	0 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> Duplicate	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> Field Blank	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> GW Int.	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> L1	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW-2D	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW-2S	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> MW-3	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-4	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-6	E235.Br-L	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Duplicate	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Field Blank	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE GW Int.	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE L1	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-2D	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-2S	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW-3	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	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	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW-4	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW-6	E235.Cl	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE Duplicate	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE Field Blank	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE GW Int.	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE L1	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-2D	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-2S	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW-3	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-4	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-6	E235.F	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Field Blank	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE GW Int.	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE L1	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-2D	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-2S	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-3	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-4	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-6	E235.NO3-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Field Blank	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE GW Int.	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE L1	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-2D	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-2S	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-3	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-4	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-6	E235.NO2-L	24-Mar-2021	----	----	----		26-Mar-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Duplicate	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Field Blank	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE GW Int.	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE L1	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-2D	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-2S	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-3	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-4	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-6	E235.SO4	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) Duplicate	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) Field Blank	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) GW Int.	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) L1	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) MW-2D	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) MW-2S	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) MW-3	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E318	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	30-Mar-2021	25 days	4 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> L1	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 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		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E366	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	29-Mar-2021	25 days	3 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> L1	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 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		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E372-U	24-Mar-2021	26-Mar-2021	28 days	2 days	✔	26-Mar-2021	25 days	0 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> Duplicate	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> Field Blank	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> GW Int.	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> L1	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2D	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2S	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW-3	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 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	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW-4	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW-6	E421.Cr-L	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> Duplicate	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> Field Blank	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> GW Int.	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> L1	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> MW-2D	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> MW-2S	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> MW-3	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 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		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-4	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-6	E509	24-Mar-2021	27-Mar-2021	28 days	3 days	✔	27-Mar-2021	24 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Duplicate	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Field Blank	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW Int.	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> L1	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2D	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2S	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-3	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 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		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-4	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-6	E421	24-Mar-2021	26-Mar-2021	180 days	2 days	✔	27-Mar-2021	177 days	1 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Duplicate	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Field Blank	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW Int.	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> L1	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-2D	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-2S	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-3	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 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		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-4	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-6	E601A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> Field Blank	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int.	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> L1	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2D	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2S	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW-3	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 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		
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW-4	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✓	01-Apr-2021	5 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW-6	E581.VH+F1	24-Mar-2021	01-Apr-2021	14 days	8 days	✓	01-Apr-2021	5 days	0 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Duplicate	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Field Blank	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> GW Int.	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> L1	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW-2D	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW-2S	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW-3	E290	24-Mar-2021	----	----	----		26-Mar-2021	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	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW-4	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW-6	E290	24-Mar-2021	----	----	----		26-Mar-2021	14 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE Duplicate	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE Field Blank	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE GW Int.	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE L1	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW-2D	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW-2S	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW-3	E100	24-Mar-2021	----	----	----		26-Mar-2021	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		
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-4	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-6	E100	24-Mar-2021	----	----	----		26-Mar-2021	28 days	2 days		✓
<b>Physical Tests : pH by Meter</b>											
HDPE Duplicate	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE Field Blank	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE GW Int.	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE L1	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-2D	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-2S	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-3	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 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		
<b>Physical Tests : pH by Meter</b>											
HDPE MW-4	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-6	E108	24-Mar-2021	----	----	----		26-Mar-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Duplicate	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Field Blank	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE GW Int.	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE L1	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-2D	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-2S	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-3	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 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 Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : TSS by Gravimetry</b>										
<b>HDPE</b> MW-4	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
<b>HDPE</b> MW-6	E160-H	24-Mar-2021	----	----	----		25-Mar-2021	7 days	1 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Duplicate	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Field Blank	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW Int.	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> L1	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-2D	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-2S	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-3	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 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		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-4	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW-6	E641A	24-Mar-2021	26-Mar-2021	14 days	2 days	✔	27-Mar-2021	40 days	0 days	✔	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Field Blank	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int.	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> L1	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2D	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2S	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-3	E611C	24-Mar-2021	01-Apr-2021	---	---		01-Apr-2021	---	---		



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	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-4	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-6	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> Field Blank	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW Int.	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> L1	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-2D	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-2S	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-3	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	



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		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-4	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-6	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Field Blank	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int.	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> L1	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2D	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2S	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-3	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 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		
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-4	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-6	E611C	24-Mar-2021	01-Apr-2021	14 days	8 days	✔	01-Apr-2021	5 days	0 days	✔	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Field Blank	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int.	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> L1	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2D	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-2S	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW-3	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----		



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	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-4	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW-6	E611C	24-Mar-2021	01-Apr-2021	----	----		01-Apr-2021	----	----	

**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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171215	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	169176	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	170141	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	169177	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
pH by Meter	E108	169362	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168987	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	172125	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	172126	1	11	9.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	169832	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171215	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	169176	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	170141	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	169177	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	169833	1	18	5.5	5.0	✓
pH by Meter	E108	169362	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	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	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168987	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	172125	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	172126	1	11	9.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	169364	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	169832	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171215	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Conductivity in Water	E100	169363	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	169176	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	170141	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	169177	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	169833	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
TSS by Gravimetry	E160-H	168987	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	172125	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	172126	1	11	9.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	169234	1	14	7.1	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	169360	1	15	6.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	171215	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	169356	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	169176	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	170141	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	169177	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	169359	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	169361	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	169357	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	169355	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>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	169231	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	169232	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	169233	1	14	7.1	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	172125	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	172126	1	11	9.0	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.
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 Vancouver - 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.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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 Vancouver - 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
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
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 <sub>3</sub> .



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury Water Filtration	EP509  Vancouver - 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  Vancouver - 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 : VA21A5569

Page : 1 of 18

Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 210016800
PO : 726379
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 Fuginiski
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 25-Mar-2021 10:40
Date Analysis Commenced : 25-Mar-2021
Issue Date : 01-Apr-2021 15:44

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 Angelo Salandanan, Bruna Botti, Gloria Chan, Kim Jensen, Miles Gropen, Ophelia Chiu, and Woochan Song.

Page : 2 of 18  
Work Order : VA21A5569  
Client : Morrison Hershfield Limited  
Project : 210016800

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## **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
<b>Physical Tests (QC Lot: 168987)</b>											
KS2100843-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	21.6	21.2	0.4	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 168988)</b>											
VA21A5569-006	Duplicate	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	236	254	7.36%	20%	----
<b>Physical Tests (QC Lot: 169362)</b>											
VA21A5558-001	Anonymous	pH	----	E108	0.10	pH units	7.66	7.69	0.391%	4%	----
<b>Physical Tests (QC Lot: 169363)</b>											
VA21A5558-001	Anonymous	conductivity	----	E100	2.0	µS/cm	115	115	0.174%	10%	----
<b>Physical Tests (QC Lot: 169364)</b>											
VA21A5558-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	51.3	52.3	1.93%	20%	----
<b>Anions and Nutrients (QC Lot: 169231)</b>											
VA21A5569-001	MW-2D	Kjeldahl nitrogen, total [TKN]	----	E318	0.250	mg/L	13.4	13.0	3.07%	20%	----
<b>Anions and Nutrients (QC Lot: 169232)</b>											
VA21A5569-001	MW-2D	nitrogen, total	7727-37-9	E366	0.300	mg/L	13.1	13.5	3.06%	20%	----
<b>Anions and Nutrients (QC Lot: 169233)</b>											
VA21A5569-001	MW-2D	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.311	0.346	10.6%	20%	----
<b>Anions and Nutrients (QC Lot: 169234)</b>											
VA21A5569-001	MW-2D	ammonia, total (as N)	7664-41-7	E298	0.100	mg/L	13.3	13.2	0.800%	20%	----
<b>Anions and Nutrients (QC Lot: 169355)</b>											
VA21A5558-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.94	4.81	2.69%	20%	----
<b>Anions and Nutrients (QC Lot: 169356)</b>											
VA21A5558-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.89	2.89	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169357)</b>											
VA21A5558-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169359)</b>											
VA21A5558-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.031	0.032	0.0007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169360)</b>											
VA21A5569-001	MW-2D	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 169361)</b>											
VA21A5569-001	MW-2D	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0366	0.0353	0.0013	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 169176)</b>											
VA21A5569-001	MW-2D	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	0.00014	0.00014	0.000005	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
<b>Dissolved Metals (QC Lot: 169177)</b>											
VA21A5569-001	MW-2D	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0028	0.0021	0.0007	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	0.0140	0.0138	1.68%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0447	0.0447	0.00684%	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	0.234	0.232	1.02%	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	100	100	0.175%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000019	0.000020	0.000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0110	0.0111	0.528%	20%	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00090	0.00088	0.00001	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	47.8	47.7	0.358%	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	12.6	12.6	0.277%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.11	3.12	0.304%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0130	0.0132	1.16%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00209	0.00211	0.00002	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.120	0.121	0.0006	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	20.2	20.4	1.09%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0108	0.0107	0.606%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000051	0.000066	0.000014	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	14.6	14.5	0.0880%	20%	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	38.7	39.0	0.550%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.544	0.545	0.173%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	46.3	46.0	0.641%	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	0.000143	0.000144	0.931%	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
<b>Dissolved Metals (QC Lot: 169177) - continued</b>											
VA21A5569-001	MW-2D	zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0078	0.0077	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 170141)</b>											
KS2100849-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 171215)</b>											
KS2100861-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	22	26	4	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 172126)</b>											
VA21A5569-001	MW-2D	benzene	71-43-2	E611C	0.50	µg/L	0.60	0.58	0.02	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	2.28	2.30	0.02	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	0.64	0.76	0.12	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	0.58	0.63	0.05	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	1.0	µg/L	<1.0	<1.0	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	----
		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	----



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>
<b>Volatile Organic Compounds (QC Lot: 172126) - continued</b>											
VA21A5569-001	MW-2D	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	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 172125)</b>											
VA21A5569-001	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
<b>Physical Tests (QCLot: 168987)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 168988)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 169363)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 169364)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Anions and Nutrients (QCLot: 169231)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 169232)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 169233)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 169234)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 169355)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 169356)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 169357)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 169359)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 169360)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 169361)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 169176)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 169177)</b>						
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
<b>Dissolved Metals (QCLot: 169177) - continued</b>						
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	---
<b>Dissolved Metals (QCLot: 170141)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 170141) - continued</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 171215)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Volatile Organic Compounds (QCLot: 172126)</b>						
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	1	µg/L	<1.0	---
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	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 172126) - continued</b>						
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	---
xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	---
<b>Hydrocarbons (QCLot: 169832)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Hydrocarbons (QCLot: 172125)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 169833)</b>						
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(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 168987)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 168988)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	92.0	85.0	115	----
<b>Physical Tests (QCLot: 169362)</b>									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
<b>Physical Tests (QCLot: 169363)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 169364)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	92.5	85.0	115	----
<b>Anions and Nutrients (QCLot: 169231)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169232)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 169233)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.9	80.0	120	----
<b>Anions and Nutrients (QCLot: 169234)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 169355)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 169356)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 169357)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 169359)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 169360)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	----
<b>Anions and Nutrients (QCLot: 169361)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
<b>Dissolved Metals (QCLot: 169176)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	99.9	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
<b>Dissolved Metals (QCLot: 169177)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.3	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.6	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.8	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.8	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.6	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.2	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	101	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	109	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.6	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.9	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	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	96.7	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	98.1	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.9	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	100	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	88.6	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.0	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.8	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.0	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	98.0	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.5	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.4	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
<b>Dissolved Metals (QCLot: 170141) - continued</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
<b>Aggregate Organics (QCLot: 171215)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	94.7	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 172126)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	97.7	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	112	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	123	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	87.2	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	99.0	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	116	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	105	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	87.0	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	113	70.0	130	----
dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	112	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	95.8	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	98.5	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	99.7	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	99.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	95.5	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	99.6	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	82.2	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	113	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	116	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	118	60.0	140	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 172126) - continued</b>									
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	118	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	102	70.0	130	----
xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	112	70.0	130	----
<b>Hydrocarbons (QCLot: 169832)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	101	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	98.3	70.0	130	----
<b>Hydrocarbons (QCLot: 172125)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	82.2	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 169833)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	97.3	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	95.8	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	96.5	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	97.6	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	81.6	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	87.0	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	92.4	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	109	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	96.5	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	97.0	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	104	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	104	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
<b>Anions and Nutrients (QCLot: 169231)</b>										
VA21A5569-002	MW-2S	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
<b>Anions and Nutrients (QCLot: 169232)</b>										
VA21A5569-002	MW-2S	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 169233)</b>										
VA21A5569-002	MW-2S	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 169234)</b>										
VA21A5569-002	MW-2S	ammonia, total (as N)	7664-41-7	E298	ND mg/L	2 mg/L	ND	75.0	125	MS-B
<b>Anions and Nutrients (QCLot: 169355)</b>										
VA21A5569-002	MW-2S	sulfate (as SO4)	14808-79-8	E235.SO4	98.5 mg/L	100 mg/L	98.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 169356)</b>										
VA21A5569-002	MW-2S	chloride	16887-00-6	E235.Cl	99.8 mg/L	100 mg/L	99.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169357)</b>										
VA21A5569-002	MW-2S	nitrite (as N)	14797-65-0	E235.NO2-L	0.479 mg/L	0.5 mg/L	95.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 169359)</b>										
VA21A5569-002	MW-2S	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 169360)</b>										
VA21A5569-002	MW-2S	bromide	24959-67-9	E235.Br-L	0.498 mg/L	0.5 mg/L	99.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 169361)</b>										
VA21A5569-002	MW-2S	nitrate (as N)	14797-55-8	E235.NO3-L	2.47 mg/L	2.5 mg/L	99.0	75.0	125	----
<b>Dissolved Metals (QCLot: 169176)</b>										
VA21A5569-001	MW-2D	chromium, dissolved	7440-47-3	E421.Cr-L	0.0396 mg/L	0.04 mg/L	98.9	70.0	130	----
<b>Dissolved Metals (QCLot: 169177)</b>										
VA21A5569-001	MW-2D	aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.6	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0194 mg/L	0.02 mg/L	97.0	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	0.0368 mg/L	0.04 mg/L	92.0	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00870 mg/L	0.01 mg/L	87.0	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
<b>Dissolved Metals (QCLot: 169177) - continued</b>										
VA21A5569-001	MW-2D	boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00394 mg/L	0.004 mg/L	98.4	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	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0185 mg/L	0.02 mg/L	92.6	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	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0868 mg/L	0.1 mg/L	86.8	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	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0374 mg/L	0.04 mg/L	93.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.99 mg/L	10 mg/L	99.9	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	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		silicon, dissolved	7440-21-3	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00694 mg/L	0.008 mg/L	86.8	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	0.0422 mg/L	0.04 mg/L	105	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00373 mg/L	0.004 mg/L	93.3	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.376 mg/L	0.4 mg/L	94.1	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
<b>Dissolved Metals (QCLot: 170141)</b>										
KS2100849-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000954 mg/L	0.0001 mg/L	95.4	70.0	130	----
<b>Aggregate Organics (QCLot: 171215)</b>										
KS2100861-002	Anonymous	chemical oxygen demand [COD]	----	E559	522 mg/L	500 mg/L	104	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
<b>Volatile Organic Compounds (QCLot: 172126)</b>										
VA21A5569-002	MW-2S	benzene	71-43-2	E611C	123 µg/L	100 µg/L	123	60.0	140	----
		bromodichloromethane	75-27-4	E611C	126 µg/L	100 µg/L	126	60.0	140	----
		bromoform	75-25-2	E611C	98.8 µg/L	100 µg/L	98.8	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	120 µg/L	100 µg/L	120	60.0	140	----
		chlorobenzene	108-90-7	E611C	99.8 µg/L	100 µg/L	99.8	60.0	140	----
		chloroethane	75-00-3	E611C	126 µg/L	100 µg/L	126	50.0	150	----
		chloroform	67-66-3	E611C	62.0 µg/L	100 µg/L	62.0	60.0	140	----
		chloromethane	74-87-3	E611C	112 µg/L	100 µg/L	112	50.0	150	----
		dibromochloromethane	124-48-1	E611C	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	115 µg/L	100 µg/L	115	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	123 µg/L	100 µg/L	123	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	128 µg/L	100 µg/L	128	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	74.1 µg/L	100 µg/L	74.1	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	122 µg/L	100 µg/L	122	60.0	140	----
		dichloromethane	75-09-2	E611C	125 µg/L	100 µg/L	125	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	127 µg/L	100 µg/L	127	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	90.4 µg/L	100 µg/L	90.4	60.0	140	----
		ethylbenzene	100-41-4	E611C	93.0 µg/L	100 µg/L	93.0	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		styrene	100-42-5	E611C	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	93.9 µg/L	100 µg/L	93.9	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	96.6 µg/L	100 µg/L	96.6	60.0	140	----
		toluene	108-88-3	E611C	77.1 µg/L	100 µg/L	77.1	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		trichloroethylene	79-01-6	E611C	124 µg/L	100 µg/L	124	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	123 µg/L	100 µg/L	123	50.0	150	----
		vinyl chloride	75-01-4	E611C	112 µg/L	100 µg/L	112	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	196 µg/L	200 µg/L	98.0	60.0	140	----
		xylene, o-	95-47-6	E611C	108 µg/L	100 µg/L	108	60.0	140	----
<b>Hydrocarbons (QCLot: 172125)</b>										



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>
<b>Hydrocarbons (QCLot: 172125) - continued</b>										
VA21A5569-001	MW-2D	VHw (C6-C10)	----	E581.VH+F1	4540 µg/L	6310 µg/L	72.0	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

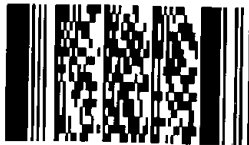
Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																						
Company:	Morrison Hershfield Ltd.	Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					<b>EMERGENCY</b>																	
Contact:	Josie Gilson	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			<b>PRIORITY (Business Days)</b>		<b>1 Business day [E1 - 100%]</b> <input type="checkbox"/>																				
Phone:	778-837-9801	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			4 day [P4-20%] <input type="checkbox"/>		<b>Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]</b> <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			3 day [P3-25%] <input type="checkbox"/>		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:			<b>Analysis Request</b>																						
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																						
	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																									
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																									
ALS Account # / Quote #:		AFE/Cost Center:		PO#																							
Job #:		Major/Minor Code:		Routing Code:																							
PO / AFE:		Requisitioner:																									
LSD:		Location:																									
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																							
		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		Disolved Metals & Mercury		Total Metals & Mercury		General Parameters		Nutrients, Anions & COD		PAH/LEPH/HEPH		VOCs		SAMPLES ON HOLD		Sample is hazardous (please provide further details)		NUMBER OF CONTAINERS	
		MW-2D		24-Mar-21				Water		R		R		R		R		R		R				8			
		MW-2S		24-Mar-21				Water		R		R		R		R		R		R				8			
		MW-3		24-Mar-21				Water		R		R		R		R		R		R				8			
		MW-4		24-Mar-21				Water		R		R		R		R		R		R				8			
		MW-6		24-Mar-21				Water		R		R		R		R		R		R				8			
		Duplicate		24-Mar-21				Water		R		R		R		R		R		R				8			
		Field Blank		24-Mar-21				Water		R		R		R		R		R		R				8			
		GW Int.		24-Mar-21				Water		R		R		R		R		R		R				8			
		L1		24-Mar-21				Water		R		R		R		R		R		R				8			
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>																									
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)																									
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)																									
		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																									
		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"/>		Cooling Initiated <input type="checkbox"/>															
		INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C																				
							7 8 6 8																				
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																					
Released by: Emily Peets		Date: March 25 2021		Time:		Received by:		Date:		Time:		Received by:		Date:		Time:											
												jc		MAR 25 2021		10:40 am											

Environmental Division  
Vancouver  
Work Order Reference  
VA21A5569



Telephone : +1 804 253 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.



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA21B2271**  
**Client** : **Morrison Hershfield Limited**  
**Contact** : Josie Gilson  
**Address** : 4321 Still Creek Dr  
 Burnaby BC Canada V5C 6S7  
**Telephone** : 604-454-0402  
**Project** : 210016800  
**PO** : 726379  
**C-O-C number** : ----  
**Sampler** : E. Peets  
**Site** :  
**Quote number** : Q65605 - Whistler Landfill Closure Environmental Monitoring Program  
**No. of samples received** : 5  
**No. of samples analysed** : 5

**Page** : 1 of 5  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Carla Fuginski  
**Address** : 8081 Lougheed Highway  
 Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 17-Jun-2021 15:10  
**Date Analysis Commenced** : 18-Jun-2021  
**Issue Date** : 28-Jun-2021 11:54

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
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, 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

Sub-Matrix: Water					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-11
(Matrix: Water)					Client sampling date / time	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021
Analyte	CAS Number	Method	LOR	Unit	VA21B2271-001	VA21B2271-002	VA21B2271-003	VA21B2271-004	VA21B2271-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	47.2	<1.0	29.1	28.6	26.3	
conductivity	----	E100	2.0	µS/cm	390	339	158	195	104	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	130	116	38.6	60.7	34.4	
pH	----	E108	0.10	pH units	6.66	4.57	7.26	7.45	7.17	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	10.5	47.3	3.5	3.5	<3.0	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.178	0.119	<0.0050	0.0122	<0.0050	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	31.6	4.99	16.2	17.1	5.26	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.083	0.310	0.041	0.056	0.043	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.371	0.714	0.072	0.108	0.063	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.11	0.228	0.302	0.392	0.247	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	1.11	0.230	0.302	0.393	0.247	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0019	<0.0010	0.0011	<0.0010	
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.46	0.928	0.372	0.511	0.343	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0112	0.139	0.0190	0.0094	0.0089	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	79.3	144	16.5	31.9	12.2	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	2.57	8.92	0.142	0.472	0.169	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00023	0.00052	0.00012	0.00012	0.00015	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0514	0.0221	0.0156	0.0189	0.0110	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000224	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	0.021	0.018	<0.010	0.012	<0.010	
cadmium, total	7440-43-9	E420	0.000050	mg/L	0.0000844	0.000271	0.0000201	0.0000165	0.0000125	
calcium, total	7440-70-2	E420	0.050	mg/L	44.4	37.4	12.9	20.5	11.1	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.00273	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.0111	0.0327	<0.00010	0.00113	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0440	0.171	0.00233	0.00760	0.00168	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC-2	SFC-2B	SFC-3	SFC-4B	SFC-11
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021
Analyte	CAS Number	Method	LOR	Unit	VA21B2271-001	VA21B2271-002	VA21B2271-003	VA21B2271-004	VA21B2271-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
iron, total	7439-89-6	E420	0.010	mg/L	2.87	26.3	0.155	0.560	0.147	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0.000059	0.000066	0.000074	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0026	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	4.63	5.50	1.54	2.32	1.62	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.624	0.899	0.00966	0.126	0.00969	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00545	0.000270	0.00116	0.00116	0.000349	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00534	0.0170	<0.00050	0.00104	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.120	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	3.95	0.869	1.04	1.51	0.646	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00400	0.00146	0.00094	0.00158	0.00052	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000103	0.000137	<0.000050	<0.000050	0.000061	
silicon, total	7440-21-3	E420	0.10	mg/L	5.25	7.47	6.97	6.74	8.35	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	19.0	4.79	13.8	11.4	6.38	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.266	0.127	0.107	0.176	0.120	
sulfur, total	7704-34-9	E420	0.50	mg/L	28.1	51.0	4.90	10.4	3.76	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<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	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	0.00139	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00033	0.00331	0.00371	0.00442	0.00501	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000160	0.000483	0.000021	0.000027	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00054	<0.00050	0.00075	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0159	0.0413	<0.0030	0.0038	0.0042	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	41	<20	<20	<20	

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





## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21B2271</b>	Page	: 1 of 16
Client	: <b>Morrison Hershfield Limited</b>	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	: 210016800	Date Samples Received	: 17-Jun-2021 15:10
PO	: 726379	Issue Date	: 28-Jun-2021 11:54
C-O-C number	: ----		
Sampler	: E. Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 5		
No. of samples analysed	: 5		

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 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-11	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-3	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-11	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC-2	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	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		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-11	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-2	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-2B	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-3	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC-4B	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> SFC-11	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	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
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-2	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-2B	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-3	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SFC-4B	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-11	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-2	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-2B	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-3	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SFC-4B	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-11	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-2	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-2B	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-3	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC-4B	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-11	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-2	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-2B	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-3	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC-4B	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-11	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-2	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-2B	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-3	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC-4B	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-11	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-2	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC-2B	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E318	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E318	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-11	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-11	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	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		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-2B	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-3	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC-4B	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-11	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-2	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-2B	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-3	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC-4B	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> SFC-11	E100	16-Jun-2021	----	----	----		18-Jun-2021	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	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SFC-2	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SFC-2B	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SFC-3	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE SFC-4B	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE SFC-11	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SFC-2	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SFC-2B	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SFC-3	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE SFC-4B	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 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		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-11	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-2	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-2B	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-3	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC-4B	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC-11	E508	16-Jun-2021	----	----	----		21-Jun-2021	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC-2	E508	16-Jun-2021	----	----	----		21-Jun-2021	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC-2B	E508	16-Jun-2021	----	----	----		21-Jun-2021	28 days	6 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC-3	E508	16-Jun-2021	----	----	----		21-Jun-2021	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		
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SFC-4B	E508	16-Jun-2021	----	----	----		21-Jun-2021	28 days	6 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SFC-11	E420	16-Jun-2021	----	----	----		23-Jun-2021	180 days	8 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SFC-2	E420	16-Jun-2021	----	----	----		23-Jun-2021	180 days	8 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SFC-2B	E420	16-Jun-2021	----	----	----		23-Jun-2021	180 days	8 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SFC-3	E420	16-Jun-2021	----	----	----		23-Jun-2021	180 days	8 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SFC-4B	E420	16-Jun-2021	----	----	----		23-Jun-2021	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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227883	2	35	5.7	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Conductivity in Water	E100	224437	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
pH by Meter	E108	224435	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	226552	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	226206	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	227704	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227883	2	35	5.7	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Conductivity in Water	E100	224437	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
pH by Meter	E108	224435	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	226552	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	226206	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	227704	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	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	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✔
Chemical Oxygen Demand by Colourimetry	E559	227883	2	35	5.7	5.0	✔
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✔
Conductivity in Water	E100	224437	1	13	7.6	5.0	✔
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	226552	2	40	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	226206	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✔
TSS by Gravimetry	E160-H	227704	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✔
Chemical Oxygen Demand by Colourimetry	E559	227883	2	35	5.7	5.0	✔
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	226552	2	40	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	226206	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	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 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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



<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 : VA21B2271

Page : 1 of 14

Client : Morrison Hershfield Limited
Contact : Josie Gilson
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 210016800
PO : 726379
C-O-C number : ----
Sampler : E. Peets
Site :
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring
Program
No. of samples received : 5
No. of samples analysed : 5

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 : 17-Jun-2021 15:10
Date Analysis Commenced : 18-Jun-2021
Issue Date : 28-Jun-2021 11:54

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 Dee Lee (Analyst, Metals), Kevin Duarte (Supervisor - Metals ICP Instrumentation, Metals), Lindsay Gung (Supervisor - Water Chemistry, Inorganics), and Robin Weeks (Team Leader - Metals, Metals).

Page : 2 of 14  
Work Order : VA21B2271  
Client : Morrison Hershfield Limited  
Project : 210016800

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## **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
<b>Physical Tests (QC Lot: 224435)</b>											
VA21B2271-003	SFC-3	pH	----	E108	0.10	pH units	7.26	7.25	0.138%	4%	----
<b>Physical Tests (QC Lot: 224436)</b>											
VA21B2271-003	SFC-3	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	29.1	28.4	2.43%	20%	----
<b>Physical Tests (QC Lot: 224437)</b>											
VA21B2271-003	SFC-3	conductivity	----	E100	2.0	µS/cm	158	157	0.254%	10%	----
<b>Physical Tests (QC Lot: 227704)</b>											
FJ2100436-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224438)</b>											
VA21B2271-001	SFC-2	fluoride	16984-48-8	E235.F	0.020	mg/L	0.083	0.083	0.0006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224439)</b>											
VA21B2271-001	SFC-2	chloride	16887-00-6	E235.Cl	0.50	mg/L	31.6	31.6	0.00561%	20%	----
<b>Anions and Nutrients (QC Lot: 224440)</b>											
VA21B2271-001	SFC-2	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224441)</b>											
VA21B2271-001	SFC-2	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.11	1.11	0.00954%	20%	----
<b>Anions and Nutrients (QC Lot: 224442)</b>											
VA21B2271-001	SFC-2	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0011	0.000009	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224443)</b>											
VA21B2271-001	SFC-2	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	79.3	79.4	0.0826%	20%	----
<b>Anions and Nutrients (QC Lot: 227549)</b>											
VA21B2271-001	SFC-2	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.371	0.381	0.010	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227550)</b>											
VA21B2271-001	SFC-2	nitrogen, total	7727-37-9	E366	0.150	mg/L	1.46	1.48	0.022	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227551)</b>											
VA21B2271-001	SFC-2	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0112	0.0095	0.0017	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227552)</b>											
VA21B2271-001	SFC-2	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.178	0.177	0.494%	20%	----
<b>Total Metals (QC Lot: 226206)</b>											
VA21B2242-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.304	0.266	13.1%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00026	0.00026	0.000005	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00804	0.00810	0.642%	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
<b>Total Metals (QC Lot: 226206) - continued</b>											
VA21B2242-001	Anonymous	barium, total	7440-39-3	E420	0.00010	mg/L	0.0772	0.0780	1.16%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000028	0.000022	0.000006	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	0.134	0.134	0.145%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000340	0.0000326	0.0000014	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	180	177	1.49%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000045	0.000041	0.000004	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00079	0.00081	0.00002	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00038	0.00038	0.0000002	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00937	0.00959	2.31%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	3.01	2.98	0.962%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000211	0.000210	0.000001	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0035	0.0034	0.0001	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	65.2	64.6	0.889%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.147	0.147	0.232%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0139	0.0139	0.268%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00061	0.00061	0.000001	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.218	0.242	0.024	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	11.0	11.2	1.28%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00116	0.00109	0.00007	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000059	0.000051	0.000008	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	12.9	12.8	0.410%	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	56.5	55.8	1.19%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	1.22	1.23	0.585%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	192	196	2.11%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	0.00021	0.00001	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	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00070	0.00072	0.00001	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.0135	0.0113	17.5%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00032	0.00032	0.000004	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.0192	0.0199	3.52%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0146	0.0145	0.942%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0043	0.0045	0.0003	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
<b>Total Metals (QC Lot: 226206) - continued</b>											
VA21B2242-001	Anonymous	zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00033	0.00025	0.00008	Diff <2x LOR	----
<b>Total Metals (QC Lot: 226552)</b>											
VA21B2217-013	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 226553)</b>											
VA21B2271-002	SFC-2B	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 227883)</b>											
KS2101913-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	1170	1160	0.930%	20%	----
<b>Aggregate Organics (QC Lot: 227884)</b>											
VA21B2271-005	SFC-11	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
<b>Physical Tests (QCLot: 224436)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 224437)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 227704)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 224438)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 224439)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 224440)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 224441)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 224442)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 224443)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 227549)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 227550)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 227551)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 227552)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Total Metals (QCLot: 226206)</b>						
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	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 226206) - continued</b>						
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	---
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
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	---
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	---
<b>Total Metals (QCLot: 226552)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Total Metals (QCLot: 226553)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---



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>
<b>Aggregate Organics (QCLot: 227883)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Aggregate Organics (QCLot: 227884)</b>						
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	
<b>Physical Tests (QCLot: 224435)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 224436)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	99.8	85.0	115	----
<b>Physical Tests (QCLot: 224437)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 227704)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	98.2	85.0	115	----
<b>Anions and Nutrients (QCLot: 224438)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 224439)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 224440)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	98.2	85.0	115	----
<b>Anions and Nutrients (QCLot: 224441)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 224442)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 224443)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 227549)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 227550)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 227551)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.2	80.0	120	----
<b>Anions and Nutrients (QCLot: 227552)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.0	85.0	115	----
<b>Total Metals (QCLot: 226206)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	102	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	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	
<b>Total Metals (QCLot: 226206) - continued</b>									
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	109	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.4	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.7	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	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	108	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.1	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.4	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	101	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	99.7	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	94.8	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	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	99.0	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.8	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.4	80.0	120	----
<b>Total Metals (QCLot: 226552)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	93.7	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
<b>Total Metals (QCLot: 226553)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.8	80.0	120	----
<b>Aggregate Organics (QCLot: 227883)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	111	85.0	115	----
<b>Aggregate Organics (QCLot: 227884)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	106	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**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
<b>Anions and Nutrients (QCLot: 224438)</b>										
VA21B2271-002	SFC-2B	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224439)</b>										
VA21B2271-002	SFC-2B	chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224440)</b>										
VA21B2271-002	SFC-2B	bromide	24959-67-9	E235.Br-L	0.514 mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 224441)</b>										
VA21B2271-002	SFC-2B	nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224442)</b>										
VA21B2271-002	SFC-2B	nitrite (as N)	14797-65-0	E235.NO2-L	0.489 mg/L	0.5 mg/L	97.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 224443)</b>										
VA21B2271-002	SFC-2B	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 227549)</b>										
VA21B2271-002	SFC-2B	Kjeldahl nitrogen, total [TKN]	----	E318	2.65 mg/L	2.5 mg/L	106	70.0	130	----
<b>Anions and Nutrients (QCLot: 227550)</b>										
VA21B2271-002	SFC-2B	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 227551)</b>										
VA21B2271-002	SFC-2B	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 227552)</b>										
VA21B2271-002	SFC-2B	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
<b>Total Metals (QCLot: 226206)</b>										
VA21B2242-001	Anonymous	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	0.0204 mg/L	0.02 mg/L	102	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	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00872 mg/L	0.01 mg/L	87.2	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00378 mg/L	0.004 mg/L	94.5	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
<b>Total Metals (QCLot: 226206) - continued</b>										
VA21B2242-001	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00968 mg/L	0.01 mg/L	96.8	70.0	130	----
		chromium, total	7440-47-3	E420	0.0410 mg/L	0.04 mg/L	103	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		copper, total	7440-50-8	E420	0.0181 mg/L	0.02 mg/L	90.4	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	0.0177 mg/L	0.02 mg/L	88.6	70.0	130	----
		lithium, total	7439-93-2	E420	0.0994 mg/L	0.1 mg/L	99.4	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	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		nickel, total	7440-02-0	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0202 mg/L	0.02 mg/L	101	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	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00377 mg/L	0.004 mg/L	94.2	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	0.0387 mg/L	0.04 mg/L	96.9	70.0	130	----
		thallium, total	7440-28-0	E420	0.00354 mg/L	0.004 mg/L	88.4	70.0	130	----
		thorium, total	7440-29-1	E420	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		titanium, total	7440-32-6	E420	0.0353 mg/L	0.04 mg/L	88.3	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		zinc, total	7440-66-6	E420	0.357 mg/L	0.4 mg/L	89.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 226552)</b>										
VA21B2219-001	Anonymous	mercury, total	7439-97-6	E508	ND mg/L	0.0001 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 226553)</b>										
VA21B2271-003	SFC-3	mercury, total	7439-97-6	E508	0.0000957 mg/L	0.0001 mg/L	95.7	70.0	130	----
<b>Aggregate Organics (QCLot: 227883)</b>										

Page : 14 of 14  
 Work Order : VA21B2271  
 Client : Morrison Hershfield Limited  
 Project : 210016800



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>
<b>Aggregate Organics (QCLot: 227883) - continued</b>										
KS2101913-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Aggregate Organics (QCLot: 227884)</b>										
VA21B2272-001	Anonymous	chemical oxygen demand [COD]	----	E559	107 mg/L	100 mg/L	107	75.0	125	----





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

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																
Company:	Morrison Hershfield Ltd.	Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Regular [R]</b> <input 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			<b>PRIORITY (Business Days)</b>	4 day [P4-20%] <input type="checkbox"/>					<b>EMERGENCY</b>	1 Business day [E1 - 100%] <input type="checkbox"/>									
Phone:	778-837-9801	<input 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 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			<b>Analysis Request</b>																
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																			
Company:	Resort Municipality of Whistler (RMOW)	Email 1 or Fax atucker@whistler.ca			<b>Oil and Gas Required Fields (client use)</b>																
Contact:	Andrew Tucker	Email 2 ap@whistler.ca																			
<b>Project Information</b>		<b>ALS Account # / Quote #:</b>																			
Job #: 2100168		Major/Minor Code:																			
PO / AFE: 726379		Routing Code:																			
LSD:		Requisitioner:																			
ALS Lab Work Order # (lab use only):		Location:																			
ALS Contact: C. Funginski		Sampler: E. Peets																			
ALS Sample # (lab use only)		Date (dd-mmm-yy)				Time (hh:mm)			Sample Type												
Sample Identification and/or Coordinates (This description will appear on the report)																					
SFC-2		16-Jun-21			Water			R R R													
SFC-2B		16-Jun-21			Water			R R R													
SFC-3		16-Jun-21			Water			R R R													
SFC-4B		16-Jun-21			Water			R R R													
SFC-11		16-Jun-21			Water			R R R													
SFC-12																					
SFC-13																					
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**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA21B2272**  
**Client** : **Morrison Hershfield Limited**  
**Contact** : Josie Gilson  
**Address** : 4321 Still Creek Dr  
 Burnaby BC Canada V5C 6S7  
**Telephone** : 604-454-0402  
**Project** : 210016800  
**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 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** : 17-Jun-2021 15:10  
**Date Analysis Commenced** : 18-Jun-2021  
**Issue Date** : 28-Jun-2021 12:47

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>
Clarie Tejano	Laboratory Assistant	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, 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.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	<i>Detection Limit Raised: Chromatographic interference due to co-elution.</i>
DLDS	<i>Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.</i>
DLQ	<i>Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.</i>



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
(Matrix: Water)										
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-001	VA21B2272-002	VA21B2272-003	VA21B2272-004	VA21B2272-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	326	105	30.9	127	35.8	
conductivity	----	E100	2.0	µS/cm	1030	324	168	408	704	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	306	95.3	37.7	127	139	
pH	----	E108	0.10	pH units	6.65	6.71	6.23	6.55	6.52	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	118	37.1	11.1	139	92.1	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	14.5	3.13	0.389	2.37	0.0511	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.250 <sup>DLDS</sup>	<0.050	<0.050	<0.050	<0.250 <sup>DLDS</sup>	
chloride	16887-00-6	E235.Cl	0.50	mg/L	55.8	5.52	9.62	23.0	124	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 <sup>DLDS</sup>	<0.155 <sup>DLCl</sup>	0.031	<0.025 <sup>DLCl</sup>	<0.100 <sup>DLDS</sup>	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	14.6	3.22	0.444	2.49	0.339	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 <sup>DLDS</sup>	0.0244	0.478	0.0232	0.194	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0255	0.0244	0.478	0.0232	0.194	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	<0.0010	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	
nitrogen, total	7727-37-9	E366	0.030	mg/L	14.6	3.34	0.872	2.47	0.501	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.134	0.0380	0.0133	0.224	0.351	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	122	47.7	27.0	39.5	92.6	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0092	0.0046	0.0117	0.0027	0.0172	
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	0.0148	0.00691	<0.00010	0.00917	0.00026	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0427	0.0714	0.0622	0.173	0.0460	
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	0.224	0.092	<0.010	0.051	0.012	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000165	0.000130	0.0000439	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	102	30.3	11.8	41.4	47.3	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000020	0.000014	0.000040	0.000030	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0109	0.00150	0.00557	0.0243	0.00194	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00211	0.00229	0.00409	0.00118	0.00401	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-2D	MW-2S	MW-3	MW-4	MW-6
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-001	VA21B2272-002	VA21B2272-003	VA21B2272-004	VA21B2272-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
iron, dissolved	7439-89-6	E421	0.010	mg/L	48.1	29.5	<0.010	37.8	2.47	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000062	0.000074	0.000053	<0.000050	0.000054	
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	12.5	4.78	2.01	5.78	5.19	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.19	1.28	1.25	2.06	0.210	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0.0000089	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0122	0.00410	0.000770	0.0138	0.00146	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00210	0.00069	0.00105	0.00256	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.104	<0.050	<0.050	<0.050	0.053	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	20.9	6.74	2.95	5.85	4.08	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0110	0.00398	0.00724	0.00394	0.00470	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000076	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	14.8	8.80	6.60	10.6	5.72	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	41.4	8.91	12.1	18.0	74.7	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.560	0.188	0.103	0.251	0.438	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	43.5	15.7	8.29	13.0	32.8	
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	0.000058	0.000016	0.000026	
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	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00035	<0.00030	<0.00030	<0.00030	0.00033	
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	0.000145	0.000015	<0.000010	0.000142	0.000020	
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	0.0047	0.0049	0.0069	0.0047	0.0071	
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	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	42	<20	<20	28	26	



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

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## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-006	VA21B2272-007	VA21B2272-008	-----	-----	
					Result	Result	Result	---	---	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	149	<1.0	141	----	----	
conductivity	----	E100	2.0	µS/cm	425	<2.0	778	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	128	<0.60	214	----	----	
pH	----	E108	0.10	pH units	6.60	5.52	6.47	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	418	<3.0	41.7	----	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	2.31	<0.0050	1.01	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.250 <sup>DLDS</sup>	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	23.3	<0.50	96.9	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.036 <sup>DLCI</sup>	<0.020	<0.100 <sup>DLDS</sup>	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.64	<0.050	1.14	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0144	<0.0050	0.0363	----	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0144	<0.0051	0.0363	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	2.60	<0.030	1.17	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.646	<0.0020	0.0398	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	39.6	<0.30	98.4	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0028	<0.0010	0.0345	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00897	<0.00010	0.00061	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.176	<0.00010	0.0683	----	----	
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	0.050	<0.010	0.113	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000143	<0.0000050	0.0000068	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	41.7	<0.050	73.7	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000032	<0.000010	0.000011	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0239	<0.00010	0.00174	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00033	<0.00020	<0.00020	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	37.7	<0.010	22.6	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-006	VA21B2272-007	VA21B2272-008	-----	-----	
					Result	Result	Result	---	---	
<b>Dissolved Metals</b>										
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	5.79	<0.0050	7.33	---	---	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	2.02	<0.00010	2.01	---	---	
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	0.0136	<0.000050	0.000780	---	---	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00249	<0.00050	0.00122	---	---	
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	5.79	<0.050	6.49	---	---	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00388	<0.00020	0.00394	---	---	
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	10.7	<0.050	8.73	---	---	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0.000012	---	---	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	18.0	<0.050	59.2	---	---	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.255	<0.00020	0.539	---	---	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	13.5	<0.50	35.4	---	---	
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	0.000018	<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	0.00012	---	---	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0.00037	---	---	
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	0.000142	<0.000010	0.000035	---	---	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0.00067	---	---	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0038	<0.0010	0.0124	---	---	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0.00036	---	---	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	---	---	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	---	---	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	60	<20	25	---	---	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	----	----	<0.50	---	---	





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-006	VA21B2272-007	VA21B2272-008	-----	-----	
					Result	Result	Result	---	---	
<b>Volatile Organic Compounds</b>										
chloromethane	74-87-3	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	---	---	<0.75	---	---	
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	---	---	<0.50	---	---	
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	---	---	<0.20	---	---	
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
chloroethane	75-00-3	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
dichloromethane	75-09-2	E611C	1.0	µg/L	---	---	<1.0	---	---	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	---	---	<0.50	---	---	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	---	---	<0.50	---	---	
trichloroethylene	79-01-6	E611C	0.50	µg/L	---	---	<0.50	---	---	
vinyl chloride	75-01-4	E611C	0.40	µg/L	---	---	<0.40	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
benzene	71-43-2	E611C	0.50	µg/L	---	---	<0.50	---	---	
ethylbenzene	100-41-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
styrene	100-42-5	E611C	0.50	µg/L	---	---	<0.50	---	---	
toluene	108-88-3	E611C	0.40	µg/L	---	---	<0.40	---	---	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	---	---	<0.40	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-006	VA21B2272-007	VA21B2272-008	-----	-----	
					Result	Result	Result	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
xylene, o-	95-47-6	E611C	0.30	µg/L	---	---	<0.30	---	---	
xylenes, total	1330-20-7	E611C	0.50	µg/L	---	---	<0.50	---	---	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	---	---	91.6	---	---	
difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	---	---	94.9	---	---	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	---	---	<250	---	---	
EPH (C19-C32)	----	E601A	250	µg/L	---	---	<250	---	---	
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	---	---	<100	---	---	
HEPHw	----	EC600A	250	µg/L	---	---	<250	---	---	
LEPHw	----	EC600A	250	µg/L	---	---	<250	---	---	
VPHw	----	EC580A	100	µg/L	---	---	<100	---	---	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	---	---	90.2	---	---	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	---	---	93.8	---	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	---	---	1.00	---	---	
acenaphthylene	208-96-8	E641A	0.010	µg/L	---	---	<0.010	---	---	
acridine	260-94-6	E641A	0.010	µg/L	---	---	<0.010	---	---	
anthracene	120-12-7	E641A	0.010	µg/L	---	---	<0.025 <sup>DLO</sup>	---	---	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	---	---	<0.010	---	---	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	---	---	<0.0050	---	---	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	---	---	<0.010	---	---	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	---	---	<0.015	---	---	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	---	---	<0.010	---	---	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	---	---	<0.010	---	---	
chrysene	218-01-9	E641A	0.010	µg/L	---	---	<0.010	---	---	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	---	---	<0.0050	---	---	
fluoranthene	206-44-0	E641A	0.010	µg/L	---	---	0.210	---	---	
fluorene	86-73-7	E641A	0.010	µg/L	---	---	0.155	---	---	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	---	---	<0.010	---	---	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	---	---	<0.010	---	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	Field Blank	GW Int.	----	----
Client sampling date / time					16-Jun-2021	16-Jun-2021	16-Jun-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2272-006	VA21B2272-007	VA21B2272-008	-----	-----	
					Result	Result	Result	---	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	---	---	<0.010	---	---	
naphthalene	91-20-3	E641A	0.050	µg/L	---	---	<0.050	---	---	
phenanthrene	85-01-8	E641A	0.020	µg/L	---	---	<0.020	---	---	
pyrene	129-00-0	E641A	0.010	µg/L	---	---	0.110	---	---	
quinoline	6027-02-7	E641A	0.050	µg/L	---	---	<0.050	---	---	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	---	---	97.8	---	---	
naphthalene-d8	1146-65-2	E641A	0.1	%	---	---	108	---	---	
phenanthrene-d10	1517-22-2	E641A	0.1	%	---	---	111	---	---	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.50	µg/L	---	---	<0.50	---	---	
bromoform	75-25-2	E611C	0.50	µg/L	---	---	<0.50	---	---	
chloroform	67-66-3	E611C	0.50	µg/L	---	---	<0.50	---	---	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	---	---	<0.50	---	---	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21B2272</b>	Page	: 1 of 25
Client	: <b>Morrison Hershfield Limited</b>	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	: 210016800	Date Samples Received	: 17-Jun-2021 15:10
PO	: 726379	Issue Date	: 28-Jun-2021 12:47
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 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 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		
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E559	16-Jun-2021	----	----	----		23-Jun-2021	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 Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW-6	E559	16-Jun-2021	----	----	----		23-Jun-2021	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Duplicate	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Field Blank	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> GW Int.	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW-2D	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW-2S	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW-3	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW-4	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW-6	E298	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	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		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE Field Blank	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE GW Int.	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-2D	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-2S	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-3	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-4	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW-6	E235.Br-L	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Duplicate	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	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		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> Field Blank	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> GW Int.	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW-2D	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW-2S	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW-3	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW-4	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW-6	E235.Cl	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> Duplicate	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> Field Blank	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	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		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE GW Int.	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-2D	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-2S	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-3	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-4	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW-6	E235.F	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Field Blank	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE GW Int.	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-2D	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-2S	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-3	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-4	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW-6	E235.NO3-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Field Blank	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE GW Int.	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-2D	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-2S	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-3	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-4	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW-6	E235.NO2-L	16-Jun-2021	----	----	----		18-Jun-2021	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Duplicate	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Field Blank	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE GW Int.	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-2D	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW-2S	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	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		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> MW-3	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> MW-4	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> MW-6	E235.SO4	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E318	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E318	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E318	16-Jun-2021	22-Jun-2021	----	7 days	✔	23-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E366	16-Jun-2021	22-Jun-2021	----	7 days	✔	24-Jun-2021	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		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E366	16-Jun-2021	22-Jun-2021	----	7 days	✓	24-Jun-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> Duplicate	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> Field Blank	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> GW Int.	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2D	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-2S	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-3	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-4	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	28 days	1 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW-6	E372-U	16-Jun-2021	22-Jun-2021	----	7 days	✓	23-Jun-2021	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		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> Duplicate	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> Field Blank	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW Int.	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-2D	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-2S	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-3	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-4	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW-6	E509	16-Jun-2021	19-Jun-2021	----	4 days	✓	19-Jun-2021	28 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Duplicate	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 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		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Field Blank	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW Int.	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2D	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-2S	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-3	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-4	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW-6	E421	16-Jun-2021	22-Jun-2021	----	7 days	✓	22-Jun-2021	180 days	1 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW Int.	E601A	16-Jun-2021	22-Jun-2021	14 days	7 days	✓	23-Jun-2021	40 days	2 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int.	E581.VH+F1	16-Jun-2021	24-Jun-2021	----	9 days	✓	25-Jun-2021	14 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		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE Duplicate	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE Field Blank	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE GW Int.	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-2D	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-2S	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-3	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-4	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE MW-6	E290	16-Jun-2021	----	----	----		18-Jun-2021	14 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE Duplicate	E100	16-Jun-2021	----	----	----		18-Jun-2021	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		
<b>Physical Tests : Conductivity in Water</b>											
HDPE Field Blank	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE GW Int.	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-2D	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-2S	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-3	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-4	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW-6	E100	16-Jun-2021	----	----	----		18-Jun-2021	28 days	3 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE Duplicate	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE Field Blank	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 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		
<b>Physical Tests : pH by Meter</b>											
HDPE GW Int.	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-2D	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-2S	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-3	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-4	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW-6	E108	16-Jun-2021	----	----	----		18-Jun-2021	0.25 hrs	60 hrs	*	EHTR-FM
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Duplicate	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Field Blank	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE GW Int.	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 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		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-2D	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-2S	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-3	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-4	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW-6	E160-H	16-Jun-2021	----	----	----		23-Jun-2021	7 days	8 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) GW Int.	E641A	16-Jun-2021	22-Jun-2021	14 days	7 days	✔	22-Jun-2021	40 days	1 days	✔	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) GW Int.	E611C	16-Jun-2021	24-Jun-2021	----	----		25-Jun-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) GW Int.	E611C	16-Jun-2021	24-Jun-2021	----	----		25-Jun-2021	----	----		
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) GW Int.	E611C	16-Jun-2021	24-Jun-2021	----	9 days	✔	25-Jun-2021	14 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		
				Rec	Actual			Rec	Actual	Eval
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW Int.	E611C	16-Jun-2021	24-Jun-2021	----	----		25-Jun-2021	----	----	

**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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227884	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Conductivity in Water	E100	224437	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	225508	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	227089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
pH by Meter	E108	224435	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	227704	2	26	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	229414	1	4	25.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	229415	1	1	100.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	226896	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227884	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Conductivity in Water	E100	224437	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	225508	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	227089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	226895	1	9	11.1	5.0	✓
pH by Meter	E108	224435	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	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	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	227704	2	26	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	229414	1	4	25.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	229415	1	1	100.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	224436	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	226896	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227884	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Conductivity in Water	E100	224437	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	225508	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	227089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	226895	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
TSS by Gravimetry	E160-H	227704	2	26	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	229414	1	4	25.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	229415	1	1	100.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	227552	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	224440	1	13	7.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	227884	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	224439	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	225508	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	227089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	224438	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	224441	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	224442	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	224443	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	227549	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	227550	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	227551	1	18	5.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	229414	1	4	25.0	5.0	✓

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 Work Order : VA21B2272  
 Client : Morrison Hershfield Limited  
 Project : 210016800



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							
VOCs (BC List) by Headspace GC-MS	E611C	229415	1	1	100.0	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 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.
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 Vancouver - 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 Vancouver - 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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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  Vancouver - 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
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
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 <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 Vancouver - 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 : VA21B2272

Page : 1 of 18

Client : Morrison Hershfield Limited
Contact : Josie Gilson
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 210016800
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 : 17-Jun-2021 15:10
Date Analysis Commenced : 18-Jun-2021
Issue Date : 28-Jun-2021 12:47

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 Clarie Tejano, Dee Lee, Kevin Duarte, Lindsay Gung, and Ophelia Chiu.

Page : 2 of 18  
Work Order : VA21B2272  
Client : Morrison Hershfield Limited  
Project : 210016800

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## **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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 224435)</b>											
VA21B2271-003	Anonymous	pH	----	E108	0.10	pH units	7.26	7.25	0.138%	4%	----
<b>Physical Tests (QC Lot: 224436)</b>											
VA21B2271-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	29.1	28.4	2.43%	20%	----
<b>Physical Tests (QC Lot: 224437)</b>											
VA21B2271-003	Anonymous	conductivity	----	E100	2.0	µS/cm	158	157	0.254%	10%	----
<b>Physical Tests (QC Lot: 227704)</b>											
FJ2100436-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 227705)</b>											
VA21B2272-008	GW Int.	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	41.7	43.7	4.68%	20%	----
<b>Anions and Nutrients (QC Lot: 224438)</b>											
VA21B2271-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.083	0.083	0.0006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224439)</b>											
VA21B2271-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	31.6	31.6	0.00561%	20%	----
<b>Anions and Nutrients (QC Lot: 224440)</b>											
VA21B2271-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224441)</b>											
VA21B2271-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.11	1.11	0.00954%	20%	----
<b>Anions and Nutrients (QC Lot: 224442)</b>											
VA21B2271-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0011	0.000009	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 224443)</b>											
VA21B2271-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	79.3	79.4	0.0826%	20%	----
<b>Anions and Nutrients (QC Lot: 227549)</b>											
VA21B2271-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.371	0.381	0.010	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227550)</b>											
VA21B2271-001	Anonymous	nitrogen, total	7727-37-9	E366	0.150	mg/L	1.46	1.48	0.022	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227551)</b>											
VA21B2271-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0112	0.0095	0.0017	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 227552)</b>											
VA21B2271-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.178	0.177	0.494%	20%	----
<b>Dissolved Metals (QC Lot: 225508)</b>											
FJ2100428-001	Anonymous	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
<b>Dissolved Metals (QC Lot: 225509)</b>											
VA21B2272-007	Field Blank	mercury, dissolved	7439-97-6	E509	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 227089)</b>											
YL2100544-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0238	0.0232	2.26%	20%	----
		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	0.00011	0.00011	0.000004	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0358	0.0355	0.987%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	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	0.546	0.544	0.501%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.000050	mg/L	0.0000384	0.0000345	0.0000038	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	117	116	0.599%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000038	0.000037	0.000001	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00078	0.00077	0.00001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00124	0.00119	0.00005	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.030	0.002	Diff <2x LOR	----
		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	0.0072	0.0073	0.00005	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	69.2	67.9	1.88%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0859	0.0853	0.649%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0204	0.0204	0.0383%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0260	0.0254	2.32%	20%	----
		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	13.1	12.6	4.45%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0124	0.0119	3.95%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000309	0.000267	0.000042	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.00	2.92	2.98%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	0.000018	0.000015	0.000003	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	57.6	56.6	1.81%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.07	1.06	1.39%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	142	139	2.18%	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	0.000015	0.000015	0.0000002	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	----





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
<b>Dissolved Metals (QC Lot: 227089) - continued</b>											
YL2100544-001	Anonymous	titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00038	0.00034	0.00004	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.00011	0.00013	0.00001	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00851	0.00851	0.0228%	20%	----
		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	0.0046	0.0044	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 227884)</b>											
VA21B2271-005	Anonymous	chemical oxygen demand [COD]	---	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 229415)</b>											
VA21B2272-008	GW Int.	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	1.0	µg/L	<1.0	<1.0	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, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----



Sub-Matrix: **Water**

*Laboratory Duplicate (DUP) Report*

<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>
<b>Volatile Organic Compounds (QC Lot: 229415) - continued</b>											
VA21B2272-008	GW Int.	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	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 229414)</b>											
VA21B2269-003	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	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
<b>Physical Tests (QCLot: 224436)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 224437)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 227704)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 227705)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 224438)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 224439)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 224440)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 224441)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 224442)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 224443)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 227549)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 227550)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 227551)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 227552)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 225508)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 225509)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 227089)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 227089) - continued</b>						
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
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	---
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
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	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 227089) - continued</b>						
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Aggregate Organics (QCLot: 227884)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Volatile Organic Compounds (QCLot: 229415)</b>						
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	1	µg/L	<1.0	---
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	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 229415) - continued</b>						
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	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 226896)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 229414)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 226895)</b>						
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	----



## 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	
<b>Physical Tests (QCLot: 224435)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 224436)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	99.8	85.0	115	----
<b>Physical Tests (QCLot: 224437)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 227704)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	98.2	85.0	115	----
<b>Physical Tests (QCLot: 227705)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 224438)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 224439)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 224440)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	98.2	85.0	115	----
<b>Anions and Nutrients (QCLot: 224441)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 224442)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 224443)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 227549)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 227550)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 227551)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.2	80.0	120	----
<b>Anions and Nutrients (QCLot: 227552)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.0	85.0	115	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.8	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	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
<b>Dissolved Metals (QCLot: 227089)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	104	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.0	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	85.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	97.2	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	102	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.3	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	103	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	107	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	95.2	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	92.4	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.3	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.3	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	99.3	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	105	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	
<b>Dissolved Metals (QCLot: 227089) - continued</b>									
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
<b>Aggregate Organics (QCLot: 227884)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	106	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 229415)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	122	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	84.2	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	117	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	96.9	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	125	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	90.5	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	117	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	114	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	126	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	123	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	130	70.0	130	----
dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	114	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	127	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	128	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	111	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	121	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	105	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	99.3	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	129	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	105	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	118	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	101	60.0	140	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 229415) - continued</b>									
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	82.3	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	115	70.0	130	----
xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	114	70.0	130	----
<b>Hydrocarbons (QCLot: 226896)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	108	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Hydrocarbons (QCLot: 229414)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	95.8	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 226895)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	74.6	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	85.5	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	95.2	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	91.5	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	88.4	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	82.0	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	89.7	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	99.6	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	81.6	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	65.4	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	62.7	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	69.3	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	89.9	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	104	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
<b>Anions and Nutrients (QCLot: 224438)</b>										
VA21B2271-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224439)</b>										
VA21B2271-002	Anonymous	chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224440)</b>										
VA21B2271-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.514 mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 224441)</b>										
VA21B2271-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 224442)</b>										
VA21B2271-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.489 mg/L	0.5 mg/L	97.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 224443)</b>										
VA21B2271-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 227549)</b>										
VA21B2271-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.65 mg/L	2.5 mg/L	106	70.0	130	----
<b>Anions and Nutrients (QCLot: 227550)</b>										
VA21B2271-002	Anonymous	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 227551)</b>										
VA21B2271-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 227552)</b>										
VA21B2271-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
<b>Dissolved Metals (QCLot: 225508)</b>										
FJ2100428-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000976 mg/L	0.0001 mg/L	97.6	70.0	130	----
<b>Dissolved Metals (QCLot: 225509)</b>										
VA21B2272-008	GW Int.	mercury, dissolved	7439-97-6	E509	0.0000939 mg/L	0.0001 mg/L	93.9	70.0	130	----
<b>Dissolved Metals (QCLot: 227089)</b>										
YL2100544-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.204 mg/L	0.2 mg/L	102	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.7	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
<b>Dissolved Metals (QCLot: 227089) - continued</b>										
YL2100544-001	Anonymous	beryllium, dissolved	7440-41-7	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00791 mg/L	0.01 mg/L	79.1	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	0.00391 mg/L	0.004 mg/L	97.8	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	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0190 mg/L	0.02 mg/L	95.3	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0182 mg/L	0.02 mg/L	90.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.88 mg/L	2 mg/L	94.2	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.100 mg/L	0.1 mg/L	100	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	ND mg/L	0.02 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0358 mg/L	0.04 mg/L	89.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	11.2 mg/L	10 mg/L	112	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	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0428 mg/L	0.04 mg/L	107	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.40 mg/L	10 mg/L	94.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00392 mg/L	0.004 mg/L	98.0	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	0.0429 mg/L	0.04 mg/L	107	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00375 mg/L	0.004 mg/L	93.8	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	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0203 mg/L	0.02 mg/L	101	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	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.371 mg/L	0.4 mg/L	92.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
<b>Aggregate Organics (QCLot: 227884)</b>										



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
<b>Aggregate Organics (QCLot: 227884) - continued</b>										
VA21B2272-001	MW-2D	chemical oxygen demand [COD]	----	E559	107 mg/L	100 mg/L	107	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 229415)</b>										
VA21B2272-008	GW Int.	benzene	71-43-2	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		bromodichloromethane	75-27-4	E611C	139 µg/L	100 µg/L	139	60.0	140	----
		bromoform	75-25-2	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	77.8 µg/L	100 µg/L	77.8	60.0	140	----
		chlorobenzene	108-90-7	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		chloroethane	75-00-3	E611C	76.6 µg/L	100 µg/L	76.6	50.0	150	----
		chloroform	67-66-3	E611C	123 µg/L	100 µg/L	123	60.0	140	----
		chloromethane	74-87-3	E611C	63.1 µg/L	100 µg/L	63.1	50.0	150	----
		dibromochloromethane	124-48-1	E611C	92.8 µg/L	100 µg/L	92.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	133 µg/L	100 µg/L	133	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		dichloromethane	75-09-2	E611C	130 µg/L	100 µg/L	130	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	127 µg/L	100 µg/L	127	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	131 µg/L	100 µg/L	131	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	97.2 µg/L	100 µg/L	97.2	60.0	140	----
		ethylbenzene	100-41-4	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		styrene	100-42-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	139 µg/L	100 µg/L	139	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		toluene	108-88-3	E611C	92.8 µg/L	100 µg/L	92.8	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	123 µg/L	100 µg/L	123	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		trichloroethylene	79-01-6	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	96.2 µg/L	100 µg/L	96.2	50.0	150	----
		vinyl chloride	75-01-4	E611C	61.5 µg/L	100 µg/L	61.5	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	219 µg/L	200 µg/L	110	60.0	140	----

Page : 18 of 18  
 Work Order : VA21B2272  
 Client : Morrison Hershfield Limited  
 Project : 210016800



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>
<b>Volatile Organic Compounds (QCLot: 229415) - continued</b>										
VA21B2272-008	GW Int.	xylylene, o-	95-47-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
<b>Hydrocarbons (QCLot: 229414)</b>										
VA21B2269-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5150 µg/L	6310 µg/L	81.6	60.0	140	----





**Environmental**

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA21C1100**  
**Client** : **Morrison Hershfield Limited**  
**Contact** : Emily Peets  
**Address** : 4321 Still Creek Dr  
Burnaby BC Canada V5C 6S7  
**Telephone** : 604-454-0402  
**Project** : 2100168  
**PO** : 726379  
**C-O-C number** : 20-908444  
**Sampler** : E. Peets  
**Site** :  
**Quote number** : Q65605 - Whistler Landfill Closure Environmental Monitoring Program  
**No. of samples received** : 5  
**No. of samples analysed** : 5

**Page** : 1 of 5  
**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-Sep-2021 10:20  
**Date Analysis Commenced** : 25-Sep-2021  
**Issue Date** : 07-Oct-2021 09:24

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>
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		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.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SFC 2	SFC 2B	SFC 3	SFC 4B	SFC 11
(Matrix: Water)										
Client sampling date / time					23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021
Analyte	CAS Number	Method	LOR	Unit	VA21C1100-001	VA21C1100-002	VA21C1100-003	VA21C1100-004	VA21C1100-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	73.9	<1.0	31.6	40.9	30.6	
conductivity	----	E100	2.0	µS/cm	372	868	258	256	131	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	135	272	52.5	78.5	44.3	
pH	----	E108	0.10	pH units	6.96	3.31	7.14	7.55	7.05	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	4.1	27.9	<3.0	<3.0	<3.0	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.140	1.08	0.0099	0.0079	<0.0050	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.250 <sup>DLDS</sup>	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	23.3	7.54	39.9	27.2	7.34	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.062	0.483	0.042	0.051	0.044	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.464	1.38	0.092	0.107	0.053	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.21	0.0503 <sup>HTD</sup>	0.258 <sup>HTD</sup>	0.399 <sup>HTD</sup>	0.217 <sup>HTD</sup>	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	1.21	0.0503	0.258	0.399	0.217	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	<0.0050 <sup>DLDS, HTD</sup>	<0.0010 <sup>HTD</sup>	<0.0010 <sup>HTD</sup>	<0.0010 <sup>HTD</sup>	
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.47	1.33	0.347	0.482	0.268	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0.0089	0.0021	0.0039	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	63.4	386	26.0	35.7	18.6	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.665	11.2	0.0776	0.0711	0.0820	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00013	0.00085	<0.00010	<0.00010	0.00011	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0591	0.0316	0.0261	0.0239	0.0148	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	0.000343	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	0.023	0.021	<0.010	0.016	<0.010	
cadmium, total	7440-43-9	E420	0.000050	mg/L	0.0000588	0.000324	0.0000362	0.0000079	0.0000121	
calcium, total	7440-70-2	E420	0.050	mg/L	46.9	75.7	17.2	26.3	13.9	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000011	0.000068	<0.000010	<0.000010	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.00100	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00523	0.0707	0.00034	0.00038	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0147	0.168	0.00230	0.00229	0.00100	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SFC 2	SFC 2B	SFC 3	SFC 4B	SFC 11
Client sampling date / time					23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021	23-Sep-2021
Analyte	CAS Number	Method	LOR	Unit	VA21C1100-001	VA21C1100-002	VA21C1100-003	VA21C1100-004	VA21C1100-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
iron, total	7439-89-6	E420	0.010	mg/L	1.30	29.7	0.101	0.128	0.058	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0050	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	4.29	20.1	2.31	3.11	2.33	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.550	4.78	0.0199	0.100	0.00984	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00728	0.000116	0.000476	0.00136	0.000278	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00212	0.0308	0.00055	0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	4.66	3.28	1.56	2.21	0.733	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00490	0.00535	0.00134	0.00212	0.00055	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000073	0.000106	<0.000050	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	5.15	13.4	8.19	7.98	9.93	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	22.6	8.98	30.0	21.3	9.01	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.292	0.339	0.162	0.255	0.185	
sulfur, total	7704-34-9	E420	0.50	mg/L	24.1	147	9.53	14.0	7.13	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<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	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	0.00056	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0.00110	0.00074	0.00167	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000109	0.000437	<0.000010	0.000020	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00070	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0096	0.0607	0.0050	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	33	<20	<20	<20	

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



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21C1100</b>	Page	: 1 of 17
Client	: <b>Morrison Hershfield Limited</b>	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	: 2100168	Date Samples Received	: 24-Sep-2021 10:20
PO	: 726379	Issue Date	: 07-Oct-2021 09:24
C-O-C number	: 20-908444		
Sampler	: E. Peets		
Site	:		
Quote number	: Q65605 - Whistler Landfill Closure Environmental Monitoring Program		
No. of samples received	: 5		
No. of samples analysed	: 5		

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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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.



**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Method Blank (MB) Values</b>								
Physical Tests	QC-MRG2-3025340 01	----	alkalinity, total (as CaCO3)	----	E290	6.2 mg/L <sup>B</sup>	1.5 mg/L	Blank result exceeds permitted value

**Result Qualifiers**

Qualifier	Description
B	<i>Method Blank exceeds ALS DQO. Associated sample results which are &lt; Limit of Reporting or &gt; 5 times blank level are considered reliable.</i>



## 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 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 11	E559	23-Sep-2021	----	----	----		01-Oct-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 2	E559	23-Sep-2021	----	----	----		01-Oct-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 2B	E559	23-Sep-2021	----	----	----		01-Oct-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 3	E559	23-Sep-2021	----	----	----		01-Oct-2021	28 days	8 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 4B	E559	23-Sep-2021	----	----	----		01-Oct-2021	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 11	E298	23-Sep-2021	01-Oct-2021	----	----		02-Oct-2021	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SFC 2	E298	23-Sep-2021	01-Oct-2021	----	----		02-Oct-2021	28 days	9 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		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 2B	E298	23-Sep-2021	01-Oct-2021	----	----		02-Oct-2021	28 days	9 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 3	E298	23-Sep-2021	01-Oct-2021	----	----		02-Oct-2021	28 days	9 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 4B	E298	23-Sep-2021	01-Oct-2021	----	----		02-Oct-2021	28 days	9 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC 11	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC 2	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC 2B	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC 3	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
<b>HDPE</b> SFC 4B	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> SFC 11	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SFC 2	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SFC 2B	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SFC 3	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SFC 4B	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SFC 11	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SFC 2	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SFC 2B	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SFC 3	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SFC 4B	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC 11	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC 2	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC 2B	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC 3	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SFC 4B	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC 11	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC 2	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC 2B	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC 4B	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SFC 3	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	8 days	*	EHT
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC 11	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC 2	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC 2B	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC 3	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE SFC 4B	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC 11	E318	23-Sep-2021	01-Oct-2021	----	----		05-Oct-2021	28 days	12 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC 2	E318	23-Sep-2021	01-Oct-2021	----	----		05-Oct-2021	28 days	12 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (sulfuric acid) SFC 2B	E318	23-Sep-2021	01-Oct-2021	----	----		05-Oct-2021	28 days	12 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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 3	E318	23-Sep-2021	01-Oct-2021	----	----		05-Oct-2021	28 days	12 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 4B	E318	23-Sep-2021	01-Oct-2021	----	----		05-Oct-2021	28 days	12 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 11	E366	23-Sep-2021	01-Oct-2021	----	----		04-Oct-2021	28 days	11 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 2	E366	23-Sep-2021	01-Oct-2021	----	----		04-Oct-2021	28 days	11 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 2B	E366	23-Sep-2021	01-Oct-2021	----	----		04-Oct-2021	28 days	11 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 3	E366	23-Sep-2021	01-Oct-2021	----	----		04-Oct-2021	28 days	11 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 4B	E366	23-Sep-2021	01-Oct-2021	----	----		04-Oct-2021	28 days	11 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 11	E372-U	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 2	E372-U	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	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		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 2B	E372-U	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 3	E372-U	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SFC 4B	E372-U	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC 11	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC 2	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC 2B	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC 3	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> SFC 4B	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> SFC 11	E100	23-Sep-2021	----	----	----		25-Sep-2021	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	
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC 2	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC 2B	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC 3	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SFC 4B	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : pH by Meter</b>										
HDPE SFC 11	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	59 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC 2	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	59 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC 2B	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	59 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC 3	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	59 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SFC 4B	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	59 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		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC 11	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC 2	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC 2B	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC 3	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SFC 4B	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC 11	E508	23-Sep-2021	----	----	----		02-Oct-2021	28 days	9 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC 2	E508	23-Sep-2021	----	----	----		02-Oct-2021	28 days	9 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC 2B	E508	23-Sep-2021	----	----	----		02-Oct-2021	28 days	9 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) SFC 3	E508	23-Sep-2021	----	----	----		02-Oct-2021	28 days	9 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	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SFC 4B	E508	23-Sep-2021	----	----	----		02-Oct-2021	28 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC 11	E420	23-Sep-2021	----	----	----		01-Oct-2021	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC 2	E420	23-Sep-2021	----	----	----		01-Oct-2021	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC 2B	E420	23-Sep-2021	----	----	----		01-Oct-2021	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC 3	E420	23-Sep-2021	----	----	----		01-Oct-2021	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SFC 4B	E420	23-Sep-2021	----	----	----		01-Oct-2021	180 days	9 days	✓

**Legend & Qualifier Definitions**

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

EHT: Exceeded ALS recommended hold time prior to analysis.

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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	302535	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	308064	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	308002	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
pH by Meter	E108	302533	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	308061	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	308925	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	307792	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	308062	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	308063	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	306961	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	302535	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	308064	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	308002	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
pH by Meter	E108	302533	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	308061	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	308925	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	307792	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	308062	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	308063	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	306961	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	302535	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	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Ammonia by Fluorescence	E298	308064	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	308002	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	308061	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	308925	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	307792	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	308062	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	308063	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	306961	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	308064	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	308002	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	308061	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	308925	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	307792	1	18	5.5	5.0	✓
Total Nitrogen by Colourimetry	E366	308062	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	308063	1	20	5.0	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 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 <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



<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 : **VA21C1100**

Page : 1 of 14

Client : Morrison Hershfield Limited  
Contact : Emily Peets  
Address : 8001 Hwy 99  
Whistler BC Canada V0N 1B8

Telephone : ----

Project : 2100168

PO : 726379

C-O-C number : 20-908444

Sampler : E. Peets

Site :

Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program

No. of samples received : 5

No. of samples analysed : 5

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 : 24-Sep-2021 10:20

Date Analysis Commenced : 25-Sep-2021

Issue Date : 07-Oct-2021 09:24

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.

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Work Order : VA21C1100  
Client : Morrison Hershfield Limited  
Project : 2100168

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## **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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 302533)</b>											
VA21C0987-001	Anonymous	pH	----	E108	0.10	pH units	8.06	8.06	0.0248%	4%	----
<b>Physical Tests (QC Lot: 302534)</b>											
VA21C0987-001	Anonymous	conductivity	----	E100	2.0	µS/cm	582	581	0.172%	10%	----
<b>Physical Tests (QC Lot: 302535)</b>											
VA21C1074-002	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.2	71.5	0.485%	20%	----
<b>Physical Tests (QC Lot: 306961)</b>											
KS2103091-008	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302536)</b>											
VA21C0987-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.203	0.198	2.34%	20%	----
<b>Anions and Nutrients (QC Lot: 302537)</b>											
VA21C0987-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.286%	20%	----
<b>Anions and Nutrients (QC Lot: 302538)</b>											
VA21C0987-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.03	2.02	0.01	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302539)</b>											
VA21C0987-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302540)</b>											
VA21C0987-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0054	<0.0050	0.0004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302541)</b>											
VA21C0987-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 308061)</b>											
VA21C1087-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.091	0.104	0.013	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 308062)</b>											
VA21C1087-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.101	0.102	0.0009	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 308063)</b>											
VA21C1087-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0028	0.0022	0.0006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 308064)</b>											
VA21C1087-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 307792)</b>											
VA21C1041-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	12.8	13.2	2.91%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00036	0.00035	0.000010	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0260	0.0295	12.3%	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
<b>Total Metals (QC Lot: 307792) - continued</b>											
VA21C1041-001	Anonymous	barium, total	7440-39-3	E420	0.00010	mg/L	0.107	0.117	8.76%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	0.000256	0.000249	0.000007	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000365	0.000360	0.000005	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000213	0.000204	4.20%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	38.0	38.3	0.889%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000831	0.000819	1.45%	20%	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.0238	0.0249	4.60%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.0175	0.0205	15.5%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0371	0.0384	3.33%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	43.9	44.0	0.162%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.0289	0.0284	1.98%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0259	0.0248	4.42%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	8.59	8.91	3.74%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	2.03	2.17	6.89%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000220	0.000196	0.000024	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0393	0.0410	4.23%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.375	0.368	0.006	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	2.28	2.34	2.69%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0115	0.0117	2.12%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000210	0.000216	0.000006	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	22.6	22.2	1.85%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000088	0.000090	0.000001	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	5.53	5.73	3.64%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.210	0.202	3.79%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	0.83	0.82	0.005	Diff <2x LOR	----
		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	0.000078	0.000075	0.000004	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.0117	0.0112	4.51%	20%	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00035	0.00032	0.00003	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.133	0.133	0.386%	20%	----
		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	0.000861	0.000821	4.68%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0119	0.0123	3.36%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0575	0.0602	4.64%	20%	----



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>
<b>Total Metals (QC Lot: 307792) - continued</b>											
VA21C1041-001	Anonymous	zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00065	0.00053	0.00012	Diff <2x LOR	----
<b>Total Metals (QC Lot: 308925)</b>											
VA21C1093-002	Anonymous	mercury, total	7439-97-6	E508	0.0000250	mg/L	<0.0000250	<0.0000250	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 308002)</b>											
VA21C0745-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	477	476	0.115%	20%	----



## 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
<b>Physical Tests (QCLot: 302534)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 302535)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	# 6.2	B
<b>Physical Tests (QCLot: 306961)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 302536)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 302537)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 302538)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 302539)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 302540)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 302541)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 308061)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 308062)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 308063)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 308064)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Total Metals (QCLot: 307792)</b>						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 307792) - continued</b>						
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	---
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
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	---
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	---
<b>Total Metals (QCLot: 308925)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 308002)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---



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## Qualifiers

Qualifier	Description
B	<i>Method Blank exceeds ALS DQO. Associated sample results which are &lt; Limit of Reporting or &gt; 5 times blank level are considered reliable.</i>

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## 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	
<b>Physical Tests (QCLot: 302533)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 302534)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.3	90.0	110	----
<b>Physical Tests (QCLot: 302535)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
<b>Physical Tests (QCLot: 306961)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	89.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 302536)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	90.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 302537)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 302538)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 302539)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 302540)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 302541)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 308061)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	93.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 308062)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 308063)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	100	80.0	120	----
<b>Anions and Nutrients (QCLot: 308064)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.7	85.0	115	----
<b>Total Metals (QCLot: 307792)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	109	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	111	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	111	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	
<b>Total Metals (QCLot: 307792) - continued</b>									
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	97.1	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	108	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	104	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	110	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	107	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	96.2	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	96.6	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	112	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	108	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	115	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	107	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	106	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	115	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	103	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	110	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	110	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	112	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
<b>Total Metals (QCLot: 308925)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.4	80.0	120	----

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 Work Order : VA21C1100  
 Client : Morrison Hershfield Limited  
 Project : 2100168



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Aggregate Organics (QCLot: 308002)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	100	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
<b>Anions and Nutrients (QCLot: 302536)</b>										
VA21C1100-001	SFC 2	fluoride	16984-48-8	E235.F	0.987 mg/L	1 mg/L	98.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 302537)</b>										
VA21C1074-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 302538)</b>										
VA21C1074-001	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 302539)</b>										
VA21C1100-001	SFC 2	bromide	24959-67-9	E235.Br-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 302540)</b>										
VA21C1074-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 302541)</b>										
VA21C1074-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.486 mg/L	0.5 mg/L	97.1	75.0	125	----
<b>Anions and Nutrients (QCLot: 308061)</b>										
VA21C1087-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.47 mg/L	2.5 mg/L	98.7	70.0	130	----
<b>Anions and Nutrients (QCLot: 308062)</b>										
VA21C1087-002	Anonymous	nitrogen, total	7727-37-9	E366	0.398 mg/L	0.4 mg/L	99.6	70.0	130	----
<b>Anions and Nutrients (QCLot: 308063)</b>										
VA21C1087-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0518 mg/L	0.05 mg/L	104	70.0	130	----
<b>Anions and Nutrients (QCLot: 308064)</b>										
VA21C1087-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
<b>Total Metals (QCLot: 307792)</b>										
VA21C1041-002	Anonymous	aluminum, total	7429-90-5	E420	0.208 mg/L	0.2 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E420	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		barium, total	7440-39-3	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0109 mg/L	0.01 mg/L	109	70.0	130	----
		boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	97.5	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00418 mg/L	0.004 mg/L	104	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
<b>Total Metals (QCLot: 307792) - continued</b>										
VA21C1041-002	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		chromium, total	7440-47-3	E420	0.0422 mg/L	0.04 mg/L	106	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		copper, total	7440-50-8	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		iron, total	7439-89-6	E420	2.03 mg/L	2 mg/L	101	70.0	130	----
		lead, total	7439-92-1	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		lithium, total	7439-93-2	E420	0.105 mg/L	0.1 mg/L	105	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	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		nickel, total	7440-02-0	E420	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		phosphorus, total	7723-14-0	E420	11.8 mg/L	10 mg/L	118	70.0	130	----
		potassium, total	7440-09-7	E420	4.18 mg/L	4 mg/L	104	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		selenium, total	7782-49-2	E420	0.0443 mg/L	0.04 mg/L	111	70.0	130	----
		silicon, total	7440-21-3	E420	9.38 mg/L	10 mg/L	93.8	70.0	130	----
		silver, total	7440-22-4	E420	0.00423 mg/L	0.004 mg/L	106	70.0	130	----
		sodium, total	17341-25-2	E420	2.20 mg/L	2 mg/L	110	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	22.0 mg/L	20 mg/L	110	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		thallium, total	7440-28-0	E420	0.00400 mg/L	0.004 mg/L	99.9	70.0	130	----
		thorium, total	7440-29-1	E420	0.0221 mg/L	0.02 mg/L	111	70.0	130	----
		tin, total	7440-31-5	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		titanium, total	7440-32-6	E420	0.0424 mg/L	0.04 mg/L	106	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		uranium, total	7440-61-1	E420	0.00443 mg/L	0.004 mg/L	111	70.0	130	----
		vanadium, total	7440-62-2	E420	0.109 mg/L	0.1 mg/L	109	70.0	130	----
		zinc, total	7440-66-6	E420	0.424 mg/L	0.4 mg/L	106	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0427 mg/L	0.04 mg/L	107	70.0	130	----
<b>Total Metals (QCLot: 308925)</b>										
VA21C1093-003	Anonymous	mercury, total	7439-97-6	E508	0.0000986 mg/L	0.0001 mg/L	98.6	70.0	130	----
<b>Aggregate Organics (QCLot: 308002)</b>										
VA21C0745-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----

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Work Order : VA21C1100  
Client : Morrison Hershfield Limited  
Project : 2100168

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CERTIFICATE OF ANALYSIS

Work Order : **VA21C1101**  
Client : **Morrison Hershfield Limited**  
Contact : Emily Peets  
Address : 4321 Still Creek Dr  
Burnaby BC Canada V5C 6S7  
Telephone : 604-454-0402  
Project : 2100168  
PO : 726379  
C-O-C number : 20-908442  
Sampler : Emily Peets  
Site :  
Quote number : Q65605 - Whistler Landfill Closure Environmental Monitoring Program  
No. of samples received : 8  
No. of samples analysed : 8

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 : 24-Sep-2021 10:20  
Date Analysis Commenced : 25-Sep-2021  
Issue Date : 05-Oct-2021 16:27

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>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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>
-	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.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW2D	MW2S	MW3	MW4	MW6
(Matrix: Water)										
Client sampling date / time					23-Sep-2021 09:10	23-Sep-2021 10:00	23-Sep-2021 12:30	23-Sep-2021 13:30	23-Sep-2021 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-001	VA21C1101-002	VA21C1101-003	VA21C1101-004	VA21C1101-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	338	107	30.3	82.4	66.1	
conductivity	----	E100	2.0	µS/cm	1020	351	144	270	525	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	303	119	32.0	81.2	92.1	
pH	----	E108	0.10	pH units	6.51	6.55	6.32	6.62	6.64	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	90.1	88.3	4.3	85.3	106	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	14.2	2.74	0.400	1.37	0.0219	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.268	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	57.5	7.79	6.76	16.4	66.1	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 <sup>DLDS</sup>	0.107	<0.020	0.044	0.069	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	15.1	2.89	0.457	1.50	0.261	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 <sup>DLDS, HTD</sup>	0.0108 <sup>HTD</sup>	0.0591	0.0100	0.162	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0255	0.0108	0.0591	0.0100	0.163	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS, HTD</sup>	<0.0010 <sup>HTD</sup>	<0.0010	<0.0010	0.0013	
nitrogen, total	7727-37-9	E366	0.030	mg/L	14.9	2.81	0.457	1.42	0.388	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	1.10	0.0557	0.0175	0.0861	0.822	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	113	55.8	24.2	24.4	81.6	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0161	0.0041	0.0120	0.0046	0.0244	
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	0.0127	0.00716	<0.00010	0.00651	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0422	0.0922	0.0630	0.0933	0.0326	
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	0.230	0.091	<0.010	0.032	0.016	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.000125	0.0000926	0.0000239	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	101	37.2	9.77	26.8	31.1	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000020	0.000015	0.000039	0.000023	0.000012	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0101	0.00162	0.00378	0.0146	0.00011	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW2D	MW2S	MW3	MW4	MW6
Client sampling date / time					23-Sep-2021 09:10	23-Sep-2021 10:00	23-Sep-2021 12:30	23-Sep-2021 13:30	23-Sep-2021 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-001	VA21C1101-002	VA21C1101-003	VA21C1101-004	VA21C1101-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00024	0.00185	0.00222	0.00106	0.00203	
iron, dissolved	7439-89-6	E421	0.010	mg/L	49.1	39.1	0.046	23.8	0.130	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000054	<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	12.3	6.44	1.86	3.48	3.50	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.14	1.62	1.33	1.39	0.0107	
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	0.0107	0.00319	0.000666	0.0141	0.00219	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00184	0.00074	0.00089	0.00156	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.081	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	19.5	7.41	2.90	3.87	2.99	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0111	0.00451	0.00715	0.00267	0.00457	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000080	0.000051	<0.000050	<0.000050	0.000153	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	14.6	9.75	6.46	9.58	5.45	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	39.8	9.89	8.61	11.0	69.6	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.513	0.224	0.0950	0.145	0.380	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	39.2	21.2	8.03	8.56	36.0	
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	0.000040	0.000014	0.000021	
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	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00074	<0.00030	<0.00030	<0.00030	0.00068	
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	0.000145	0.000019	<0.000010	0.000050	0.000022	
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	0.0012	0.0043	0.0026	0.0036	0.0023	
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	
<b>Aggregate Organics</b>										





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW2D	MW2S	MW3	MW4	MW6
Client sampling date / time					23-Sep-2021 09:10	23-Sep-2021 10:00	23-Sep-2021 12:30	23-Sep-2021 13:30	23-Sep-2021 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-001	VA21C1101-002	VA21C1101-003	VA21C1101-004	VA21C1101-005	
					Result	Result	Result	Result	Result	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	68	<20	<20	<20	33	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	2.74	<0.50	<0.50	<0.50	<0.50	
chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
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	0.60	<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	
<b>Volatile Organic Compounds [Drycleaning]</b>										
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-	156-59-2	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	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
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	
<b>Volatile Organic Compounds [Fuels]</b>										
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	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW2D	MW2S	MW3	MW4	MW6
Client sampling date / time					23-Sep-2021 09:10	23-Sep-2021 10:00	23-Sep-2021 12:30	23-Sep-2021 13:30	23-Sep-2021 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-001	VA21C1101-002	VA21C1101-003	VA21C1101-004	VA21C1101-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [Fuels]</b>										
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	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40	
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	<0.30	<0.30	<0.30	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>Volatile Organic Compounds [THMs]</b>										
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	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	92.5	93.8	94.5	92.4	90.8	
difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	83.4	74.4	71.6	78.1	76.3	
<b>Hydrocarbons</b>										
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	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	89.4	86.2	86.3	84.4	88.9	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	93.3	116	103	106	107	
<b>Polycyclic Aromatic Hydrocarbons</b>										
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	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW2D	MW2S	MW3	MW4	MW6
Client sampling date / time					23-Sep-2021 09:10	23-Sep-2021 10:00	23-Sep-2021 12:30	23-Sep-2021 13:30	23-Sep-2021 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-001	VA21C1101-002	VA21C1101-003	VA21C1101-004	VA21C1101-005	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons</b>										
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	
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	91-22-5	E641A	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	91.1	87.8	88.6	91.9	106	
naphthalene-d8	1146-65-2	E641A	0.1	%	106	114	88.7	113	101	
phenanthrene-d10	1517-22-2	E641A	0.1	%	111	109	121	115	107	

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	GW Int	LI	----	----
Client sampling date / time					23-Sep-2021 09:20	23-Sep-2021 11:15	23-Sep-2021 10:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-006	VA21C1101-007	VA21C1101-008	-----	-----	
					Result	Result	Result	----	----	
<b>Physical Tests</b>										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	328	143	114	----	----	
conductivity	----	E100	2.0	µS/cm	1000	703	685	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	298	177	278	----	----	
pH	----	E108	0.10	pH units	6.50	6.27	6.63	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	90.3	16.1	<3.0	----	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	14.8	0.925	0.812	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.279	<0.050	<0.050	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	58.8	79.7	5.05	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 <sup>DLDS</sup>	0.108	0.042	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	15.1	1.05	1.45 <sup>TKNI</sup>	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0250 <sup>DLDS, HTD</sup>	0.0275 <sup>HTD</sup>	20.3 <sup>HTD</sup>	----	----	
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0255	0.0275	20.3	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0050 <sup>DLDS, HTD</sup>	<0.0010 <sup>HTD</sup>	0.0438 <sup>HTD</sup>	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	14.8	1.01	22.1	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.628	0.0193	0.0404	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	115	85.0	142	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0116	0.0383	0.0142	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00030	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0129	0.00052	0.00018	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0416	0.0622	0.0484	----	----	
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	0.224	0.105	0.066	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.0000608	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	99.0	60.3	96.9	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000021	0.000011	<0.000010	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.0103	0.00113	0.00054	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0.0222	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	GW Int	LI	----	----
Client sampling date / time					23-Sep-2021 09:20	23-Sep-2021 11:15	23-Sep-2021 10:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-006	VA21C1101-007	VA21C1101-008	-----	-----	
					Result	Result	Result	---	---	
<b>Dissolved Metals</b>										
iron, dissolved	7439-89-6	E421	0.010	mg/L	49.8	21.7	0.033	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000082	<0.000050	0.000136	----	----	
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	12.3	6.49	8.82	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	3.16	1.90	0.0523	----	----	
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	0.0109	0.00200	0.000503	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00186	0.00069	0.00227	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.089	<0.050	<0.050	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	19.9	5.67	5.17	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.0112	0.00373	0.00338	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000089	<0.000050	0.000165	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	15.0	9.29	11.1	----	----	
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	39.9	48.0	13.4	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.521	0.454	0.383	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	39.7	29.4	49.5	----	----	
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	0.00055	0.00037	<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	0.000144	0.000024	0.000046	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	0.00070	<0.00050	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0010	0.0050	0.0343	----	----	
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	----	----	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559	20	mg/L	48	21	33	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	GW Int	LI	----	----
Client sampling date / time					23-Sep-2021 09:20	23-Sep-2021 11:15	23-Sep-2021 10:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-006	VA21C1101-007	VA21C1101-008	-----	-----	
					Result	Result	Result	---	---	
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	2.73	<0.50	<0.50	----	----	
chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	<5.0	----	----	
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	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
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-	156-59-2	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	1.0	µg/L	<1.0	<1.0	<1.0	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	
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	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
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	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	GW Int	LI	----	----
Client sampling date / time					23-Sep-2021 09:20	23-Sep-2021 11:15	23-Sep-2021 10:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-006	VA21C1101-007	VA21C1101-008	-----	-----	
					Result	Result	Result	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	<0.40	----	----	
xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	<0.40	----	----	
xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	<0.30	----	----	
xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
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	<0.50	<0.50	<0.50	----	----	
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	<0.50	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	93.2	89.3	90.1	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	72.6	74.1	71.1	----	----	
<b>Hydrocarbons</b>										
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	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	86.9	83.9	87.2	----	----	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	101	104	91.3	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	1.03	<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 <sup>DLO</sup>	<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	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Duplicate	GW Int	LI	----	----
Client sampling date / time					23-Sep-2021 09:20	23-Sep-2021 11:15	23-Sep-2021 10:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C1101-006	VA21C1101-007	VA21C1101-008	-----	-----	
					Result	Result	Result	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
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	0.225	<0.010	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	0.106	<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	0.118	<0.010	----	----	
quinoline	91-22-5	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A	0.1	%	97.8	96.0	89.0	----	----	
naphthalene-d8	1146-65-2	E641A	0.1	%	107	121	92.6	----	----	
phenanthrene-d10	1517-22-2	E641A	0.1	%	116	116	111	----	----	

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



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA21C1101</b>	Page	: 1 of 31
Client	: <b>Morrison Hershfield Limited</b>	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	: 2100168	Date Samples Received	: 24-Sep-2021 10:20
PO	: 726379	Issue Date	: 05-Oct-2021 16:27
C-O-C number	: 20-908442		
Sampler	: Emily 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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- Duplicate outliers occur - please see following pages for full details.
- 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.



**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Method Blank (MB) Values</b>								
Physical Tests	QC-MRG2-3025340 01	----	alkalinity, total (as CaCO3)	----	E290	6.2 mg/L <sup>B</sup>	1.5 mg/L	Blank result exceeds permitted value

**Result Qualifiers**

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

<b>Duplicate (DUP) RPDs</b>								
Anions and Nutrients	Anonymous	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	22.3 % <sup>TKND</sup>	20%	Duplicate RPD does not meet the DQO for this test.

**Result Qualifiers**

Qualifier	Description
TKND	TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.



## 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 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 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		
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> Duplicate	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> GW Int	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> LI	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW2D	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW2S	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW3	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW4	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	*	EHT



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
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (lab preserved)</b> MW6	E559	23-Sep-2021	----	----	----		28-Sep-2021	3 days	5 days	* EHT
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> MW4	E298	23-Sep-2021	25-Sep-2021	3 days	1 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> MW6	E298	23-Sep-2021	25-Sep-2021	3 days	1 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> Duplicate	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> GW Int	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> LI	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> MW2D	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> MW2S	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	28 days	1 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (lab preserved)</b> MW3	E298	23-Sep-2021	25-Sep-2021	3 days	2 days	✓	26-Sep-2021	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		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE GW Int	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE LI	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW2D	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW2S	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW3	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW4	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE MW6	E235.Br-L	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Duplicate	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE GW Int	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE LI	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW2D	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW2S	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW3	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW4	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE MW6	E235.Cl	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE Duplicate	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE GW Int	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE LI	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW2D	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW2S	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW3	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW4	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE MW6	E235.F	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE GW Int	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE LI	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW2D	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW2S	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW3	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW4	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW6	E235.NO3-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE Duplicate	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE GW Int	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE LI	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW2D	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	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		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW2S	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW3	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW4	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW6	E235.NO2-L	23-Sep-2021	----	----	----		25-Sep-2021	3 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Duplicate	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE GW Int	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE LI	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW2D	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW2S	E235.SO4	23-Sep-2021	----	----	----		25-Sep-2021	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	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW3	E235.S04	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW4	E235.S04	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW6	E235.S04	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) MW4	E318	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) MW6	E318	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) Duplicate	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) GW Int	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) LI	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
Amber glass total (lab preserved) MW2D	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	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		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (lab preserved)</b> MW2S	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (lab preserved)</b> MW3	E318	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW4	E366	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW6	E366	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> Duplicate	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> GW Int	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> LI	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW2D	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW2S	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	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		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (lab preserved)</b> MW3	E366	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	28-Sep-2021	28 days	3 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> MW4	E372-U	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> MW6	E372-U	23-Sep-2021	25-Sep-2021	3 days	1 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> Duplicate	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> GW Int	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> LI	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> MW2D	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> MW2S	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	28 days	1 days	✔	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (lab preserved)</b> MW3	E372-U	23-Sep-2021	25-Sep-2021	3 days	2 days	✔	26-Sep-2021	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		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> Duplicate	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW Int	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> LI	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW2D	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW2S	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW3	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW4	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW6	E509	23-Sep-2021	01-Oct-2021	----	----		01-Oct-2021	28 days	8 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW3	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	10 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		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW4	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	10 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW6	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	10 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> Duplicate	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	11 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW Int	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	11 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> LI	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	11 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW2D	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	11 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW2S	E421	23-Sep-2021	02-Oct-2021	----	----		03-Oct-2021	180 days	11 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW6	E601A	23-Sep-2021	01-Oct-2021	14 days	7 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Duplicate	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	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		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW Int	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> LI	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW2D	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW2S	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW3	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW4	E601A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	03-Oct-2021	40 days	2 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW3	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	8 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW4	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	8 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW6	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	8 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		
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> LI	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW2D	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> MW2S	E581.VH+F1	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Duplicate	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> GW Int	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> LI	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW2D	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 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	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW2S	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW3	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW4	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW6	E290	23-Sep-2021	----	----	----		25-Sep-2021	14 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE Duplicate	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE GW Int	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE LI	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW2D	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW2S	E100	23-Sep-2021	----	----	----		25-Sep-2021	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	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW3	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW4	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW6	E100	23-Sep-2021	----	----	----		25-Sep-2021	28 days	2 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE MW6	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	43 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW4	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	45 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW3	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	46 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE GW Int	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	48 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE LI	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	48 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW2S	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	49 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		
<b>Physical Tests : pH by Meter</b>											
HDPE Duplicate	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	50 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW2D	E108	23-Sep-2021	----	----	----		25-Sep-2021	0.25 hrs	50 hrs	*	EHTR-FM
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE Duplicate	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE GW Int	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE LI	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW2D	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW2S	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW3	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW4	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 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		
<b>Physical Tests : TSS by Gravimetry</b>											
<b>HDPE</b> MW6	E160-H	23-Sep-2021	----	----	----		30-Sep-2021	7 days	7 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW6	E641A	23-Sep-2021	01-Oct-2021	14 days	7 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Duplicate	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW Int	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> LI	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW2D	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW2S	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW3	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW4	E641A	23-Sep-2021	01-Oct-2021	14 days	8 days	✔	01-Oct-2021	40 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	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW Int	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> LI	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW2D	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW2S	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW3	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW4	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW6	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	



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		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> LI	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW2D	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW2S	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW3	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW4	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW6	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW3	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	8 days		✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW4	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 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		
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW6	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	8 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> LI	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW2D	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW2S	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	14 days	9 days	✔	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Duplicate	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW Int	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> LI	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----		





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	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW2D	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW2S	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW3	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW4	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW6	E611C	23-Sep-2021	02-Oct-2021	----	----		02-Oct-2021	----	----	

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	302535	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	302290	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	304401	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	308453	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	307989	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
pH by Meter	E108	302533	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	302291	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	302292	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	302293	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	306962	1	13	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	308788	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	308789	1	8	12.5	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	302535	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	302290	1	16	6.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	307811	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	304401	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	308453	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	307989	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	307812	1	12	8.3	5.0	✓
pH by Meter	E108	302533	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	302291	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	302292	1	9	11.1	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	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	302293	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	306962	1	13	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	308788	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	308789	1	8	12.5	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	302535	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	302290	1	16	6.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	307811	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	304401	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Conductivity in Water	E100	302534	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	308453	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	307989	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	307812	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	302291	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	302292	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	302293	1	12	8.3	5.0	✓
TSS by Gravimetry	E160-H	306962	1	13	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	308788	1	9	11.1	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	308789	1	8	12.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	302290	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	302539	1	14	7.1	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	304401	2	28	7.1	5.0	✓
Chloride in Water by IC	E235.Cl	302538	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	308453	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	307989	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	302536	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	302540	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	302541	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	302537	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	302291	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	302292	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	302293	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	308788	1	9	11.1	5.0	✓

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 Work Order : VA21C1101  
 Client : Morrison Hershfield Limited  
 Project : 2100168



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							
VOCs (BC List) by Headspace GC-MS	E611C	308789	1	8	12.5	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.
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 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.
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 Vancouver - 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 Vancouver - 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 <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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  Vancouver - 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
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
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 <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 Vancouver - 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 : VA21C1101

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Client : Morrison Hershfield Limited
Contact : Emily Peets
Address : 8001 Hwy 99
Whistler BC Canada V0N 1B8
Telephone : ----
Project : 2100168
PO : 726379
C-O-C number : 20-908442
Sampler : Emily 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 : 24-Sep-2021 10:20
Date Analysis Commenced : 25-Sep-2021
Issue Date : 05-Oct-2021 16:27

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 Angelo Salandanan, Caleb Deroche, Dee Lee, Janice Leung, Kim Jensen, and Lindsay Gung.



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Work Order : VA21C1101  
Client : Morrison Hershfield Limited  
Project : 2100168

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## **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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 302533)</b>											
VA21C0987-001	Anonymous	pH	----	E108	0.10	pH units	8.06	8.06	0.0248%	4%	----
<b>Physical Tests (QC Lot: 302534)</b>											
VA21C0987-001	Anonymous	conductivity	----	E100	2.0	µS/cm	582	581	0.172%	10%	----
<b>Physical Tests (QC Lot: 302535)</b>											
VA21C1074-002	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	71.2	71.5	0.485%	20%	----
<b>Physical Tests (QC Lot: 306962)</b>											
VA21C1101-001	MW2D	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	90.1	93.3	3.49%	20%	----
<b>Anions and Nutrients (QC Lot: 302290)</b>											
VA21C0963-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0109	0.0103	0.0006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302291)</b>											
VA21C1094-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.250	mg/L	16.9	13.5	22.3%	20%	TKND
<b>Anions and Nutrients (QC Lot: 302292)</b>											
VA21C1075-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.106	0.108	0.001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302293)</b>											
VA21C1094-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0025	0.0026	0.00002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302536)</b>											
VA21C0987-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.203	0.198	2.34%	20%	----
<b>Anions and Nutrients (QC Lot: 302537)</b>											
VA21C0987-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.286%	20%	----
<b>Anions and Nutrients (QC Lot: 302538)</b>											
VA21C0987-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.03	2.02	0.01	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302539)</b>											
VA21C0987-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302540)</b>											
VA21C0987-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0054	<0.0050	0.0004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 302541)</b>											
VA21C0987-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 307989)</b>											
VA21C1070-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	0.0161	0.0205	0.0045	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	0.265	0.272	2.41%	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
<b>Dissolved Metals (QC Lot: 307989) - continued</b>											
VA21C1070-001	Anonymous	barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0404	0.0427	5.42%	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	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.050	mg/L	0.113	0.116	0.003	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000250	mg/L	<0.0000250	0.0000261	0.0000011	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.250	mg/L	680	686	0.851%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00050	mg/L	1.60	1.64	2.49%	20%	----
		copper, dissolved	7440-50-8	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.050	mg/L	8.95	9.21	2.81%	20%	----
		lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0084	0.0085	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.500	mg/L	50.5	53.0	4.82%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00050	mg/L	12.1	12.5	3.21%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.0141	0.0141	0.108%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00250	mg/L	0.0115	0.0120	0.00050	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.500	mg/L	8.14	8.48	4.14%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000250	mg/L	0.000439	0.000563	0.000124	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.250	mg/L	15.0	15.7	4.43%	20%	----
		silver, dissolved	7440-22-4	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.250	mg/L	560	585	4.36%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00100	mg/L	3.45	3.47	0.506%	20%	----
		sulfur, dissolved	7704-34-9	E421	2.50	mg/L	1030	1080	4.86%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.00757	0.00744	1.75%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0050	mg/L	<0.0050	<0.0050	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
<b>Dissolved Metals (QC Lot: 307989) - continued</b>											
VA21C1070-001	Anonymous	zirconium, dissolved	7440-67-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 308453)</b>											
VA21C1074-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 304401)</b>											
KS2103016-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	26	30	3	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 304402)</b>											
VA21C1117-001	Anonymous	chemical oxygen demand [COD]	----	E559	20000	mg/L	321000 µg/L	307	4.34%	20%	----
<b>Volatile Organic Compounds (QC Lot: 308789)</b>											
VA21C1101-001	MW2D	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	2.74	2.68	0.06	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	5.0	µg/L	<5.0	<5.0	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	0.60	0.54	0.06	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-	156-59-2	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	1.0	µg/L	<1.0	<1.0	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, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	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
<b>Volatile Organic Compounds (QC Lot: 308789) - continued</b>											
VA21C1101-001	MW2D	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	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 308788)</b>											
VA21C1101-001	MW2D	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

**Qualifiers**

Qualifier	Description
TKND	TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.



## 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
<b>Physical Tests (QCLot: 302534)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 302535)</b>						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	# 6.2	B
<b>Physical Tests (QCLot: 306962)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Anions and Nutrients (QCLot: 302290)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 302291)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 302292)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 302293)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 302536)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 302537)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 302538)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 302539)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 302540)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 302541)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Dissolved Metals (QCLot: 307989)</b>						
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	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 307989) - continued</b>						
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	---
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
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	---
<b>Dissolved Metals (QCLot: 308453)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 304401)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Aggregate Organics (QCLot: 304402)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Volatile Organic Compounds (QCLot: 308789)</b>						
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	5	µg/L	<5.0	---
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-	156-59-2	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	1	µg/L	<1.0	---
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	---
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	0.4	µg/L	<0.40	---





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 308789) - continued</b>						
xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	---
<b>Hydrocarbons (QCLot: 307811)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Hydrocarbons (QCLot: 308788)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 307812)</b>						
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	91-22-5	E641A	0.05	µg/L	<0.050	---

**Qualifiers**

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



## 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	
<b>Physical Tests (QCLot: 302533)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 302534)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.3	90.0	110	----
<b>Physical Tests (QCLot: 302535)</b>									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
<b>Physical Tests (QCLot: 306962)</b>									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	91.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 302290)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 302291)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 302292)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 302293)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	98.3	80.0	120	----
<b>Anions and Nutrients (QCLot: 302536)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	90.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 302537)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 302538)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 302539)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 302540)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 302541)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.7	90.0	110	----
<b>Dissolved Metals (QCLot: 307989)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	93.4	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.8	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	93.5	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	96.3	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
<b>Dissolved Metals (QCLot: 307989) - continued</b>									
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.8	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.3	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	90.7	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.8	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	96.5	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.6	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.2	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.5	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	94.8	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	96.8	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.2	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	93.4	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	90.5	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	95.7	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.2	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.0	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.4	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	95.5	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	100	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.5	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	92.3	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.8	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	94.4	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.5	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	96.4	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	93.8	80.0	120	----
<b>Aggregate Organics (QCLot: 304401)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Aggregate Organics (QCLot: 304401) - continued</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	102	85.0	115	----
<b>Aggregate Organics (QCLot: 304402)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	104	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 308789)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	83.6	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	97.5	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	127	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	91.8	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	96.6	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	89.0	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	92.1	70.0	130	----
chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	92.1	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	111	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	89.7	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	87.3	70.0	130	----
dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	90.0	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	83.3	70.0	130	----
dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	84.0	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	90.9	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	84.7	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	91.6	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	92.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	95.6	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	128	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	86.0	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	101	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	88.7	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	92.9	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	83.6	60.0	140	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 308789) - continued</b>									
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	87.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	91.9	70.0	130	----
xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	93.6	70.0	130	----
<b>Hydrocarbons (QCLot: 307811)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	95.4	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	95.5	70.0	130	----
<b>Hydrocarbons (QCLot: 308788)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	100	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 307812)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	129	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	94.0	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	116	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	113	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	104	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	99.2	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	118	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	114	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  $\geq 1 \times$  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
<b>Anions and Nutrients (QCLot: 302290)</b>										
VA21C0963-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0979 mg/L	0.1 mg/L	97.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 302291)</b>										
VA21C1094-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	MS-B
<b>Anions and Nutrients (QCLot: 302292)</b>										
VA21C1101-001	MW2D	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 302293)</b>										
VA21C1094-002	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0480 mg/L	0.05 mg/L	95.9	70.0	130	----
<b>Anions and Nutrients (QCLot: 302536)</b>										
VA21C1100-001	Anonymous	fluoride	16984-48-8	E235.F	0.987 mg/L	1 mg/L	98.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 302537)</b>										
VA21C1074-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 302538)</b>										
VA21C1074-001	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 302539)</b>										
VA21C1100-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 302540)</b>										
VA21C1074-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 302541)</b>										
VA21C1074-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.486 mg/L	0.5 mg/L	97.1	75.0	125	----
<b>Dissolved Metals (QCLot: 307989)</b>										
VA21C1070-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.960 mg/L	1 mg/L	96.0	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0936 mg/L	0.1 mg/L	93.6	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0966 mg/L	0.1 mg/L	96.6	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.194 mg/L	0.2 mg/L	96.8	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0450 mg/L	0.05 mg/L	89.9	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.478 mg/L	0.5 mg/L	95.7	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0191 mg/L	0.02 mg/L	95.6	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
<b>Dissolved Metals (QCLot: 307989) - continued</b>										
VA21C1070-002	Anonymous	calcium, dissolved	7440-70-2	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0475 mg/L	0.05 mg/L	95.1	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0921 mg/L	0.1 mg/L	92.1	70.0	130	----
		iron, dissolved	7439-89-6	E421	9.49 mg/L	10 mg/L	94.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0929 mg/L	0.1 mg/L	92.9	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.480 mg/L	0.5 mg/L	96.1	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.184 mg/L	0.2 mg/L	91.9	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	49.7 mg/L	50 mg/L	99.4	70.0	130	----
		potassium, dissolved	7440-09-7	E421	19.2 mg/L	20 mg/L	95.8	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0943 mg/L	0.1 mg/L	94.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.184 mg/L	0.2 mg/L	92.1	70.0	130	----
		silicon, dissolved	7440-21-3	E421	46.7 mg/L	50 mg/L	93.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	100 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.192 mg/L	0.2 mg/L	96.2	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0970 mg/L	0.1 mg/L	97.0	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.196 mg/L	0.2 mg/L	97.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0967 mg/L	0.1 mg/L	96.7	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.494 mg/L	0.5 mg/L	98.8	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.88 mg/L	2 mg/L	94.2	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.206 mg/L	0.2 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 308453)</b>										
VA21C1074-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000974 mg/L	0.0001 mg/L	97.4	70.0	130	----
<b>Aggregate Organics (QCLot: 304401)</b>										
KS2103016-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Aggregate Organics (QCLot: 304402)</b>										





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
<b>Aggregate Organics (QCLot: 304402) - continued</b>										
VA21C1101-008	LI	chemical oxygen demand [COD]	----	E559	111 mg/L	100 mg/L	111	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 308789)</b>										
VA21C1101-001	MW2D	benzene	71-43-2	E611C	95.9 µg/L	100 µg/L	95.9	60.0	140	----
		bromodichloromethane	75-27-4	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		bromoform	75-25-2	E611C	133 µg/L	100 µg/L	133	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		chlorobenzene	108-90-7	E611C	94.9 µg/L	100 µg/L	94.9	60.0	140	----
		chloroethane	75-00-3	E611C	101 µg/L	100 µg/L	101	50.0	150	----
		chloroform	67-66-3	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		chloromethane	74-87-3	E611C	106 µg/L	100 µg/L	106	50.0	150	----
		dibromochloromethane	124-48-1	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	122 µg/L	100 µg/L	122	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-2	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	97.5 µg/L	100 µg/L	97.5	60.0	140	----
		dichloromethane	75-09-2	E611C	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	95.5 µg/L	100 µg/L	95.5	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		ethylbenzene	100-41-4	E611C	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	122 µg/L	100 µg/L	122	60.0	140	----
		styrene	100-42-5	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	133 µg/L	100 µg/L	133	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	87.4 µg/L	100 µg/L	87.4	60.0	140	----
		toluene	108-88-3	E611C	101 µg/L	100 µg/L	101	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	106 µg/L	100 µg/L	106	60.0	140	----
		trichloroethylene	79-01-6	E611C	90.0 µg/L	100 µg/L	90.0	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	98.6 µg/L	100 µg/L	98.6	50.0	150	----
		vinyl chloride	75-01-4	E611C	100.0 µg/L	100 µg/L	100.0	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	185 µg/L	200 µg/L	92.5	60.0	140	----





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>
<b>Volatile Organic Compounds (QCLot: 308789) - continued</b>										
VA21C1101-001	MW2D	xylylene, o-	95-47-6	E611C	92.7 µg/L	100 µg/L	92.7	60.0	140	----
<b>Hydrocarbons (QCLot: 308788)</b>										
VA21C1101-002	MW2S	VHw (C6-C10)	----	E581.VH+F1	5500 µg/L	6310 µg/L	87.1	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.



www.alsglobal.com

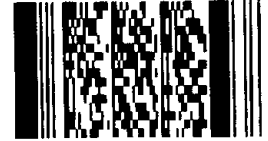
Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 908442

Page of

Environmental Division
Vancouver
Work Order Reference
VA21C1101



Telephone: +1 604 253 4188

Report To: Morrison Hershfield Ltd.
Contact: Josie Gilson
Phone: 778 837 9801
Street: 310-4321 Still Creek Dr
City/Province: Burnaby, BC
Postal Code: V5C 6S7

Invoice To: Same as Report To
Company: Resort Municipality of Whistler
Contact: Andrew Tucker

ALS Account #: 2100168
Job #: 726379
ALS Lab Work Order #: C101
ALS Contact: Carla F.
Sampler: Emily Peets

Table with columns: ALS Sample #, Sample Identification and/or Coordinates, Date, Time, Sample Type, and various chemical analysis categories (Metals, Parameters, etc.).

Drinking Water (DW) Samples (client use)
Notes / Specify Limits for result evaluation by selecting from drop-down below
3 coolers

SHIPMENT RELEASE (client use)
INITIAL SHIPMENT RECEPTION (ALS use only)
FINAL SHIPMENT RECEPTION (ALS use only)

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

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Sample ID	SFC-2B				SFC-2				SFC-3				SFC-4B				SFC-11			
Date Sampled	24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21	
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Analyte	Units																			
<b>Field Parameters</b>																				
Field Conductivity	uS/cm	339.3	147.3	873.0		324.7	248.1	370.7		218.6	102.3	180.5		190.5	131.7	260.4		79.2	37.1	107.8
Temperature	C	4.6	10.7	11.0		6.3	8.7	10.7		4.4	7.3	9.1		3.9	8.8	9.9		4.4	6.8	8.1
pH	-	5.92	4.43	3.38		6.32	6.40	6.55		6.90	7.00	6.80		7.23	7.36	7.32		7.07	6.77	6.60
Dissolved Oxygen	mg/L	3.22	5.89	2.36		6.33	7.92	3.97		12.88	11.84	9.18		9.74	11.37	8.84		12.85	11.56	9.25
Oxidation Reduction Potential	mV	180.9	90.0	113.4		160.4	67.6	19.0		68.5	131.6	73.5		129.5	103.6	68.1		40.7	120.2	58.7

Sample ID	Leachate Manhole				GW Interceptor			
Date Sampled	24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21	
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Analyte	Units							
<b>Field Parameters</b>								
Field Conductivity	uS/cm	212.9	-	722.0	-	815.0	546.0	774.0
Temperature	C	4.6	-	12.1	-	6.9	8.7	9.2
pH	-	5.9	-	6.34	-	6.61	6.42	6.20
Dissolved Oxygen	mg/L	5.5	-	3.86	-	1.65	0.66	0.93
Oxidation Reduction Potential	mV	104.9	-	36.6	-	117.7	61.1	50.4

Sample ID	MW-2D				MW-2S				MW-3				MW-4				MW-6			
Date Sampled	24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21		24-Mar-21	16-Jun-21	23-Sep-21	
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Analyte	Units																			
<b>Field Parameters</b>																				
Field Conductivity	uS/cm	890.0	730.0	1155.0		419.7	271.0	440.4		178.6	115.1	152.9		509	323.8	339.8		745.0	474.8	511.5
Temperature	C	7.2	8.4	8.3		6.9	8.1	8.5		6.9	9.4	9.8		7.6	8.5	8.8		7.1	9.2	11.4
pH	-	6.51	6.8	6.51		7.03	6.86	6.64		6.12	5.41	5.76		6.46	6.84	6.67		6.17	6.55	6.50
Dissolved Oxygen	mg/L	-0.47	3.22	2.13		1.49	1.3	1.3		-	1.87	0.82		-	1.02	2.21		8.33	4.52	3.37
Oxidation Reduction Potential	mV	62.8	101.6	104.2		111.2	120.4	23.4		102.7	153.6	222.8		33.1	116.7	121.9		133.8	131.7	112.3

Well ID	Ground Surface Elevation	Top of Well Riser Elevation	Date	Depth to Water	Static Water Level	Date	Depth to Water	Static Water Level	Date	Depth to Water	Static Water Level	Date	Depth to Water	Static Water Level
	mASML	mASML			Elevation mASL			Elevation mASL			Elevation mASL			Elevation mASL
MW2S	603.84	604.94	24-Mar-21	5.67	599.27	16-Jun-21	6.31	598.63	23-Sep-21	6.51	598.43		6.04	604.94
MW2D	603.84	604.9		5.71	599.19		6.37	598.53		6.54	598.36		6.04	604.90
MW3	600.61	601.47		1.38	600.09		1.55	599.92		1.69	599.78		6.01	601.47
MW4	596.54	677.54		3.98	673.56		3.85	673.69		4.21	673.33		6.77	677.54
MW6	610.88	610.88		4.33	606.55		4.51	606.37		5.74	605.14		6.10	610.88

## APPENDIX C: Letter of Competency & Conflict of Interest Disclosure

## Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals<sup>1</sup>, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Josephine Gilson  
Title Registered Biologist Technician
2. Are you a registered member of a professional association in B.C.?  Yes  No  
Name of Association: College of Applied Biology Registration # 46
3. Brief description of professional services:  
Provided direction, oversight and final review of the field programs, data analysis and reporting.

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

## Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:   
**X** \_\_\_\_\_

Print Name: Josephine Gilson

Witnessed by:   
**X** \_\_\_\_\_

Print Name: Emily Rogal

Date signed: March 11, 2022

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

## Conflict of Interest Disclosure Statement

A qualified professional <sup>1</sup> providing services to either the Ministry of Environment and Climate Change Strategy (“ministry”), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

- a) an ownership interest in the regulated person’s business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

### Declaration

I Josephine Gilson, as a member of the College of Applied Biology  
declare

#### **Select one of the following:**

Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Landfill Closure Annual Monitoring & Reporting.

I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Ian McKeachie at the Resort Municipality of Whistler, erring on the side of caution.

Real or perceived conflict of interest

Description and nature of conflict(s):

---

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I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

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---

---

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:



X

Print name: Josephine Gilson

Date: March 11, 2022

Witnessed by:



X

Print name: Emily Rogal

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.