Wetland 06 Water Monitoring Report – Southwest Calgary Ring Road Project Calgary, Alberta

Prepared for:

KGL Constructors
18 Seven Chiefs Road SW
Calgary, AB T2W 3C4

Project No. 102604-01

Prepared by:

Ausenco Sustainability ULC
401 – 9 Avenue SW, Suite 1430
Calgary, AB T2P 3C5
T: 403.264.0671
F: 403.264.0670
Ausenco.com

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List of Acronyms and Abbreviations

Acronym / Abbreviation	Definition
the Approval	*Water Act* Approval No.: 00388473-00-00
Ausenco	Ausenco Sustainability ULC
BOD	Biochemical Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
DO	Dissolved Oxygen
ESC	Erosion and Sediment Control
GOA	Government of Alberta
GPS	Global Positioning System
Hemmera	Hemmera Envirochem Inc.
KGL	KGL Constructors
Monitoring Plan	Long-Term Monitoring Plan
the Order	Ministerial Order 06/2018
the Project	Southwest Calgary Ring Road Project
QEP	Qualified Environmental Professional
SCC	Standards Council of Canada
SWCRR	Southwest Calgary Ring Road
TUC	Transportation Utility Corridor
TSS	Total Suspended Solids
WAIR	Wetland Assessment and Impact Report

List of Symbols and Units of Measure

Symbol / Unit of Measure	Definition
km	Kilometre
m	Metre
mg/L	Milligrams per litre
µg/L	Microgram per litre
m/sec	Metres per second
m^3/sec	Metres cubed per second

1.0 Project Background

Wetland 06 is an historic oxbow of the Elbow River located in the Weaselhead Natural Area, a natural environmental park that borders the west end of Glenmore Reservoir (**Figure 1**) within the City of Calgary. A small portion of Wetland 06 intersects the Transportation Utility Corridor (TUC) running north-south through the Weaselhead Natural Area. Wetland 06 is oriented along an east-west axis and is approximately 500 metres (m) long with wetted widths generally less than 30 m. Wetland 06 collects surface water from several other upslope wetlands, namely Wetland 07, 08 and 09 (**Figure 1**), and drains generally east through the Weaselhead Natural Area, eventually discharging to the Glenmore Reservoir, which provides approximately half of the City of Calgary's drinking water supply.

The TUC intersecting the western portion of Wetland 06 was incorporated into the proposed design of the Southwest Calgary Ring Road (SWCRR) Project (the Project). The SWCRR Project was awarded by Alberta Transportation to Mountain View Partnership, which in turn engaged KGL Constructors (KGL) to develop the Project. The scope of the Project encompassed the design and construction of approximately 31 kilometres (km) of new six and eight lane divided freeway, 14 interchanges, as well as three watercourse realignments and associated crossing structures. The Project corridor is located along the western limit of the City of Calgary south of Highway 8 and includes sections of Highways 8 and 22.

On August 11, 2017, the Project received *Water Act* Approval No.: 00388473-00-00 (the Approval) to impact twenty-four wetlands, including Wetland 06. Subsequently, an Environmental Appeal was filed (*Brockman and Tulick v. Director, South Saskatchewan Region, AEP*; Appeal No.: 17-047 and 17-050-R. 2017) affecting KGL's ability to impact the wetlands, as described in the Approval.

As a result of the Environmental Appeal, the Minister of Environment and Parks issued Ministerial Order 06/2018 (the Order), on January 29, 2018. The Order amended the previously received Approval to include additional conditions to address water quality and quantity impacts to Wetland 06. In June 2018, the Director of Alberta Environment and Parks approved a Long-Term Monitoring Plan (Monitoring Plan) developed by Hemmera Envirochem (Hemmera) on behalf of KGL to fulfil requirements of the Order (see conditions 6.2 and 6.6).

The Monitoring Plan (Hemmera 2018) outlined the following obligations:

- The Monitoring Plan comes into effect as soon as approved by the Director and shall remain in effect for a period of five years after the road is officially opened to the public.
- Monitoring of the flow of water into Wetland 06 shall occur in the spring and fall of each year that the plan is in effect.
- Monitoring of water quality in Wetland 06 shall occur in the spring and fall of each year that the plan is in effect, including total dissolved solids, salts, dissolved metals, and other parameters consistent with a stormwater sampling program.
- The monitoring data shall be provided to the Director within one month from the date the data were collected.
- The results of the monitoring and analysis of the monitoring shall be provided to the Director in an annual report by March 31 of the year following the calendar year in which the data were collected.

2.0 Introduction

This monitoring report has been prepared by Ausenco Sustainability ULC (Ausenco, formerly Hemmera) on behalf of KGL. The Monitoring Plan was initially implemented in 2018 during construction. The construction phase was completed in October 2020 initiating the operational phase. Monitoring in 2024 represented Year 7 of the Monitoring Plan, and four years after the SWCRR was opened to the public. The Monitoring Plan is provided in **Appendix A**. The Monitoring Plan initially established eight sampling locations, including one reference site outside of the potential impact area of construction to determine naturally occurring variation affecting wetlands in the Weaselhead Natural Area. The overall number of sampling sites has changed over time in response to conditions encountered over the course of the Project. Monitoring efforts to date are summarised in **Table 2.a**.

Table 2.a Summary of Water Quality Monitoring Conducted at Wetland 06

Date	Monitoring Year	Events	Changes to Monitoring Program	Monitoring Stations
2018	1	Construction phase. Monitoring plan implemented.	-	8
2019	2	Construction phase. Two sediment release events in August. AEP issued Enforcement Order[1]. Hemmera prepared Wetland 06 Sediment Release Remediation Memorandum recommending additional monitoring (Hemmera 2019).	Site WQ-05c removed (encompassed by active construction area).	7
2020	3	Construction completed in October; operational phase begins. Fall sampling documented elevated zinc concentration along Pathway 1.	Two monitoring sites added in western portion of Wetland 06. Sediment sampling initiated at monitoring sites along Pathway 1. Supplemental sampling conducted in late fall Two monitoring sites established along Pathway 1 in response to elevated zinc concentrations.	9 (spring) 11 (fall)
2021	4	Operational phase. Sediment release following significant rain event (24.6 mm on July 2, 12.5 mm on July 4). Fall sampling documented elevated zinc concentration along Pathway 1.	Wetland Assessment and Impact Report (WAIR) submitted to AEP in response to sediment release. WAIR proposed that monitoring per the 2020 Enforcement Order be continued in 2021 through 2023.	11
2022	5	Operational phase.	-	11
2023	6	Operational phase.	Final year of additional monitoring per the Enforcement Order.	11
2024	7	Operational phase.	-	11

[1] Requirements under the Enforcement Order included monitoring of water quality, vegetation regeneration, weed growth and local amphibian populations. Monitoring was implemented in 2021 with results provided under separate cover in a Monitoring Report following two years of growing seasons, and a Verification Report following three years of growing seasons as conditioned in the Order.

The objective of Year 7 monitoring was to follow monitoring protocols established during Year 1 and collect surface water quality and surface water flow measurements from sample sites located within Wetland 06 as well as other waterbodies/drainages providing surface flow to Wetland 06. Consistent with previous monitoring, surface water quality and surface water flow were also monitored in a nearby reference wetland, located outside the potential impact area of construction and operations to capture naturally occurring variations affecting wetlands in the Weaselhead Natural Area.

Information collected during Year 7 monitoring will facilitate comparative analysis with data collected during previous monitoring years to assess potential influences or lack thereof of the Project on surface water quality and flow in Wetland 06. Additionally, Year 7 information will contribute to future data collected by Ausenco facilitating long term analysis of potential Project influences on surface water quality and flow in Wetland 06.

3.0 Site Description

Several adjacent wetlands within the Weaselhead Natural Area contribute surface flow to Wetland 06 (see **Figure 1**). The Monitoring Plan identified two pathways through which Project-influenced water could flow into Wetland 06.

Pathway 1 – An undefined drainage channel conveys flow from Wetland 08 and Wetland 07 diagonally across the Project footprint and northeast toward Wetland 06. The channel becomes defined downstream from the TUC and drains into Wetland 06 over a distance of approximately 400 m.

Pathway 2 – An undefined channel flows east through Wetland 09 and connects to a bypass drainage system installed as part of the Project to maintain flow from Wetland 09 to Wetland 06. The drainage system outlets to a riprap-lined constructed ditch which flows north towards the TUC boundary. From the northern edge of the TUC, a defined channel meanders north for approximately 1,000 m, draining to Wetland 06.

During the construction phase of the Project, surface run-off from the work area was managed through temporary erosion and sediment control (ESC) measures and directed away from Wetland 06 to protect water quality. The construction phase was completed in October 2020 initiating the operational phase. During the operational phase of the Project, the natural flow of surface water from the west side of the TUC into Wetland 06 is being maintained via the bypass drainage systems described above. The Project has been designed such that runoff from the road surfaces within the TUC is directed northwest into a stormwater pond and does not discharge into Wetland 06.

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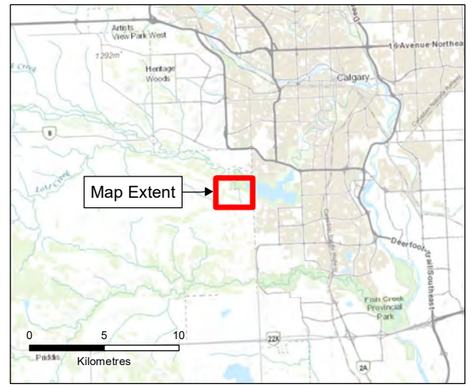
Wetland Locations



Elbow River
Reference Wetland
Wetland 06
Wetland 07
Wetland 08
Wetland 09
Watercourse 01
Glenmore Reservoir
WEASELHEAD NATURAL AREA
CITY OF CALGARY BOUNDARY
TRANSPORTATION AND UTILITY CORRIDOR (TUC)
WEASELHEAD RD

Legend

- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow (Decommissioned)
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Watercourse
- Wetland

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a “stand-alone” document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Aerial Image: City of Calgary, 2020
- Inset Basemap: ESRI World Topographic Map

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102604-01	Production Date: Mar 25, 2024	Figure 1

Ausenco KGL

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4.0 Methods

Year 7 monitoring visits were conducted by a two-person crew, led by a Qualified Environmental Professional (QEP) from Ausenco. As per the Monitoring Plan (**Appendix A**), site visits were conducted during the spring and the fall to capture seasonal variability of the wetlands. The timing of each site visit was influenced by environmental conditions, including ambient air temperatures, snow/ice cover, and precipitation events. No sampling was conducted within 72 hours of a substantial precipitation event. Site visits were completed on the following dates:

- Spring – May 22, 2024
- Fall – October 29 and November 6, 2024.

4.1 Sample Locations

The original locations for surface water quality and flow monitoring established by the Monitoring Program are provided in **Figure 2**. Sites were strategically selected in 2018 (i.e., Year 1 of monitoring). Sampling locations have been adjusted over the course of the monitoring program according to the events outlined in **Table 2.a** and summarized here**:**

- In 2019, sample site WQ-05c along Pathway 2 was encompassed by active construction and surface water was no longer accessible for sampling. WQ-05c was eliminated from the monitoring plan and no new sampling points were added as sample site WQ-05b was located downstream and would reflect relevant water quality and flow changes along Pathway 2.
- Four sample sites were added to the Monitoring Plan in 2020 to facilitate additional data collection. Two sites were established at the west end of Wetland 06 (WQ-06 and WQ-07) in response to turbidity releases from the project area, and two sites were established along Pathway 1 (WQ-04c and WQ-04d) to provide additional data resolution following elevated zinc concentrations documented during fall sampling.

Locations sampled during the 2024 Year 7 program are illustrated in **Figure 3** and listed in **Table 4.a**.

4.1.1 Water Quality Monitoring

A total of eleven surface water quality monitoring sites were sampled during Year 7 (**Table 4.a**, **Figure 3**), including seven surface water quality monitoring sites originally established during Year 1 (i.e., 2018) and four additional surface water quality monitoring sites established during Year 3 (i.e., 2020).

One surface water quality reference site (WQ-01) is located north of Wetland 06, in an adjacent wetland outside the TUC. There are no identified pathways that could direct Project-affected water to this location.

Three surface water quality monitoring sites (WQ-04a, WQ-04b, and WQ-02) were originally established along Pathway 1 from Wetland 08 and Wetland 07 into Wetland 06. Site WQ-04a is located upstream of any potential Project influences and was selected to represent background conditions along Pathway 1. In late fall of 2020, following repeated instances of elevated zinc concentrations detected along Pathway 1, two supplementary surface water quality sample sites (WQ-04d and WQ-04c) were added within the channel flowing from Wetland 7 to Wetland 6. The WQ-04d sample point is located at 11U 699123, 5652000 UTM and the WQ-04c sample point is located at 11U 699129, 5652100 UTM. These sites were sampled once during Year 3 monitoring, and during all sampling events in Years 4 through 7.

Three surface water quality monitoring sites (WQ-05a, WQ-05b and WQ-03) are located along Pathway 2 from Wetland 09 to Wetland 06. Site WQ-05a is upstream of any potential influences from the Project and was selected to represent background conditions along Pathway 2. Station WQ-05c was also part of the original Monitoring Program along Pathway 2 but was eliminated in 2019 as it was no longer accessible for sampling.

Following the recommendations of the 2019 Wetland 06 Sediment Release Remediation Memorandum (Hemmera 2020), two sample sites (i.e., WQ-06 and WQ-07) were added along a vegetated bank on the west side of Wetland 06. The WQ-06 sample point is located at 11U 699028E, 5652251 N UTM and the WQ-07 sample point is located at 11U 699027, 5652284 UTM.

4.1.2 Sediment Sampling

Sediment sampling for Year 7 was conducted in spring and fall at seven of the monitoring sites (**Table 4.a**). Sediment sampling was initiated in Year 3 following repeated instances of elevated zinc concentrations detected along Pathway 1 in Fall 2020. Sediment sample sites were co-located with the surface water quality monitoring sites along Pathway 1 (**Figure 3**).

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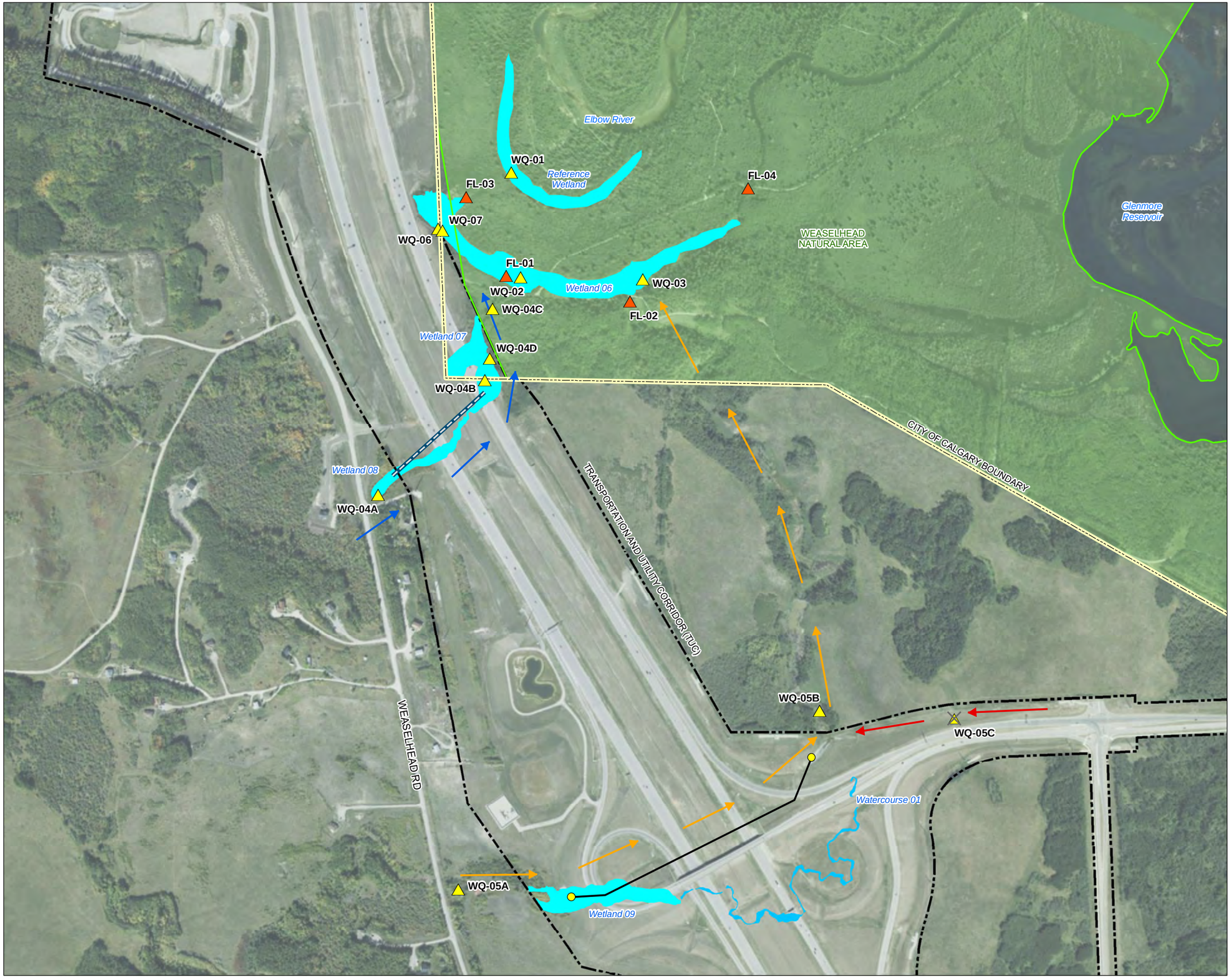
Water Flow and Quality Sampling Locations



Legend

- Water Flow Sample Location (Hemmera, 2020)
- Water Quality Sample Location (Hemmera, 2020)
- Decommissioned Water Quality Location (Hemmera, 2019)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow (Decommissioned)
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Watercourse
- Wetland

Notes

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Sources

- Contains information licensed under the Open Government Licence: Alberta
- Aerial Image: City of Calgary, 2020

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Wetland 06 Water Monitoring Report
Southwest Calgary Ring Road Project, Calgary AB

Water Flow and Quality Sampling Location Details

Legend

- Water Flow Sample Location (Hemmera, 2020)
- Water Quality Sample Location (Hemmera, 2020)
- Transect Location (Hemmera, 2019)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Wetland

Notes

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Sources

- Contains information licensed under the Open Government Licence: Government of Alberta
- Aerial Image: ESRI World Imagery, 2016

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102604-01	Production Date: Mar 25, 2024	Figure 3

Ausenco KGL

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Table 4.a Year 7 (i.e., 2024) Sample Locations

Site Name	Universal Transverse Mercator (Zone 11U)		Site Description	Site Type[1]	Sampling Component	
	Easting	Northing			In-situ and Analytical Water Quality	Sediment Sampling
WQ-01	699168	5652375	Reference wetland to the north of Wetland 06	Reference	X	-
WQ-02	699186	5652164	West (upslope) side of Wetland 06	Comparison	X	X
WQ-03	699432	5652159	East (downslope) side of Wetland 06	Comparison	X	X
WQ-04a	698898	5651725	Wetland 08, upslope of SWCRR Project	Background	X	X
WQ-04b	699113	5651956	Wetland 07, downslope of SWCRR Project and Wetland 08	Comparison	X	X
WQ-04c[2]	699129	5652100	Wetland 07, downslope of SWCRR Project and WQ-04b	Comparison	X	X
WQ-04d[2]	699123	5652000	Wetland 07, downslope of SWCRR Project and WQ-04b	Comparison	X	X
WQ-05a	699060	5650929	Upslope of Wetland 09 and SWCRR Project	Background	X	-
WQ-05b	699788	5651289	Watercourse 01 downslope of Wetland 09 and SWCRR Project	Comparison	X	-
WQ-06[3]	699028	5652251	Northwest (upslope) side of Wetland 06 down gradient of the Green Wall	Comparison	X	X
WQ-07[3]	699027	5652284	Northwest (upslope) side of Wetland 06 down gradient of the Green Wall	Comparison	X	-
WQ-05c	700061	5651274	WQ-05c was no longer accessible for sampling and eliminated from the monitoring plan in 2019	Comparison	N/A	N/A

Notes:

[1] The reference site is an adjacent wetland outside the TUC with no identified pathways that could direct Project-affected water into the wetland. Background sites are located upstream of the Project. Comparison sites are located downstream of potential Project-affected water.

[2] WQ-04c and WQ-04d were added in fall 2020 following repeated exceedances of zinc concentrations detected along Pathway 1.

[3] WQ-06 and WQ-07 were added in spring 2020 following the recommendations of the 2019 Wetland 06 Sediment Release Remediation Report (Hemmera 2019).

4.1.3 Water Flow Monitoring and Wetted Widths

A total of four surface water flow monitoring sites have been established within Wetland 06 (**Table 4.b, Figure 3**). Flow monitoring has been conducted at these locations during each sampling event throughout the program. Sampling locations were selected based on the expectation they would convey surface flow (inflow or outflow) year-round during normal surface flow conditions. Locations with defined channels were selected for monitoring to optimize the accuracy of flow measurements. Three of the sampling locations were identified to measure surface water inflows into Wetland 06:

- Site FL-01 along Pathway 1 to capture inflow coming from Wetland 07 and 08.
- Site FL-02 along Pathway 2 to capture inflow coming from Wetland 09.
- Site FL-03 along the drainage pathway from the reference wetland to Wetland 06.

Site FL-04 was established 75 m downstream of Wetland 06 at the Glenmore Pathway bridge crossing to capture outflow from Wetland 06.

Wetted width transect locations were established during Year 1 (i.e., 2018) (**Figure 3**). The location of each transect was recorded in reference to distinct local landmarks and using a global positioning system (GPS) device.

Table 4.b Surface Water Flow Sample Locations

Site Name	Universal Transverse Mercator (Zone 11U)		Inflow or Outflow
	Easting	Northing	
FL-01	699156	5652166	Inflow
FL-02	699406	5652115	Inflow
FL-03	699075	5652326	Inflow
FL-04	699644	5652343	Outflow

4.2 Water Quality Monitoring

Surface water quality sampling was conducted at of the sample sites provided in **Table 4.a** and described in **Section 4.1.1**. Weather conditions were recorded, and photos documenting current conditions were taken at each location during each sampling visit.

Sampling was conducted following the Canadian Council of Ministers of Environment shore sampling protocol (CCME 2011). The crew wore unpowdered nitrile disposable gloves during sample collection. At each sample site, the crew worked from the bank and collected water samples using an extension pole to avoid site disturbance. To minimize the risk of contamination between sites, the extension pole and clamp were rinsed upon arrival at each site before samples were collected. The field crew followed laboratory protocols for sample bottle rinsing; all rinsing of bottles or collection equipment was conducted slightly downslope of the sample site to prevent cross contamination.

Water samples were collected at approximately 60% depth if site conditions allowed and facing upstream if flow was present. During fall sampling several of the sample sites were extremely shallow (i.e., less than 0.10 m of water present), and samples comprised the entire water depth. Algae, sediment, organic matter, scum, and film were avoided to prevent contamination and ensure the sample was representative. Water samples were collected one at a time, capped immediately to prevent contamination and labelled with a water-proof marker. After collection, samples were placed in a cooler with ice packs and kept at approximately 4°C until delivery to the laboratory. Before transport from site, all samples were packed and sealed to prevent spillage and breakage. Samples were delivered to the laboratory within the same day as collection to allow analysis within appropriate holding times.

Bureau Veritas, a laboratory certified by the Standard Council of Canada (SCC), completed the analysis of water samples. A chain of custody form was completed, indicating the transfer of custody from the authorized crew member to the accredited laboratory.

Water quality parameters with a holding time of less than 7-days (i.e., biological oxygen demand, nitrate, nitrite, sulfate, total dissolved solids, and total suspended solids) were immediately analyzed in all samples. Samples collected from the reference wetland (WQ-01) and Wetland 06 (WQ-02, WQ-03, WQ-06 and WQ-07) were immediately analysed for the parameters listed in **Table 4.c**. These parameters are reflective of the City of Calgary Stormwater Management and Design Manual (2011) and likely to facilitate the detection of any potential impacts of the construction and operation phases of the Project. The remaining samples (WQ-04a, WQ-04b, WQ-04c, WQ-04d, WQ-05a, and WQ-05b) were held by the laboratory and tested if exceedances of water quality parameters under the Environmental Quality Guidelines for Alberta Surface Water were detected in Wetland 06 samples (GOA; Government of Alberta 2018). This testing protocol facilitated the potential determination of source pathway of water quality exceedances in Wetland 06.

In-situ measurements of turbidity and physical parameters (*i.e.*, specific conductivity, dissolved oxygen, pH, and water temperature) were also collected at all water quality sample sites. Measurements were taken at approximately 60% water depth using a calibrated Aquatroll 600.

Year 7 water quality parameters were compared to data collected in previous monitoring years. Surface water quality data collected from proximate sites in Wetland 06 in 2016 and 2017 by the Weaselhead / Glenmore Preservation Society and presented in their 2017 Environmental Monitoring Report (Porto 2018) was also compared to select parameters from sampling sites within Wetland 06.

Table 4.c Water Quality Parameters

Sediment and Physical	
• Total Suspended Solids (TSS) • Total Dissolved Solids (TDS) • Turbidity	• Specific conductivity (EC) • pH • Dissolved Oxygen (DO)
Nutrients and Others (mg/L)	
• Biochemical Oxygen Demand (BOD) • Chemical Oxygen Demand (COD) • Nitrate (NO_3) • Nitrite (NO_2)	• Total Kjelahl Nitrogen (TKN) • Ammonia-Nitrogen (NH_3-N) • Total Phosphorus (TP) • Dissolved Reactive Phosphorus (TDP) • Ortho-Phosphate
Metals (mg/L)	
• Silver (Ag) • Aluminum (Al) • Arsenic (As) • Boron (B) • Barium (Ba) • Beryllium (Be) • Calcium (Ca) • Cadmium (Cd)	• Cobalt (Co) • Chromium (Cr) • Copper (Cu • Iron (Fe) • Potassium (K) • Lithium (Li) • Magnesium (Mg) • Manganese (Mn)	• Molybdenum (Mo) • Nickel (Ni) • Lead (Pb) • Sulfur (S) • Antimony (Sb) • Selenium (Se) • Silicon (Si)	• Tin (Sn) • Strontium (Sr) • Sodium (Na) • Titanium (Ti) • Thallium (Tl) • Uranium (U) • Vanadium (V) • Zinc (Zn)
Major Ions and Salts	
• Sodium (Na^{2+}) • Potassium (K^{+}) • Potassium (K^{+})	• Calcium (Ca^{2+}) • Chloride (Cl^{-}) • Sulfate (SO^{4-})

4.3 Sediment Sampling

During spring and fall sampling, sediment samples were collected from the water-sediment interface at the seven sites along Pathway 1 provided in **Table 4.a** and described in **Section 4.1.2**. Site conditions (e.g., water levels) were recorded, and photos documenting current conditions were taken at each location.

Sampling was conducted according to contaminated sediment sampling guidance provided by CCME (1993). Sediment samples were collected in a downstream to upstream direction to reduce alteration of site conditions prior to sample collection. The crew wore unpowdered nitrile disposable gloves during sample collection. A stainless-steel trowel and bowl were used for sample collection. Sampling tools were cleaned with Alconox and rinsed with metal free deionized water between each site to prevent cross-contamination; all rinsing of collection equipment was conducted downslope and away from the shoreline of the sample site.

The collected sediment was mixed until homogenous, and algae, woody debris, organic matter, and rocks were removed. Sediment samples were collected one at a time, capped immediately to prevent contamination, and labelled with a water-proof marker. Collected samples were stored in a cooler with ice packs and kept at approximately 4°C until they could be delivered to the laboratory. Before transport from site, all samples were packed and sealed to prevent spillage and breakage. Samples were collected and delivered to a laboratory within the same day to allow sample analysis within appropriate holding times.

Bureau Veritas, a laboratory certified by SCC, completed the analysis of sediment samples. A chain of custody form was completed, indicating the transfer of custody from the authorized crew member to the laboratory. Sediment monitoring parameters are presented in **Table 4.d**.

Table 4.d Sediment Parameters

Field Parameter			
• Percent saturation			
Inorganics			
• Boron Sat Paste (mg/L)		• Moisture (%)	
Metals (mg/kg)			
• Arsenic (As) • Boron (B) • Barium (Ba) • Beryllium (Be) • Cadmium (Cd) • Cobalt (Co)	• Chromium (Cr) • Chromium, hexavalent • Copper (Cu) • Molybdenum (Mo) • Mercury (Mg) • Nickel (Ni)	• Lead (Pb) • Antimony (Sb) • Selenium (Se) • Silver (Ag) • Tin (Sn) • Thallium (Tl)	• Uranium (U) • Vanadium (V) • Zinc (Zn)

4.4 Water Flow Monitoring and Wetted Widths

Surface flow monitoring was conducted by the crew at the sample sites provided in **Table 4.b** and described in **Section 4.1.3**. Surface flow was determined using the velocity-area method (Government of Alberta 2009) and a HACH® velocity flow meter. During spring monitoring the outflow channel (FL-04) was dry at the time of survey, and site FL-03 was nearly dry. The inflow sites had water and low flow. During the fall survey all inflow sites and the outflow site were dry. Following each seasonal monitoring visit, the inflows and outflow of Wetland 06 were used to calculate a modified water balance within the wetland.

In previous years. water level measurements were taken at staff gauges located within Wetland 06 and the reference wetland during spring and fall monitoring visits. The water level staff gauges were originally deployed during spring 2018, during Year 1 monitoring. Gauges have since been removed, and water level was not recorded at these locations during the 2024 site visits.

Wetted width was measured at four transects in Wetland 06 during the spring monitoring visit and at one transect during fall sampling. There was no surface water present in the reference wetland during spring or fall sampling, and no wetted widths could be measured.

Water level and wetted width of Wetland 06 and the reference wetland were compared and used to assess if the wetted perimeter of Wetland 06 was impacted by Project activities, by accounting for seasonal variability resulting from natural fluctuations.

5.0 Results

5.1 Water Quality Monitoring and Sediment Sampling

5.1.1 2024 Water Quality and Sediment Results

Water quality parameters outlined in **Table 4.c** were measured at sample sites located within Wetland 06, the inflow pathways from Wetlands 07 and 08, and Wetland 09.

Water quality samples could not be collected from the following locations as these sites were dry, or water was too low to allow sampling during monitoring visits:

- WQ-01 (reference wetland) and WQ-05a (upstream on Pathway 2) during both sampling events
- WQ-02 and WQ-04d during fall monitoring.

Water quality sampling results between 2018 and 2024 from WQ-01, WQ-02, and WQ-03 are summarized in **Table 5.a1.** These sample sites are intended to demonstrate the natural seasonal variability within Wetland 06 and the reference wetland. Additionally, the 2024 results for water quality sampling along Pathways 1 and 2 are shown in **Table 5.a2**. Surface water quality analytical results from the two additional sites on the west side of Wetland 06 are presented in **Table 5.b**.

The certificates of analysis for surface water results and raw water quality data from all viable sample sites from spring and fall monitoring are provided in **Appendix B and C**, respectively**.** Photographs taken at each sample site are provided in **Appendix D**.

Following recommendations from monitoring reports in Years 3 through 6 (2020 – 2023), sediment sampling was repeated during Year 7 within Wetland 06 and along Pathway 1. Sediment samples were collected and tested for total metals. Sediment analytical results are presented in provided in **Table 5.c**. The certificates of analysis for sediment results and raw data are provided in **Appendix B** and **C**.

Water quality and sediment sampling results from Year 7 sampling were compared to the Environmental Quality Guidelines (EQG) for Alberta Surface Water (GOA 2018). For parameters with no Alberta EQG, comparisons were made to the CCME Canadian Environmental Quality Guidelines (CCME 1999). In the text below, both Alberta and CCME water quality guidelines are referred to as the EQGs. The following exceedances were observed:

Selenium: Dissolved selenium concentrations above the surface water EQG of 0.001 mg/L were detected at site WQ-04a (spring and fall), WQ-04b (fall), and WQ-04c (spring) within samples along Pathway 1, as well as at sites WQ-05b (spring and fall) and WQ-03 (spring) on Pathway 2. Selenium concentrations exceeded the EQG at sites WQ-06 and WQ-07 at the west end of Wetland 06 during spring sampling. No selenium exceedances have been documented within the reference wetland; however, limited data is available for comparison, as the reference site has been dry during most sampling events to date.

Year 6 sediment samples collected at WQ-04a, WQ-04d and WQ-02 exceeded the Alberta interim EQG of 2 mg/kg. Selenium concentrations in sediment from these locations have been consistently elevated throughout the duration of the sampling program.

Uranium: Marginally elevated dissolved uranium concentration (0.019 mg/L, above the EQG of 0.015 mg/L) was recorded within the fall surface water sample at site WQ-03 within Wetland 06. Dissolved uranium was also elevated (0.018 mg/L) at this site in the spring of Year 6 (2023) and during both sampling events in Year 5. No uranium exceedances were recorded from any of the other sampling locations during any monitoring year, and there is no pattern of elevated uranium concentrations in sediment samples.

Elevated uranium concentrations may be considered naturally occurring and background conditions given the surficial geology of the area. The geology can be characterized as either fluvial deposits (sedimentary) of the Holocene epoch, or morainal deposits (diamicton till) of the Pleistocene epoch (AGS 2015). Both sedimentary deposits and diamicton till within Alberta have been found to contain uranium (CCME 2007; AITF 2011). It is likely that the uranium is weathering out of deposits into the water. Exceedance of the long-term exposure guideline at WQ-03 is marginal and may fall within natural variation. Therefore, it is unlikely that the uranium concentrations observed within the Project corridor are anthropogenic.

Zinc: Dissolved zinc concentrations exceeding the long-term EQG of 0.007 mg/L were detected at sample sites WQ-04b (0.0099 mg/L) and WQ-04d (0.035 mg/L) during the spring sampling program. These sites are located on the downstream side of the road along Pathway 1. Sediment collected from site WQ-04d also contained high concentrations of zinc (1600 mg/kg) exceeding the interim EQG of 123 mg/kg.

Zinc is an essential element for various biological functions but can produce adverse effects at higher concentrations. Potential anthropogenic sources of zinc in this context include road surface runoff, soil and sediment mobilized during the construction process, corrosion of galvanized surfaces, and dust and debris from vehicle tires and brakes.

Between 2018 and 2020 elevated zinc concentrations (above EQG of 0.003 mg/L) were recorded in water samples in Wetland 06 (WQ-02) and along Pathway 1 (WQ-04b, WQ-04d, and WQ-04c). Since 2022, no zinc exceedances in surface water or sediment have been observed within Wetland 06 suggesting that zinc is being attenuated into the sediment along Pathway 1 and is not being transported downstream into Wetland 06.

Other substances: A single instance of elevated chloride (260 mg/L) was documented at site WQ-04d in spring of 2024, exceeding the EQG of 120 mg/L.

Elevated concentrations of nickel and arsenic were recorded in sediment samples during multiple sampling years and multiple seasons (**Table 5.c**). These elevated concentrations are most likely naturally occurring and are representative of background conditions. Concentrations were similar across the Project.

Table 5.a1 Summary of 2018 to 2024 Water Quality Sampling Results – Exceedances Only

	Guidelines		WQ-01 (reference)													
			Spring							Fall						
	AB or CCME SW Freshwater Aquatic Life (Long-term)	AB or CCME SW Freshwater Aquatic Life (Short-term)	2018[a]	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Sediment and Physical																
pH	6.50 – 9.00	N/A	8.13	7.97	7.91	7.82	-	-	-	-	8.12	-	-	-	-	-
Dissolved Oxygen (mg/L)	Narr.	5	**2.20**	5.10	**3.20**	**2.80**	-	-	-	-	**3.70**	-	-	-	-	-
Nutrients and Others (mg/L)																
Nitrate (NO3)	3	124	<0.044	<0.044	<0.044	<0.044	-	-	-	-	<0.044	-	-	-	-	-
Dissolved Metals (mg/L)																
Iron (Fe)	0.30 mg/L	N/A	**1.000**	0.200	<0.060	0.070	-	-	-	-	0.090	-	-	-	-	-
Selenium (Se)	0.001 mg/L (total, alert)	N/A	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-
Uranium (U)	0.015 mg/L (total)	0.033 mg/L (total)	0.0004	0.0018	0.0011	0.0015	-	-	-	-	0.0022	-	-	-	-	-
Zinc (Zn)	0.007 mg/L[b]	0.037mg/L[b]	<0.0030	<0.0030	0.0062	0.0045	-	-	-	-	0.0051	-	-	-	-	-

	Guidelines		WQ-02													
			Spring							Fall						
	AB or CCME SW Freshwater Aquatic Life (Long-term)	AB or CCME SW Freshwater Aquatic Life (Short-term)	2018[a]	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Sediment and Physical																
pH	6.50 – 9.00	N/A	8.25	8.26	8.34	8.32	7.64	-	8.18	8.25	8.22	8.30	8.14	8.15	8.25	-
Dissolved Oxygen (mg/L)	Narr.	5	10.00	7.70	11.00	7.60	10.94	-	9.0	11.00	10.00	10.00	7.00	11.25	11.00	-
Nutrients and Others (mg/L)																
Nitrate (NO3)	3	124	<0.044	<0.044	<0.044	<0.220	<0.044	-	<0.044	0.600	0.079	0.710	0.190	0.110	<0.044	-
Dissolved Metals (mg/L)																
Iron (Fe)	0.30 mg/L	N/A	<0.060	0.083	0.090	<0.060	<0.060	-	<0.060	0.100	<0.060	0.083	<0.060	<0.060	<0.060	-
Selenium (Se)	0.001 mg/L (total, alert)	N/A	**0.0011**	0.0006	0.0009	0.0008	0.0003	-	0.00096	**0.0014**	**0.0011**	**0.0013**	**0.0014**	0.0004	0.0006	-
Uranium (U)	0.015 mg/L (total)	0.033 mg/L (total)	0.0031	0.0059	0.0035	0.0054	0.0130	-	0.012	0.0048	0.0043	0.0032	0.0065	0.0110	0.0042	-
Zinc (Zn)	0.007 mg/L[b]	0.037mg/L[b]	<0.0030	<0.0030	<0.0030	**0.0160**	<0.0030	-	<0.0030	**0.0130**	**0.0180**	**0.0071**	<0.0030	<0.0030	<0.0030	-

	Guidelines		WQ-03													
			Spring							Fall						
	AB SW Freshwater Aquatic Life (Long-term)	AB SW Freshwater Aquatic Life (Short-term)	2018[a]	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Sediment and Physical																
pH	6.50 – 9.00	N/A	**9.10**	8.33	8.29	8.22	8.15	8.15	8.18	8.09	8.29	7.96	7.72	8.17	-	7.78
Dissolved Oxygen (mg/L)	Narr.	5	14.00	7.90	9.40	8.00	11.35	11.00	6.6	**4.30**	8.00	8.20	**1.80**	10.62	-	**1.80**
Nutrients (mg/L)																
Nitrate (NO3)	3	124	0.072	<0.044	**8**	<0.220	<0.044	<0.22	0.25	<0.044	<0.044	<0.22	0.027	0.500	-	<0.22
Dissolved Metals (mg/L)																
Iron (Fe)	0.30 mg/L	N/A	<0.060	0.076	<0.060	0.068	<0.060	0.065	<0.060	0.064	<0.060	0.100	0.250	<0.060	-	0.29
Selenium (Se)	0.001 mg/L (total, alert)	N/A	0.0006	0.0003	0.0007	0.0006	0.0007	0.0009	**0.0030**	0.0004	0.0004	0.0005	0.0004	0.0006	-	0.00039
Uranium (U)	0.015 mg/L (total)	0.033 mg/L (total)	0.0023	0.0052	0.0030	0.0085	**0.0160**	**0.0180**	0.010	0.0083	0.0056	0.0071	0.0075	**0.0160**	-	**0.019**
Zinc (Zn)	0.007 mg/L[b]	0.037mg/L[b]	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0043	<0.0030	-	<0.0030

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
(-) = null result/site was dry
Narr = Narrative guideline. For dissolved oxygen: 6.5 mg/L 7-day mean, increased to 8.3 mg/L from mid May to end of June to protect mayfly emergence. Where natural conditions create DO concentrations <120% of the applicable criteria means and/or minima, the minimal acceptable concentration is 90% of the natural concentration.
N/A = CCME data regarding water quality limits for specified parameter is unavailable.
[a] Spring sampling in 2018 occurred during the summer (June 5, 2018)
[b]CWQG for the Protection of Aquatic Life for Dissolved Zinc for Specified Water Quality Conditions. Guidelines are calculated based on an equation that takes into account pH, hardness and dissolved organic carbon. The value in the table is provided for reference and is for surface water of 50 mg CaCO3·L−1 hardness and 0.5 mg·L−1 dissolved organic carbon (DOC).

Table 5.a2 Summary of 2024 Water Quality Sampling Results along Pathways 1 and 2 – Exceedances Only

	Alberta Surface Water Guidelines PAL (2018)		WQ04A		WQ04B		WQ04D		WQ04C		WQ05B	
			Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	Long-term	Short-term	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024
Sediment and Physical												
pH	6.50 – 9.00	N/A	8.06	7.93	8.22	8.16	8.46	-	8.34	8.40	7.86	7.92
Dissolved Oxygen (mg/L)	Narr.	5	**1.6**	**3.6**	10.0	12.0	9.8	-	10.0	5.2	**3.6**	8.0
Nutrients (mg/L)												
Nitrate (NO3)	3	124	2.9	2.8	2.7	**3.2**		-	0.053	<0.044	<0.044	0.55
Dissolved Metals (mg/L)												
Iron (Fe)	0.30 mg/L	N/A	<0.060	<0.060	<0.060	<0.060	<0.060	-	<0.060	<0.060	<0.060	<0.060
Selenium (Se)	0.001 mg/L (total, alert)	N/A	**0.0020**	**0.0019**	0.0009	**0.0017**	0.00047	-	**0.00200**	0.00079	**0.0016**	**0.0030**
Uranium (U)	0.015 mg/L (total)	0.033 mg/L (total)	0.0039	0.0042	0.0020	0.0038	0.0024	-	0.0063	0.0048	0.0073	0.011
Zinc (Zn)	0.007 mg/L[b]	0.037mg/L[b]	<0.0030	<0.0030	**0.0099**	<0.0030	**0.0350**	-	0.0050	0.0043	<0.0030	<0.0030
Salts (mg/L)												
Chloride (Cl-)	120 mg/L	640 mg/L	7.4	8.2	**260**	110	14	-	18	19	23	37

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
(-) = null result/site was dry
Narr = Narrative guidelines. For dissolved oxygen: 6.5 mg/L 7-day mean, increased to 8.3 mg/L from mid May to end of June to protect mayfly emergence. Where natural conditions create DO concentrations <120% of the applicable criteria means and/or minima, the minimal acceptable concentration is 90% of the natural concentration.
N/A = CCME data regarding water quality limits for specified parameter is unavailable.
[b]CWQG for the Protection of Aquatic Life for Dissolved Zinc for Specified Water Quality Conditions. Guidelines are calculated based on an equation that takes into account pH, hardness and dissolved organic carbon. The value in the table is provided for reference and is for surface water of 50 mg CaCO3·L−1 hardness and 0.5 mg·L−1 dissolved organic carbon (DOC).

Table 5.b Summary of Water Quality Sampling Results from 2020 to 2024 at WQ-06 and WQ-07- Exceedances Only

	Alberta Surface Water Guidelines PAL (2018)		WQ-06										WQ-07									
			Spring					Fall					Spring					Fall				
	Long-term	Short-term	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Sediment and Physical																						
pH (Lab)	6.50 – 9.00	N/A	8.29	8.72	-	**9.7**	8.41	8.26	8.31	8.23	-	8.20	8.18	8.56	-	**9.65**	8.35	-	-	8.27	-	8.30
Dissolved Metals (mg/L)																						
Selenium (Se)	0.001 mg/L (total, alert)	N/A	0.0007	<0.00020	0.00057	**0.0012**	**0.0017**	0.00032	0.00046	0.00089	-	0.00048	0.00057	<0.00020	0.00058	0.00084	**0.0016**	-	-	0.00086	-	0.00048

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
(-) = null result/site was dry
Narr = Narrative guidelines. For dissolved oxygen: 6.5 mg/L 7-day mean, increased to 8.3 mg/L from mid May to end of June to protect mayfly emergence. Where natural conditions create DO concentrations <120% of the applicable criteria means and/or minima, the minimal acceptable concentration is 90% of the natural concentration.

Table 5.c Summary of Sediment Sampling Results from 2020 to 2024 for those Sites and Parameters where Exceedances of Relevant Guidelines have Occurred

Parameter	Guideline			Units	WQ-04A									WQ-04B								
					Spring				Fall					Spring				Fall				
	Interim	PEL	LEL		2021	2022	2023	2024	2020	2021	2022	2023	2024	2021	2022	2023	2024	2020	2021	2022	2023	2024
Arsenic	**5.9**	**17**	**N/A**	mg/kg	3.1	-	1.7	1.8	-	4.5	<2	1.9	1.9	4.5	4.8	4.9	5.5	**5.9**	5.4	4.4	5.1	5.3
Chromium	**37.3**	**90**	**N/A**	mg/kg	11	-	10	9.7	-	14	9.7	10	11	12	13	22	17	16	16	19	15	15
Lead	**35**	**91.3**	**N/A**	mg/kg	7.7	-	7.1	7.1	-	8.8	7.2	8.3	9.9	9.0	9.0	8.9	11.0	9.6	9.4	9.0	9.8	9.2
Nickel	**N/A**	**N/A**	**16**	mg/kg	**15**	**-**	9.9	10	-	**17**	11	12	13	**18**	**17**	**21**	**19**	**21**	**19**	**18**	**18**	**19**
Selenium	**2**	**N/A**	**N/A**	mg/kg	**4.0**	**-**	**4.0**	**5.0**	**-**	**5.9**	**4.5**	**5.9**	**11**	1.0	**2.7**	<0.50	0.63	1.4	1.6	0.94	0.66	0.83
Zinc	**123**	**315**	**N/A**	mg/kg	54	-	36	41	-	86	37	47	55	**480**	**420**	63	93	**340**	**360**	71	85	88

Parameter	Guideline			Units	WQ-04D									WQ-04C								
					Spring				Fall					Spring				Fall				
	Interim	PEL	LEL		2021	2022	2023	2024	2020	2021	2022	2023	2024	2021	2022	2023	2024	2020	2021	2022	2023	2024
Arsenic	**5.9**	**17**	**N/A**	mg/kg	3.0	3.5	4.2	4.7	2.9	**6.7**	3.6	4.4	4.2	3.4	3.3	4.0	3.7	4.6	5.3	-	4.0	4.7
Chromium	**37.3**	**90**	**N/A**	mg/kg	8.6	**40**	13	10	11	17	14	12	12	9.1	19	13	10	19	16	-	11	16
Lead	**35**	**91.3**	**N/A**	mg/kg	7.3	9.4	7.7	6.9	6.7	9.6	7.3	7.1	7.2	7.0	9.9	8.2	7.0	7.9	7.1	-	6.9	11
Nickel	**N/A**	**N/A**	**16**	mg/kg	15	**30**	15	13	14	**24**	**16**	14	14	14	**21**	15	13	**19**	**17**	-	14	**21**
Selenium	**2**	**N/A**	**N/A**	mg/kg	**2.8**	**2**	**2.7**	**3.0**	**2.5**	1.1	**3**	**2.7**	**2.0**	1.6	1.8	**2.8**	1.9	**2.6**	**2.1**	-	1.8	1.5
Zinc	**123**	**315**	**N/A**	mg/kg	**290**	**180**	**990**	**1600**	**230**	85	**270**	**1500**	**1100**	**240**	**140**	81	83	**330**	78	-	91	85

Parameter	Guideline			Units	WQ-02									WQ-03								
					Spring				Fall					Spring				Fall				
	Interim	PEL	LEL		2021	2022	2023	2024	2020	2021	2022	2023	2024	2021	2022	2023	2024	2020	2021	2022	2023	2024
Arsenic	**5.9**	**17**	**N/A**	mg/kg	3.3	5.4	-	2.9	-	3	2.9	4.4	-	3.5	2.9	3.1	3.3	4.2	**17**	5.6	4.4	4.5
Chromium	**37.3**	**90**	**N/A**	mg/kg	13	15	-	9.5	-	12	15	14	-	13	10	14	11	15	28	15	14	16
Lead	**35**	**91.3**	**N/A**	mg/kg	9.5	10	-	7.6	-	7.8	8.4	10	-	8.5	7	10	7.8	12	**51**	9.5	10	10
Nickel	**N/A**	**N/A**	**16**	mg/kg	**17**	**20**	-	14	-	15	**17**	**20**	-	15	12	**19**	15	**20**	**36**	**18**	**20**	**21**
Selenium	**2**	**N/A**	**N/A**	mg/kg	**2.8**	**2.3**	-	**3.3**	-	**4.4**	1.3	**2**	-	0.61	1.2	1.6	1.2	**2.1**	1.4	1.7	1.4	1.5
Zinc	**123**	**315**	**N/A**	mg/kg	78	80	-	59	-	64	64	87	-	55	50	73	59	88	**130**	77	74	82

Parameter	Guideline			Units	WQ-06									WQ-07			
					Spring				Fall					Spring		Fall	
	Interim	PEL	LEL		2021	2022	2023	2024	2020	2021	2022	2023	2024	2023	2024	2023	2024
Arsenic	**5.9**	**17**	**N/A**	mg/kg	5.6	**7.5**	5.4	**6.2**	**6.2**	**7.1**	**7.2**	**6.1**	**6.9**	5.4	4.7	**6.5**	4.7
Chromium	**37.3**	**90**	**N/A**	mg/kg	14	14	14	16	17	18	19	14	21	16	13	15	18
Lead	**35**	**91.3**	**N/A**	mg/kg	9.1	11	10	11	11	12	12	11	12	10	10	11	12
Nickel	**N/A**	**N/A**	**16**	mg/kg	**19**	**21**	**19**	**23**	**23**	**24**	**25**	**21**	**26**	**21**	**19**	**22**	**23**
Selenium	**2**	**N/A**	**N/A**	mg/kg	0.73	1.7	1	1.2	0.62	1.4	1.3	1.4	1.1	1.1	1.1	1.1	1.2
Zinc	**123**	**315**	**N/A**	mg/kg	71	82	68	84	78	94	93	78	98	75	73	81	89

Note: **Bold** = Indicates exceedance of Alberta Sediment Quality Guidelines (GOA 2018)
(-) = null result/site not sampled N/A = Guidelines for sediment quality limits for specified parameter is unavailable

5.1.2 Comparison with Results from Previous Years

After seven years of spring and fall water quality monitoring, the following observations have been made:

- Elevated pH was documented in both in situ and analytical samples at the two locations on the west side of Wetland 06 in spring 2023 (Year 6). No pH exceedances were documented at these or any other sites in subsequent visits in 2024. *In situ* and analytical pH within has been alkaline within Wetland 06 throughout the sampling program.
- Following elevated zinc concentrations documented in water samples at WQ-02 during fall sampling from 2018 - 2020, additional sediment and surface water sampling along Pathway 1 has been ongoing to help identify potential project-related sources of elevated zinc concentrations and verify results. Elevated zinc concentrations observed at all sample sites along Pathway 1 from 2019 to 2022 had suggested a potential Project-related input source of the zinc.
    - In 2023, water and sediment samples collected in both the spring and the fall from site WQ-04d were the only recorded samples with an exceedance in zinc concentrations. No zinc exceedances were documented in sediment or water samples collected from other sites along Pathway 1 or within Wetland 06 in 2023.
    - In 2024, zinc concentration exceeding the long-term Alberta Surface Water Quality Guideline for the Protection of Aquatic Life was documented at sites WQ-04b and WQ-04d during spring sampling. Zinc concentration was also elevated in sediment samples collected at WQ-04d during both spring and fall sampling events.
    - Water quality and sediment sampling results suggest that zinc has attenuated into the sediment along Pathway 1 downstream from the road and is not being transported into Wetland 06.
- Slight exceedances of nickel, selenium, uranium and arsenic were documented in sediment samples taken from Wetland 06. Although these concentrations were higher than previously recorded, it is likely that they are related to the local geology. These values should be continued to be monitored in future years.
- All other Wetland 06 parameters remain within the CCME and Alberta EQG.

5.1.3 Multi-Year Sampling Comparison of Measurements

Select surface water quality parameters (i.e., turbidity, temperature, pH, specific conductivity, DO, phosphate and chloride) collected at WQ-02 and WQ-03 during Year 7 post construction monitoring were compared to data collected in 2016 and 2017 by the Weaselhead / Glenmore Preservation Society (Porto 2018) at two sample sites in close proximity to WQ-02 and WQ-03. Water quality data collected by the Weaselhead / Glenmore Preservation Society in 2016 was collected prior to the initiation of construction activities on the Project. During the 2024 monitoring, WQ-02 was dry during the fall sampling event. A comparison of surface water quality parameters is presented in **Table 5.d** and demonstrates the natural variability in water quality between sites and season in Wetland 06.

Turbidity: In 2024, turbidity ranged from a low of 6.23 NTU at WQ-02 in the spring to 50.35 NTU at WQ-03 in the fall. Pre-construction turbidity measurements at these sites ranged from 0.80 to 36.00 NTU (Porto 2018). Elevated turbidity at WQ-03 in fall 2024 sampling was likely caused by physical disturbance to the substrate while the field crew was breaking through the ice cover to collect in-situ measurements.

Chloride: Similar to previous monitoring years (i.e. 2018 to 2023), in 2024, the Wetland 06 samples exhibited higher chloride concentrations than the pre-construction samples collected by the Weaselhead / Glenmore Preservation Society in 2016 and 2017. Chloride concentrations in pre-construction samples ranged from 2.88 mg/L to 7.70 mg/L. In 2024, chloride concentrations ranged from 20 to 31 mg/L.

Elevated chloride concentrations may result from various sources including road salt runoff and herbicides (Kelly et al. 2012). A comparison between post-construction sampling years shows that although chloride measurements are elevated from pre-construction concentrations, the chloride concentration at WQ-02 and WQ-03 sites within Wetland 06 has not shown an increasing trend since 2018, and has remained well below the long-term guideline for the protection of aquatic life of 120 mg/L (CCME 1999). Chloride has limited reactivity with the environment and is highly soluble in water, meaning its residence time within a water body is greatly influenced by the rate of water flow. Limited flow, as has been observed within Wetland 06 will result in a longer persistence time.

Conductivity: In-situ water quality sampling of Wetland 06 in 2024 measured elevated specific conductivity when compared to pre-construction water quality data collected by the Weaselhead / Glenmore Preservation Society in 2016 and 2017. In-situ samples measured in 2024 ranged from a conductivity of 1000 μS/cm at WQ-02 in the spring to 1350 μS/cm at WQ-03 in the fall. Specific conductivity has shown a generally increasing trend from pre-construction levels, with a more prominent spike in 2023.

Specific conductivity in surface water is affected by the presence of a variety of inorganic cations and anions, including chloride. There are no EQG specific to conductivity due to its high natural variability and because it is a numerical indicator of water quality and not an independent parameter of water, however natural waters can vary between 50 μS/cm and 1,500 μS/cm (BC Ministry of Environment 2013). The lab results for conductivity at both locations fall within this range for all samples collected, with the exception of a value of 2200 μS/cm measured in the fall 2024 sample at WQ-03. However, this is the same sample that exhibited elevated turbidity following physical disturbance to the substrate during sampling, and it is likely that that elevated conductivity measurement was due to the presence of suspended sediment stirred up during the sampling process.

Table 5.d Surface Water Quality Parameters Collected from Wetland 06 Sites from 2016 to 2024

		2016[a]		2017[a]		2018[b]		2019[b]		2020[b]		2021[b]		2022[b]		2023[b]		2024[b]	
		Summer	Fall	Summer	Fall	Summer	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Sampling Site 1 (close proximity to WQ-02)	Turbidity (NTU)	30.80	0.80	20.00	18.70	6.50	5.40	2.00	8.90	6.40	60.40	92.42	129.10	40.00	130.00	-	0.47	6.23	-
	Temperature C	11.90	4.00	14.60	4.20	19.10	1.10	12.30	3.25	14.58	3.12	19.79	3.70	17.85	6.55	-	7.79	10.0	-
	pH	7.60	7.90	7.53	8.07	7.60	6.50	8.00	8.20	9.00	8.50	8.28	7.56	7.96	7.88	-	8.42	8.29	-
	Conductivity (uS/cm)	470	444	589	500	882	833	712	698	662	760	756	783	867	665	-	970[c]	1000	-
	DO (mg/L)	5.20	10.48	2.03	9.12	10.50	9.80	7.20	10.00	9.67	11.01	5.86	7.80	10.94	11.25	-	3.50	8.00	-
	Phosphate (mg/L)	0	0	0.0100	0.0100	0.0068	0.0034	0.0037	<0.0030	0.0030	0.0040	<0.0030	0.0034	-	-	-	<0.0030	<0.0030	-
	Chloride (mg/L)	2.88	5.26	3.68	5.25	41	12	13	7.3	12	15	15	11	22	63	-	14	25	-
Sampling Site 2 (close proximity to WQ-03)	Turbidity (NTU)	3.30	10.00	36.00	19.60	7.00	7.00	1.80	6.50	22.20	33.20	21.00	105.40	15.00	12.00	18.69	-	8.63	50.35
	Temperature C	12.20	4.10	10.70	2.40	20.60	0.50	16.06	3.87	12.68	5.34	19.27	3.90	12.22	2.73	22.57	-	10.8	1.6
	pH	8.00	8.00	7.95	8.15	8.90	6.80	8.27	8.19	8.89	7.96	8.28	6.95	8.08	8.41	8.70	-	8.06	7.35
	Conductivity (uS/cm)	469	449	523	491	509	688	575	766	591	737	706	455	712	893	1355	-	1279	1350
	DO (mg/L)	5.30	5.10	2.65	9.99	14.40	5.80	8.68	7.31	9.72	4.86	5.86	2.60	11.35	10.62	9.96	-	9.86	4.94
	Phosphate (mg/L)	0.1600	0.0100	0	0	0.0085	0.0085	0.0039	<0.0030	0.0040	0.0040	0.0037	0.0083	-	-	<0.0030	-	<0.0030	<0.0030
	Chloride (mg/L)	4.18	5.85	7.70	4.68	51	29	12	12	18	7.0	23	24	5.0	25	26	-	20	31

Note: [a] Porto 2018
[b] Data collected at WQ-02 and WQ-03 from 2018 to 2024 as part of the Monitoring Plan.
[c] This value is the conductivity measures in the lab sample. The in situ measurement recorded was 2299 uS/cm which was assumed to be a sampling error.

5.2 Water Flow Monitoring and Wetted Widths

Surface water flow monitoring was conducted during the spring and fall at three inflow sites and one outflow site located within Wetland 06 (**Table 4.b**). Information on channel width, channel depth, velocity and discharge were collected during each monitoring visit; the results are summarized in **Table 5.e.**

Following procedures specified in the Monitoring Plan and recommendations made following Year 1 surface water flow monitoring, the initial 2024 site visit was conducted earlier in the year (i.e., late May) to capture higher periods of flow within the Project area; with the aim of enabling calculations of velocity and discharge at all inflow and outflow locations. During the spring monitoring visit in 2024, water levels remained low. Depth and velocity measurements were able to be recorded at FL-01 and FL-02 during the spring. The inflow channel at FL-03 and outflow channel at FL-04 were dry during spring monitoring. The outflow site, FL-04 has been recorded as dry since 2018.

During the fall monitoring all sites were dry and thus no flow data was collected. There was not sufficient surface water or velocity during spring and fall monitoring to calculate discharge at any of the sites. These results were consistent with the results of all previous years of monitoring.

All inflow sites that were wetted during the spring visit showed a reduction in channel depth and wetted widths during the fall monitoring visit. Site FL-02 showed the greatest seasonal change, with a spring wetted width of 13 m to dry conditions being present at the site during the fall. These results were consistent with the results of previous years monitoring.

Table 5.e Summary of Water Flow Monitoring Site Channel Width, Depth, Velocity and Discharge

Year	Season	Parameter	FL-01 (inflow)			FL-02 (inflow)			FL-03 (inflow)			FL-04 (outflow)		
			RMID	MID	LMID	RMID	MID	LMID	RMID	MID	LMID	RMID	MID	LMID
2018	Summer	Depth (m)	0.30	0.27	0.28	0.68	0.58	0.39	-	-	-	-	-	-
		Velocity (m/s)	0	0	0	0	0	0	-	-	-	-	-	-
		Ww (m)	0.42			2.50			-			-		
		Flow (m^3/s)	0			0			-			-		
	Fall	Depth (m)	0.07	0.07	0.07	0.14	0.23	0.28	-	-	-	-	-	-
		Velocity (m/s)	0	0.15	0	0	0	0	-	-	-	-	-	-
		Ww (m)	0.49			1.15			-			-		
		Flow (m^3/s)	0.0017			0			-			-		
2019	Spring	Depth (m)	-	0.04	-	0.26	0.55	0.66	-	-	-	-	-	-
		Velocity (m/s)	-	0.20	-	0	0	0	-	-	-	-	-	-
		Ww (m)	0.55			1.58			-			-		
		Flow (m^3/s)	0.0015			0			-			-		
	Fall	Depth (m)	-	0.12	-	0.26	0.42	0.66	-	0.40	-	-	-	-
		Velocity (m/s)	-	0.10	-	0	0	0	0	0	0	-	-	-
		Ww (m)	0.25			1.30			5.0			-		
		Flow (m^3/s)	0.001			0			0			-		
2020	Spring	Depth (m)	0.03	0.08	0.05	0.62	0.65	0.64	-	-	-	-	-	-
		Velocity (m/s)	0	0.10	0	0	0	0	-	-	-	-	-	-
		Ww (m)	0.55			1.62			-			-		
		Flow (m^3/s)	0.0015			0			-			-		
	Fall	Depth (m)	0.01	0.08	0.02	0.22	0.32	0.44	-	-	-	-	-	-
		Velocity (m/s)	0	0.11	0	0	0	0	-	-	-	-	-	-
		Ww (m)	0.82			1.32			-			-		
		Flow (m^3/s)	0.0024			0			-			-		
2021	Spring	Depth (m)	0.02	0.03	0.02	0.36	0.50	0.41	0.13	0.16	0.10	-	-	-
		Velocity (m/s)	0	0	0	0	0	0	0	0	0	-	-	-
		Ww (m)	0.60			1.40			1.20			-		
		Flow (m^3/s)	0			0			0			-		
	Fall	Depth (m)	0.10	0.10	0.10	0.28	0.30	0.26	-	-	-	-	-	-
		Velocity (m/s)	0	0	0	0	0	0	-	-	-	-	-	-
		Ww (m)	0.40			1.20			-			-		
		Flow (m^3/s)	0			0			-			-		

Year	Season	Parameter	FL-01 (inflow)			FL-02 (inflow)			FL-03 (inflow)			FL-04 (outflow)		
			RMID	MID	LMID	RMID	MID	LMID	RMID	MID	LMID	RMID	MID	LMID
2022	Spring	Depth (m)	0.05	0.05	0.05	1.25	2.0	2.0	-	-	-	-	-	-
		Velocity (m/s)	0.02	0.05	0.05	0	0	0	-	-	-	-	-	-
		Ww (m)	0.60			17			-			-		
		Flow (m^3/s)	0.0012			0			-			-		
	Fall	Depth (m)	0.03	0.03	0.01	-	-	-	-	-	-	-	-	-
		Velocity (m/s)	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-
		Ww (m)	0.75			1.5			-			-		
		Flow (m^3/s)	0.00018			-			-			-		
2023	Spring	Depth (m)	-	-	-	0.10	0.75	0.10	0.10	0.25	0.10	-	-	-
		Velocity (m/s)	-	-	-	0	0	0	0	0	0	-	-	-
		Ww (m)	0.75			2.0			3.6			-		
		Flow (m^3/s)	-			0			0			-		
	Fall	Depth (m)	-	-	-	-	-	-	-	-	-	-	-	-
		Velocity (m/s)	-	-	-	-	-	-	-	-	-	-	-	-
		Ww (m)	-			-			-			-		
		Flow (m^3/s)	-			-			-			-		
2024	Spring	Depth (m)	0.05	0.15	0.05	0.50	1.50	0.50	-	-	-	-	-	-
		Velocity (m/s)	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-
		Ww (m)	1.0			13			-			-		
		Flow (m^3/s)	0.00083			0.11			-			-		
	Fall	Depth (m)	-	-	-	-	-	-	-	-	-	-	-	-
		Velocity (m/s)	-	-	-	-	-	-	-	-	-	-	-	-
		Ww (m)	-			-			-			-		
		Flow (m^3/s)	-			-			-			-		

Note: Ww = wetted width
* RMID= right mid channel, MID= mid channel, LMID= left mid channel
(-) = null result

Wetted widths measured at four transects in Wetland 06 and four transects in the reference wetland are summarized in **Table 5.f**. In Wetland 06, wetted widths were only collected in during the spring sampling from T1-1, T1-2, and T1-3 as T1-4 and the reference wetland were dry. In the fall both Wetland 06 and the reference wetland were dry. As previously recorded (2021 and 2022), during the fall the wetted width precent change has shown a decline in water level. This reduction was evident as the site was dry during the fall. Photos taking during the fall monitoring visit are presented in **Appendix D**. The reference wetland was dry during the spring and fall monitoring visit and wetted width transects could not be conducted. These results were consistent with the wetted widths results of Years 1 through 6 (i.e., 2018 - 2023) monitoring.

In the previous years of monitoring a staff gauge located within wetland has been monitored and provided measurements of water depth. During Year 6 monitoring, the staff gauge installed in Wetland 06 was no longer present at site. This area was dry in both the spring and fall sampling. Previously this section of the wetland has been previously heavily impacted by beaver activity.

Table 5.f Summary of Wetted Width Measurements from 2018 to 2024

Site	Transect	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width(m)		Percent Change of Wetted Width (%)	Wetted Width (m)		Percent Change of Wetted Width (%)
		Summer 2018	Fall 2018		Spring 2019	Fall 2019		Spring 2020	Fall 2020		Spring 2021	Fall 2021		Spring 2022	Fall 2022		Spring 2023	Fall 2023		Spring 2024	Fall 2024	
Wetland 06	T1-1	28	1	96.40	-	-	-	34	1.80	94.70	15	1	93.30	-	0.50	100	0.75	-	100	1.5	-	100
	T1-2	26	22	15.4	45	2	95.6	14	25	44	20	2	90	-	-	0	2	-	100	2	-	100
	T1-3	52	51	1.9	35	29	17.1	24	22	8.3	32	3	90.6	-	1.5	100	36	-	100	1.5	-	100
	T1-4	37	35	5.4	40	32	20	28	27	3.6	24	2	91.6	-	1	100	-	-	0	3.5	-	100
Reference Wetland	T2-1	25	-	100	13	-	100	19	-	100	-	-	0	-	-	0	-	-	0	-	-	0
	T2-2	32	-	100	15	-	100	22	-	100	6	-	100	-	-	0	-	-	0	-	-	0
	T2-3	28	-	100	13	-	100	22	-	100	3	-	100	-	-	0	-	-	0	-	-	0
	T2-4	28	-	100	7	-	100	13	-	100	-	-	0	-	-	0	-	-	0	-	-	0

Note: (-) = no surface water present during monitoring visit, **(*) = data not available**

6.0 Summary

Monitoring efforts undertaken in 2024 represent Year 7 of the Wetland 06 monitoring program. Year 7 of the monitoring program was completed according to the criteria specified in the Monitoring Plan, with the addition of supplemental monitoring sites.

During Year 7 of monitoring, the following key observations were noted:

- Water quality results showed variation in water quality parameters among sampling locations within Wetland 06, as well as between spring and fall sampling visits.
- The majority of surface water quality parameters measured were within CCME and EQG for the protection of aquatic life. Slight exceedances in **zinc, uranium and selenium were detected at localized sites**.
- Elevated concentrations of uranium and selenium are most likely naturally occurring and are representative of background conditions.
- A single exceedance of the EQG guideline for chloride was documented at site WQ-04d during spring sampling.
- Chloride and specific conductivity concentrations measured in Wetland 06 in 2024 were higher than historical measurements taken in 2016 and 2017.
- In 2024, water samples collected during spring sampling from sites WQ-04b and WQ-04d contained elevated zinc concentrations exceeding the EQG. Sediment samples at WQ-04d were elevated above all relevant guidelines during both sampling events. No other zinc exceedances were detected in water or sediment at other sampling locations. These results suggest that zinc has attenuated into the sediment along Pathway 1and is no longer being transported into Wetland 06.
- The spring site visit was conducted in early May to capture higher periods of flow within the Project area to enable calculations of velocity and discharge. Depth and velocity measurements were successfully collected at two inflow locations during spring sampling; limited to no surface water flow into or out of Wetland 06 was present during fall sampling. There has not been measurable surface outflow from Wetland 06 during any of the sampling events over the course of the monitoring program.
- Wetted widths recorded during the fall site visit at all transects in Wetland 06 since 2018 have shown a reduction in surface water quantity. Lower water levels in fall are consistent with all previous years of post-construction monitoring, however 2023 and 2024 results have shown the lowest observed water levels since the start of the monitoring program.
- The reference wetland has been dry for all fall and spring sampling events since 2022, and during all fall sampling events since 2020.

7.0 Recommendations

Monitoring in 2025 (Year 8) represents 5 years after the SWCRR was opened to the public (i.e., October 2020) and Year 8 of the overall monitoring plan, and will be the final monitoring year. Based on the results of the Year 7 (i.e., 2024) monitoring program, the following recommendations are suggested for monitoring in 2025:

- Monitoring of water quality and quantity should be continued in 2025 using similar methods and effort as employed in 2024 and outlined in the Monitoring Plan.
- Water quality monitoring efforts will continue in Year 8 to facilitate detection of any changes to surface water quality as a result of SWCRR Project impacts.
    - The pattern of zinc exceedances observed in 2019-2022 were not observed in 2023 or 2024, suggesting that the zinc in the water has attenuated into the environment as expected. As Year 7 results show that zinc continues to attenuate out of the water and into the soil at a location upstream of Wetland 06, it is recommended that surface sampling location be reduced to the original two sites (i.e., WQ-04a and WQ-04b) along Pathway 1, and sediment sampling be discontinued.
    - Analytical results of water quality sampling will continue to be reviewed by a Senior Aquatic Scientist as soon as received. If anomalies or exceedances in results are detected, resampling and additional sampling will be conducted within 45 days of the original date of sample collection to verify results and attempt to identify potential project-related sources of elevated levels.
    - Trends in changing water quality parameters noted in Wetland 06 when compared to historical data (i.e., specific conductivity and chloride) should continue to be investigated throughout subsequent monitoring to confirm potential long-term trends identified during post-construction monitoring.
- Water flow monitoring will continue in Year 8 to determine if surface water quantity within Wetland 06 has been influenced by activities related to the SWCRR Project. Similar to 2024, to capture higher periods of flow and enable calculations of velocity and discharge at all inflow and outflow locations, measurements of flow and wetted width should be completed within 72 hours of a precipitation event. Surface water and sediment sampling should continue to be planned at least 72 hours after a substantial precipitation event to avoid temporal variation in water quality results.

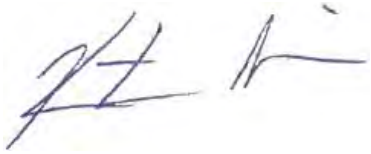
8.0 Closure

The results of Year 7 monitoring provide an additional year of surface water quality comparison for Wetland 06 following the initiation of construction phase of the SWCRR. This report addresses water quality and quantity impacts to Wetland 06, fulfilling the requirements of the Order which amended the initial *Water Act* Approval received by the Project No.: 00388473-00-00.

Report prepared by:
Ausenco Sustainability ULC

Jess Newman, B.Sc., R.P.Bio.
Aquatic Biologist

Report reviewed by:
Ausenco Sustainability ULC



Kirsten Norris, B.Sc., M.Sc., P.Biol.
Senior Fisheries Biologist

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Appendix A

Monitoring Plan

Wetland 06 Water Monitoring Plan
Southwest Calgary Ring Road Project
Calgary, Alberta

Prepared for:

KGL Constructors
18 Steven Chiefs Road SW
Calgary, Alberta T2W 3C4

Project No. 102604-01

Prepared by:

Hemmera Envirochem Inc.
322 11th Avenue SW, Suite 804
Calgary, AB T2R 0C5
T: 403.264.0671
F: 403.264.0670
hemmera.com

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1.0 INTRODUCTION

The Southwest Calgary Ring Road (SWCRR) Project (the Project) includes the design and construction of approximately 31 kilometers of new six and eight lane divided freeway, 14 interchanges, as well as three watercourse realignments and associated crossing structures. The Project corridor is located along the western limit of the City of Calgary south of Highway 8 and includes sections of Highways 8 and 22. The Project has been awarded by Alberta Transportation to Mountain View Partnership, which in turn has engaged KGL Constructors (KGL) to develop the Project.

On August 11, 2017, the Project received *Water Act* Approval No.: 00388473-00-00 (the Approval) to impact twenty-four (24) wetlands, including Wetland 06. Subsequently, an Environmental Appeal was filed (*Brockman and Tulick v. Director, South Saskatchewan Region, AEP*; Appeal Nos.: 17-047 and 17-050-R. 2017) affecting KGL's ability to impact the wetlands, as described in the Approval.

As a result of the Environmental Appeal, the Minister of Environment and Parks issued a Ministerial Order 06/2018 (the Order), on January 29, 2018, that amended the previously received Approval to include conditions to address water quality and quantity impacts to Wetland 06 (see conditions 6.2 to 6.6). To address these conditions, KGL Constructors retained Hemmera Envirochem Inc. (Hemmera) to develop a monitoring plan (the Plan) that includes:

- monitoring of the flow of water flow into Wetland 06 in the spring and fall of each year that the plan is in effect;
- monitoring of the water quality in Wetland 06 in the spring and fall of each year that the plan is in effect, including total dissolved solids, salts, dissolved metals, and other parameters consistent with a stormwater sampling program;
- the monitoring data shall be provided to the Director within one month from the date the data were collected;
- the results of the monitoring and an analysis of the monitoring shall be provided to the Director in an annual report by March 31 of the year following the calendar year in which the data were collected; and
- the monitoring plan shall come into effect as soon as the Director approves the plan and shall remain in effect for a period of five years after the road is officially opened to the public.

1.1 Monitoring Objectives

Wetlands consist of land that has been saturated for sufficient time to promote the formation of water altered soils, growth of water tolerant vegetation, and various kinds of biological activity, adapted to wet environments (ESRD 2013). They play an important role on the landscape and are ecologically and economically significant by maintaining water quality and supply in watersheds, providing flood protection and erosion control, as well as providing habitat for various fish and wildlife species. Wetland health is reflective of numerous physical, chemical, and biological components. We acknowledge that there are numerous indicators of wetland health; however, the monitoring plan has been developed specifically to reflect requirements of the Order. As a result, monitoring elements of this Plan were prioritized to surface water quality and flow exclusively.

The objectives of the Plan include:

- monitoring surface water quality in Wetland 06 and flow into Wetland 06,
- monitoring surface water flow out of Wetland 06,
- monitoring surface water quality in waterbodies/drainages that provide surface water flow into Wetland 06, and
- monitoring surface water quality in an adjacent reference wetland.

It is expected that by monitoring Wetland 06 as well as other nearby wetlands and waterbodies, the Plan will result in a suitable comparative analysis about the potential influences or lack thereof of the Project on surface water quality and flow in Wetland 06.

2.0 DESCRIPTION OF WETLAND 06

Wetland 06 is located in the Weaselhead Natural Area, a natural environmental park that borders the west end of Glenmore Reservoir (**Figure 1**) within the City of Calgary. A small portion of Wetland 06 is located within the Transportation Utility Corridor (TUC). Wetland 06 is a historical oxbow channel to the Elbow River that is over 500 m in length with wetted widths that are generally less than 30 m. A pedestrian/bike bridge associated with the Glenmore Reservoir Regional Pathway network crosses Wetland 06. Wetland 06 drains generally east through the Weaselhead Natural Area and eventually discharges into the Glenmore Reservoir, which provides approximately half of the City of Calgary's drinking water supply.

Wetlands 07, 08, and 09 are located upslope of Wetland 06 and are the source of surface water flow into Wetland 06 (**Figure 1**). Wetland 08 and 07 are located to the southwest of Wetland 06. Surface flow from Wetland 08 and 07 are conveyed into Wetland 06 by an undefined channel that becomes defined downstream of the TUC near Wetland 06 as the slope gradient increases. A bypass drainage culvert will be installed during the construction phase of the Project to convey water from Wetland 07 and 08 through the Project area. Wetland 09 is located south of Wetland 06. Surface flow from Wetland 09 is conveyed by an undefined channel first flowing easterly through the Project and then northerly from the TUC boundary through a defined channel to Wetland 06. A bypass drainage system has been installed as part of the Project to maintain flow from Wetland 09 to Wetland 06.

During the construction phase of the Project, surface run-off from the work area will be managed through temporary erosion and sediment control (ESC) measures and will be redirected away from Wetland 06. During the operational phase of the Project, the natural flow of surface water (i.e., from the west side of the TUC) into Wetland 06 will be maintained via the bypass drainage systems described above. Further, during the operational phase, Project-impacted water will not be discharged into Wetland 06. All Project-impacted water in the vicinity of Wetland 06 has been designed to flow north into a stormwater pond.

3.0 MONITORING SCHEDULE

The monitoring schedule, including field sampling visits, seasonal data summaries, and annual reports is provided in **Table 1.** Field sampling visits to monitor surface water quality and flow will occur during the spring and fall of each year of the Plan. Additional details on sampling frequency are provided in **Section 4.2.**

Following each season of monitoring, data summaries (i.e., surface water quality and flow) will be made publicly available by KGL within one month of the seasonal field sampling visits. The annual report will be made publicly available by March 31 of the year following the field sampling visits.

Table 1 Monitoring Schedule

Task	Monitoring Year[a]											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. Water Quality Monitoring[b]												
2. Water Flow Monitoring[b]												
3. Seasonal Data Summary[c]												
4. Annual Report[d]												

[a] Plan year includes construction phase and first five years of the operational phase.

[b] Surface water quality and flow field sampling visits are proposed in May and October of each year of the Plan; however, annual variability in ambient air temperature, snow/ice cover, and precipitation events may impact the exact date of sampling.

[c] Surface water quality and flow data summaries will be made publicly available within one month of each seasonal monitoring visit.

[d]The Annual Report will be made publicly available by March 31 of the year following the field sampling visits (e.g., the 2018 Annual Report will be posted by March 30, 2019).

4.0 METHODOLOGY

4.1 Sample locations

The locations for surface water quality and flow monitoring are provided in **Figure 2.** The sites have been selected strategically for appropriate reference and comparison site considerations, in order to allow for a comparative analysis. An enhanced view of the sampling sites in and near Wetland 06 is provided in **Figure 3**. Suitability of these locations has been field verified during a reconnaissance survey in early spring 2018, however, the locations of these sites are subject to change pending potential subsequent annual and seasonal variability in site conditions.

4.1.1 Surface Water Quality

Surface water quality will be monitored at eight site locations (**Table 2**).

One surface water quality reference site (WQ-01) is identified for the Plan. The reference site is located north of Wetland 06 in an adjacent wetland that is outside the TUC. This site was selected as there are no identified or known pathways from the Project that could potentially direct Project-effected water into the adjacent wetland.

Based on a desktop assessment and a field reconnaissance, Hemmera identified two pathways in which Project-influenced water could potentially flow into Wetland 06 (see **Figure 1**). The two identified pathways are described below. For each of the respective pathways, comparison samples will be collected from a series of sample sites (i.e., background vs. comparison) (see **Figure 2**).

- Pathway 1 is an undefined channel that diagonally bisects the Project footprint. From the west side of the TUC boundary, water flows northeast through Wetland 08 into Wetland 07 where it then flows past the east side of the TUC boundary and then into a defined channel (approximately 400 m) that ultimately drains into Wetland 06 (see **Figure 1**). The sample sites associated with Pathway 1 are; WQ-04a, WQ-04b, and WQ-02 (see **Figure 2**). WQ-04a has been selected as a background site, as it is located upstream of potential influences from the Project.
- Pathway 2 is an undefined channel that flows east through Wetland 09 where it then enters a recently construction stormwater drainage system (see **Figure 1**). The drainage system outlets into a constructed riprap lined drainage ditch that flows north towards the eastern TUC boundary. In addition, a constructed drainage ditches channels water west where it converges with flows in the aforementioned constructed riprap lined drainage ditch. From the eastern TUC water meanders north through a defined channel (approximately 1,000 m) that eventually drains into Wetland 06 (see **Figure 1**). The samples sites associated with Pathway 2 are; WQ-05a, WQ-05b, WQ-05c, and WQ-03 (see **Figure 2**).

Surface water quality monitoring sites are subject to change due to seasonality and site conditions. Additional or alternative surface water quality monitoring sites may be identified if field crews observe abnormal site conditions or contaminant indicators, more information is provided in **Section 4.3.**

Table 2 Surface Water Quality Sample Locations

Site Name	Universal Transverse Mercator (Zone 11U)		Site Description	Reference or Comparison Site
	Easting	Northing		
WQ-01	699168	5652375	Reference wetland to the north of Wetland 06	Reference
WQ-02	699186	5652164	West (upslope) side of Wetland 06	Comparison
WQ-03	699432	5652159	East (downslope) side of Wetland 06	Comparison
WQ-04a	698898	5651725	Wetland 08, upslope of SWCRR Project	Background
WQ-04b	699113	5651956	Wetland 07, downslope of SWCRR Project and Wetland 08	Comparison
WQ-05a	699060	5650929	Upslope of Wetland 09 and SWCRR Project	Background
WQ-5b	699788	5651289	Watercourse 01 downslope of Wetland 09 and SWCRR Project	Comparison
WQ-05c	700061	5651274	Catchment basin to the east of SWCRR Project and upslope of the confluence with Watercourse 01	Comparison

4.1.2 Surface Water Flow

Surface water flow will be monitored at four locations around Wetland 06 (**Table 3**). Each of these locations are expected to provide conveyance of surface flow (inflow or outflow) year-round during normal surface flow conditions. Given the higher than average snowfall and later than normal lowland melt in 2018, sampling locations for surface water flow may need to be reconsidered in subsequent sampling visits.

Surface water inflows have been identified at FL-01, FL-02, and FL-03. The sampling location FL-01 occurs where surface water inflow is associated with drainage from Wetland 07 and 08. Site FL-02 is where the surface water inflow is conveyed from Wetland 09. Site FL-03 is where the surface water inflow associated with drainage from the reference wetland to the north of Wetland 06. Surface water outflow monitoring will occur at FL-04 at the Glenmore Pathway bridge crossing approximately 75 m downslope from Wetland 06.

Table 3 Surface Water Flow Sample Locations

Site Name	Universal Transverse Mercator (Zone 11U)		Inflow or Outflow
	Easting	Northing	
FL-01	699156	5652166	Inflow
FL-02	699406	5652115	Inflow
FL-03	699075	5652326	Inflow
FL-04	699644	5652343	Outlfow

Surface flow in undefined channels (i.e., lacking defined bed and banks) may be present at the surface water flow monitoring locations pending flow conditions during each field sampling visit and are expected be influenced by natural events (e.g., precipitation levels) within and between monitoring years. Monitoring flow in waterbodies lacking defined bed and banks can also have reduced accuracy as compared to a defined channel. Therefore, field crews may be required to adjust the surface water flow monitoring sites

during each field sampling visit to a location where channel characteristics are most appropriate for flow measurements. If additional surface water inflow or outflow locations are identified during the field sampling visits due to variability in hydrological connectivity, contingency surface water flow monitoring sites will be added.

4.2 Frequency of sampling

Surface water quality and flow monitoring will occur twice annually, once in the spring and once in the fall. The spring field sampling visit is proposed to occur in May and the fall field sampling visit is proposed to occur in October of each year of the Plan. The exact timing of the spring and fall field sampling visits are dependent on environmental conditions including ambient air temperatures, snow/ice cover, and precipitation events. Sampling will not occur during or within 72 hours of a substantial precipitation event to reduce any temporal variation (short-term pulse response) associated with extreme disturbances resulting in water and flow sampling that is more representative of the wetland conditions.

4.3 Water Quality Monitoring

Surface water quality samples will be taken from the banks of at the sample sites provided in **Tables 2** and discussed in **Section 4.1.1**. Site conditions (e.g., weather) will be recorded y the field crew. At each sampling site, five photos will be taken in a north, south, east, west, and ground direction.

Discrete profile lake water sampling and composite integrated water sampling methodologies (Alberta Environment 2006) have been determined to be inappropriate sampling methodologies for this Plan as water depths at the sampling sites are not deep enough to require spatial characterization over a horizontal or depth profile. The protocol provided by Canadian Council of Ministers of the Environment (CCME) (2011) for shore sampling will be followed and is summarized below. A certified Canadian Association for Laboratory Accreditation (CALA) laboratory will complete the laboratory analysis of water samples.

Samples will be labeled using a water-proof marker for accurate identification by the field crews and the laboratory. A chain of custody form will be completed, and any transfers of custody will be noted on the form by the authorized personnel including transfer to the CALA laboratory. Field crews will wear unpowdered latex or polyethylene disposable gloves and refrain from smoking or eating while collecting water samples (Alberta Government 2006).

An extension pole will be used to collect a “grab sample” from each sampling site and to avoid disturbing the site during collection of the water samples (CCME 2011). At each sampling location, the extension pole and clamp will be rinsed prior to collecting the water samples to reduce possible contamination between sites. Laboratory protocols for sample bottle rinsing will be followed and any rinsing of sample bottles or collection equipment will be completed slightly downslope of the sampling location to prevent cross contamination.

Water samples will be collected facing upstream if flow is present (CCME 2011). Water bottles will be uncapped immediately prior to filling. Water samples will be collected one at a time ensuring the lid is immediately capped once the bottle is filled. Water samples will be collected at approximately 60% water depth to avoid surface scum and film, and to collect a representative water sample. Algae, sediment, and organic matter will be avoided in the water sample.

Laboratory protocols for preservatives, storage, and transportation of water samples will be followed. Water samples will be kept in coolers containing enough ice packs or warm water bottles to keep the samples at approximately 4°C. All water samples will be sealed and packed in the coolers as to prevent spillage or breakage. Water samples will be delivered to the laboratory as soon as possible after collection, preferably the same day and hold times will be followed so analysis will occur within the appropriate hold periods.

Water sample parameters to be monitored during the Plan include those identified as potential sources or indicators of sources of pollutants or contaminants that may result from the construction and operations phases of the Project. Previous studies have shown sediment transport and deposition pose the greatest risk to the construction phase of highway projects, resulting from excavation and earthworks (Barrett et. al., 1995). Eroded soil can also transport nutrients, ions, and metals (Barrett et. al., 1995). During the operations phase of highway projects, sedimentation remains a concern along with transportation of pollutants from vehicles operating on the highway through run-off (Barrett et. al., 1995).

Water samples will be collected at all eight sampling (**Table 2**) for the parameters provided in **Table 4**. All samples collected from Wetland 06 and the reference wetland (i.e., WQ-01, WQ-02, and WQ-03) will be submitted for analysis for all parameters immediately after collection, with regular turn around time of 7-days requested. For remaining sample locations (i.e., WQ-04a,b; WQ-05a,b,c), all samples will be submitted, however, only those samples which have a holding time of less than 7 days will be immediately analysed (i.e., biological oxygen demand, nitrate, nitrite, sulfate, total dissolved solids, and total suspended solids. Samples not immediately analysed will be kept at the laboratory, pending the results from WQ-01 to WQ-03, and will be stored at the laboratory in accordance with CALA standards. If an exceedance value is identified at WQ- 01, WQ-02, or WQ-03, additional laboratory analysis for the exceedance parameter(s) will be conducted for the remaining sample sites (i.e., WQ-04a,b; WQ-05a,b,c), to determine if the exceedance is Project related or generated offsite.

The parameters provided in **Table 4** are reflective of those included in the City of Calgary Stormwater Management and Design Manual (2011). Project activities associated with the construction and operations phase of the Project are unlikely to have effects on microbiological indicators; as such they have been excluded from the Plan.

Table 4 Water Quality Parameters Monitored During the Plan

Sediment & Physical	
• Total Suspended Solids (TSS) • Total Dissolved Solids (TDS) • Turbidity	• Conductivity (EC) • pH • Dissolved Oxygen (DO)
Nutrients and Others (mg/L)	
• Biochemical Oxygen Demand (BOD) • Chemical Oxygen Demand (COD) • Nitrate (NO_3) • Nitrite (NO_2)	• Total Kjelahl Nitrogen (TKN) • Ammonia-Nitrogen (NH_3-N) • Total Phosphorus (TP) • Dissolved Reactive Phosphorus (TDP) • Ortho-Phosphate

Dissolved Metals & Metals (mg/L)			
• Silver (Ag)	• Cobalt (Co)	• Molybdenum (Mo)	• Tin (Sn)
• Aluminum (Al)	• Chromium (Cr)	• Nickel (Ni)	• Strontium (Sr)
• Arsenic (As)	• Copper (Cu	• Lead (P)	• Sodium (Na)
• Boron (B)	• Iron (Fe)	• Lead (Pb)	• Titanium (Ti)
• Barium (Ba)	• Potassium (K)	• Sulfur (S)	• Thallium (Tl)
• Beryllium (Be)	• Lithium (Li)	• Antimony (Sb)	• Uranium (U)
• Calcium (Ca)	• Magnesium (Mg)	• Selenium (Se)	• Vanadium (V)
• Cadmium (Cd)	• Manganese (Mn)	• Silicon (Si)	• Zinc (Zn)
Major Ions& Salts			
• Sodium (Na^{2+})		• Calcium (Ca^{2+})	
• Potassium (K^{+})		• Chloride (Cl^{-})	
• Potassium (K^{+})		• Sulfate (SO^{4-})	

Sediment and physical parameters provided in the first section of **Table 4** (i.e., TSS, TDS, turbidity, conductivity, dissolved oxygen, and pH) will be measured at all water quality monitoring sites listed in **Table 2**. In addition, water temperature, conductivity, pH, and dissolved oxygen which will be measured in-situ at all water quality monitoring sites provided in **Table 2.** These measurements will be taken below the water surface at approximately 60% water depth. Manufacturers instructions for calibration and measuring parameters will be followed.

In-situ measurements will be used as field indicators for any supplemental water quality sampling, if required. Field crews may collect additional water samples for analysis at the existing water sampling locations or at additional locations not included in **Table 2** if abnormal site conditions are observed or in-situ measurements indicate potential water quality abnormalities. Field indicators of potential hydrocarbons (e.g., oil sheen, odor) will be noted by field crews and a potential observation will trigger further water quality analysis for hydrocarbons.

4.4 Water Flow Monitoring

The proposed locations for surface water flow monitoring have been discussed in **Section 4.1**. Surface flow will be measured at each monitoring site using a HACH® velocity flow meter (or comparable model) and using the velocity-area method (Government of Alberta 2009). Using the surface water inflows and outflows of Wetland 06, a modified water balance will be completed. The sum of all surface water inflow and sum of all outflows will be compared for each seasonal sampling visit and between years of the Plan.

In addition to flow monitoring, field crews will deploy a water level staff gauge in both Wetland 06 and the reference wetland. Water depths will be recorded during each field sampling visit. Wetted widths will also be measured at four transects across Wetland 06 and the reference wetland. Transect locations will be recorded using a global positioning system (GPS) devise and natural landmarks will be recorded for replicability in the transect location from each seasonal field sampling visit during the Plan.

A comparison of the wetted widths and water depths of Wetland 06 and the reference wetland will be used to assess if the wetted perimeter of Wetland 06 is being reduced while accounting for natural fluctuations resulting in annual variability through comparison to the reference wetland.

4.5 Reporting

Surface water quality and flow results for each monitoring field visit will be made publicly available by KGL within one month of the seasonal field sampling event. The annual report, incorporating both seasonal field sampling visits will be made publicly available by KGL by March 31 of the year following the seasonal field sampling visits.

The annual report will include analysis of the surface water quality and flow results for both seasonal field visits. Surface water quality results will be compared relative the Environmental Quality Guidelines for Alberta Surface Waters (Government of Alberta 2014). Select surface water quality parameters (i.e., turbidity, temperature, pH, conductivity, dissolved oxygen, phosphate, and chloride) will also be compared to water quality parameters collected by the Weaselhead /Glenmore Park Preservation Society in 2016 within Wetland 06 as part of a baseline conditions environmental monitoring study (Porto 2017). This study will provide baseline conditions (i.e., prior to construction activities on the Project) in Wetland 06 with the limitation that not all water quality parameters measured in this Plan were included in the 2016 baseline study.

The annual report will also compare wetted width measurements and water depths in Wetland 06 versus the reference wetland to the north. Any change in wetted width or water depth recorded during prescribed sampling times (i.e., May and October) will be compared in the reference wetland to identify if changes in the wetland are due to Project effects or natural environmental conditions (e.g., drought). Following the first annual report, subsequent annual reports will also include a trend analysis through comparison of surface water quality and flow between years of the Plan.

5.0 CLOSURE

This Monitoring Plan has been developed to meet the monitoring requirements described in Condition 6.2 and other additional monitoring components that will enable identification of potential impacts to the surface water quality and flow of Wetland 06. Alternatively, the Plan may also identify and inform on other potential impacts that are not related to the Project.

In developing this Plan, Hemmera has relied in good faith on information provided by others and has assumed that the information provided by those individuals is both complete and accurate. This Plan was developed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale, but with specific reference to the Order. The Plan presented herein should be considered within the context of the scope of work and project terms of reference; further, the Plan is time sensitive and should considered valid only during the timeline included in this Plan. This Plan is based upon the applicable guidelines, regulations, and legislation existing at the time the Plan was produced.

Prepared by:
Hemmera Envirochem Inc.

per: Caitlin Gifford B.Sc., P.Biol.
Aquatic Biologist

Greg Eisler, B.Sc., P.Biol., R.P.Bio.
Senior Aquatic Biologist

6.0 REFERENCES

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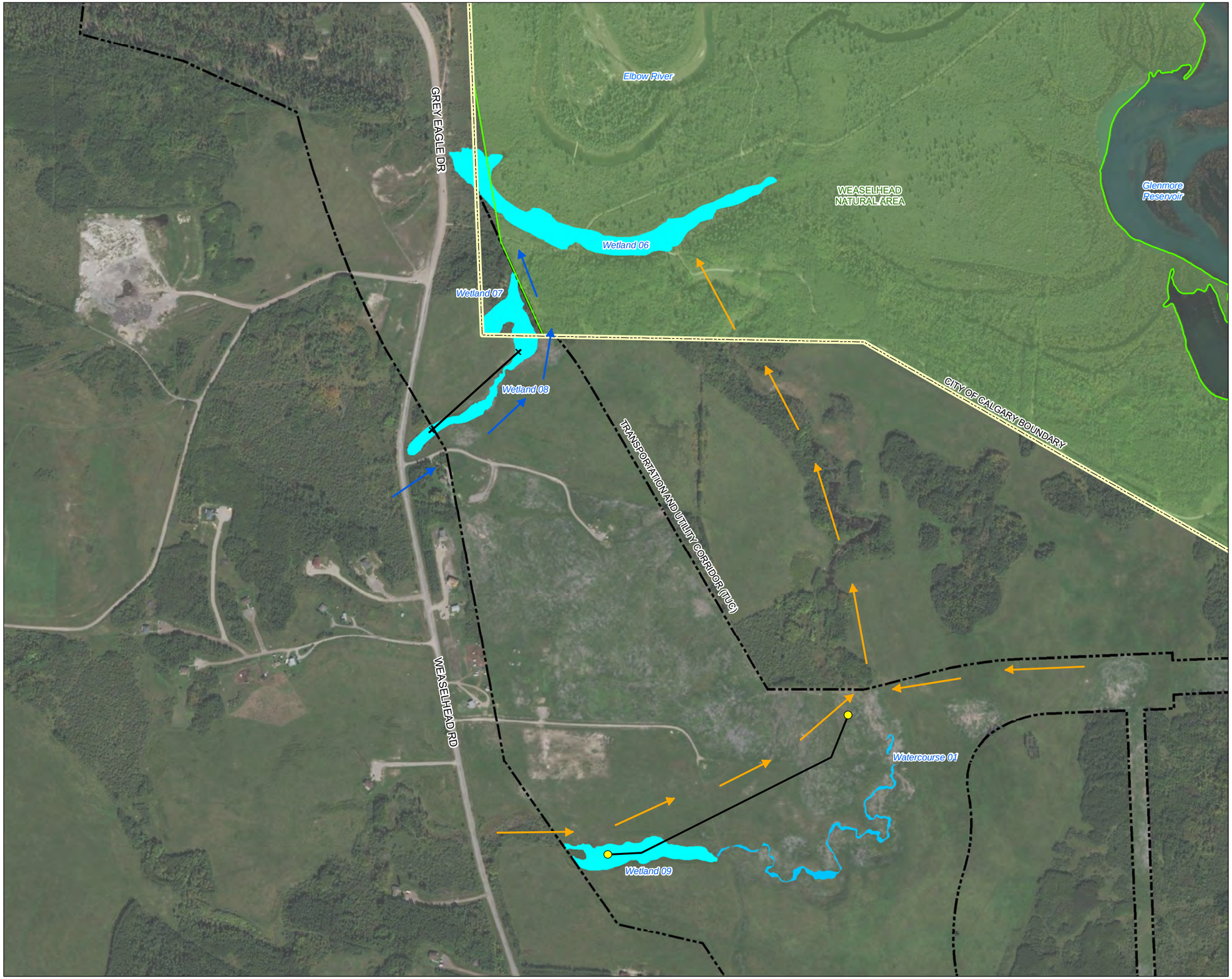
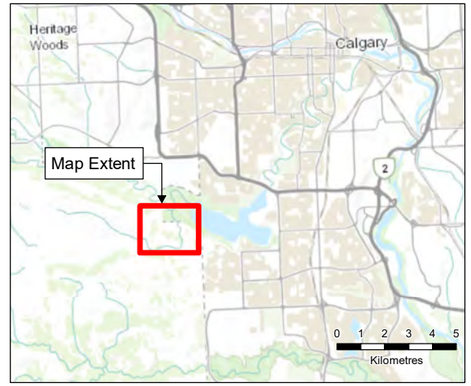
FIGURES

2018 Wetland Monitoring Program
Weaselhead Rd, Calgary AB

Wetland Locations





Legend

- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Watercourse
- Wetland

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Aerial Image: ESRI World Imagery, 2016
- Inset Basemap: ESRI World Topographic Map

N

1:7,500

0 100 200 300 400 500

Metres

NAD 1983 UTM Zone 11N

Page Size: 11" x 17"

102604-01	Production Date: May 17, 2018	Figure 1

Hemmera
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KGL

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2018 Wetland Monitoring Program
Weaselhead Rd, Calgary AB

Water Flow and Quality Sampling Locations

Legend

- Water Flow Sample Location (Hemmera, 2018)
- Water Quality Sample Location (Hemmera, 2018)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Watercourse
- Wetland

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Metres

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102604-01	Production Date: May 17, 2018	Figure 2

Hemmera
An Ausenco Company

KGL

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2018 Wetland Monitoring Program
Weaselhead Rd, Calgary AB

Water Flow and Quality Sampling Location Details

Legend

- Water Flow Sample Location (Hemmera, 2018)
- Water Quality Sample Location (Hemmera, 2018)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Wetland

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Sources

- Aerial Image: ESRI World Imagery, 2016

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0 25 50 75 100 125

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102604-01	Production Date: May 17, 2018	Figure 3

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Appendix B

Raw Spring Sampling Data

Your Project #: 102604-01
Your C.O.C. #: C#725060-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/05/29
Report #: R3506215
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C436402
Received: 2024/05/22, 16:25

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2024/05/24	AB SOP-00005	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	2	N/A	2024/05/28	AB SOP-00005	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2024/05/29	AB SOP-00005	SM 24 2320 B m
Biochemical Oxygen Demand	9	2024/05/23	2024/05/28	AB SOP-00017	SM 24 5210B m
Cadmium - low level CCME - Dissolved	9	N/A	2024/05/24		Auto Calc
Chloride/Sulphate by Auto Colourimetry	9	N/A	2024/05/23	AB SOP-00020	SM24-4500-Cl/SO4-E m
COD by Colorimeter	4	N/A	2024/05/23	AB SOP-00016	SM 24 5220D m
COD by Colorimeter	5	N/A	2024/05/24	AB SOP-00016	SM 24 5220D m
Oxygen (Dissolved) (1)	9	N/A	2024/05/23	AB SOP-00058	SM 23 4500-O C m
Conductivity @25C	1	N/A	2024/05/24	AB SOP-00005	SM 24 2510 B m
Conductivity @25C	2	N/A	2024/05/28	AB SOP-00005	SM 24 2510 B m
Conductivity @25C	6	N/A	2024/05/29	AB SOP-00005	SM 24 2510 B m
Hardness	2	N/A	2024/05/23		Auto Calc
Hardness	7	N/A	2024/05/24		Auto Calc
Elements by ICP - Dissolved (2)	9	N/A	2024/05/23	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (2)	5	N/A	2024/05/23	AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Dissolved (2)	4	N/A	2024/05/24	AB SOP-00043	EPA 6020b R2 m
Ion Balance	1	N/A	2024/05/24		Auto Calc
Ion Balance	8	N/A	2024/05/29		Auto Calc
Sum of cations, anions	2	N/A	2024/05/23		Auto Calc
Sum of cations, anions	7	N/A	2024/05/24		Auto Calc
Ammonia-N (Total)	9	N/A	2024/05/24	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite	9	N/A	2024/05/24		Auto Calc
NO2 (N); NO2 (N) + NO3 (N) in Water	3	N/A	2024/05/23	AB SOP-00091	SM 24 4500 NO3m
NO2 (N); NO2 (N) + NO3 (N) in Water	6	N/A	2024/05/24	AB SOP-00091	SM 24 4500 NO3m
Nitrate (as N)	9	2024/05/22	2024/05/24		Auto Calc
pH @25°C (3)	1	N/A	2024/05/24	AB SOP-00005	SM 24 4500-H+B m
pH @25°C (3)	2	N/A	2024/05/28	AB SOP-00005	SM 24 4500-H+B m
pH @25°C (3)	6	N/A	2024/05/29	AB SOP-00005	SM 24 4500-H+B m
Orthophosphate by Automated Analyzer (4)	9	N/A	2024/05/23	AB SOP-00025	SM 24 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	1	2024/05/24	2024/05/27	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Filt. Residue)	8	2024/05/27	2024/05/28	AB SOP-00065	SM 24 2540 C m

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 102604-01
Your C.O.C. #: C#725060-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/05/29
Report #: R3506215
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C436402
Received: 2024/05/22, 16:25

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Dissolved Solids (Calculated)	1	N/A	2024/05/24		Auto Calc
Total Dissolved Solids (Calculated)	8	N/A	2024/05/29		Auto Calc
Total Kjeldahl Nitrogen (Total)	3	N/A	2024/05/24	BBY WI-00033	Auto Calc
Total Kjeldahl Nitrogen (Total)	3	N/A	2024/05/28	BBY WI-00033	Auto Calc
Total Kjeldahl Nitrogen (Total)	3	N/A	2024/05/29	BBY WI-00033	Auto Calc
Nitrogen (Total)	3	2024/05/24	2024/05/24	AB SOP-00093	SM 24 4500-N C m
Nitrogen (Total)	6	2024/05/27	2024/05/28	AB SOP-00093	SM 24 4500-N C m
Total Phosphorus Dissolved client FF/FP (5)	9	2024/05/24	2024/05/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	6	2024/05/24	2024/05/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	3	2024/05/28	2024/05/28	AB SOP-00024	SM 24 4500-P A,B,F m
Total Suspended Solids (NFR)	1	2024/05/23	2024/05/23	AB SOP-00061	SM 24 2540 D m
Total Suspended Solids (NFR)	8	2024/05/24	2024/05/28	AB SOP-00061	SM 24 2540 D m
Turbidity	9	N/A	2024/05/23	CAL SOP-00081	SM 24 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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Your Project #: 102604-01
Your C.O.C. #: C#725060-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/05/29
Report #: R3506215
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C436402

Received: 2024/05/22, 16:25

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The APHA Standard Method requires dissolved oxygen to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory dissolved oxygen analyses in this report are reported past the APHA Standard Method holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt.
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
(4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(5) Dissolved Phosphorus > Total Phosphorus Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

Encryption Key

Bureau Veritas
29 May 2024 18:11:32

Please direct all questions regarding this Certificate of Analysis to:
Danielle Boisvert, Customer Solutions Representative
Email: danielle-andrea.boisvert@bureauveritas.com
Phone# (780)577-7178

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX430			CNX431		
Sampling Date		2024/05/22 12:00			2024/05/22 12:30		
COC Number		C#725060-02-01			C#725060-02-01		
	UNITS	WQ-02	RDL	QC Batch	WQ-03	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	12	N/A	B376223	13	N/A	B376223
Cation Sum	meq/L	11	N/A	B376223	13	N/A	B376223
Hardness (CaCO3)	mg/L	440	0.50	B376359	560	0.50	B376359
Ion Balance (% Difference)	%	0.75	N/A	B376222	0.92	N/A	B376222
Nitrate (N)	mg/L	<0.010	0.010	B376361	0.057	0.050	B376361
Nitrate (NO3)	mg/L	<0.044	0.044	B377784	0.25	0.22	B377784
Nitrite (NO2)	mg/L	<0.033	0.033	B377784	<0.033	0.033	B377784
Calculated Total Dissolved Solids	mg/L	620	10	B376225	720	10	B376225
Elements							
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B375674	<0.000020	0.000020	B375674
Misc. Inorganics							
Conductivity	uS/cm	940	2.0	B382009	1100	2.0	B382429
pH	pH	8.18	N/A	B382008	8.18	N/A	B382428
Anions							
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B382004	<1.0	1.0	B382425
Alkalinity (Total as CaCO3)	mg/L	350	1.0	B382004	300	1.0	B382425
Bicarbonate (HCO3)	mg/L	420	1.0	B382004	370	1.0	B382425
Carbonate (CO3)	mg/L	<1.0	1.0	B382004	<1.0	1.0	B382425
Hydroxide (OH)	mg/L	<1.0	1.0	B382004	<1.0	1.0	B382425
Chloride (Cl)	mg/L	25	1.0	B377868	20	1.0	B377868
Sulphate (SO4)	mg/L	190	5.0	B377868	290	5.0	B377868
Nutrients							
Nitrite (N)	mg/L	<0.010	0.010	B377890	<0.010	0.010	B378306
Nitrate plus Nitrite (N)	mg/L	<0.010	0.010	B377890	0.057 (1)	0.050	B378306
Elements							
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B376811	<0.0030	0.0030	B376811
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B376811	<0.00060	0.00060	B376811
Dissolved Arsenic (As)	mg/L	0.00093	0.00020	B376811	0.00055	0.00020	B376811
Dissolved Barium (Ba)	mg/L	0.071	0.010	B377758	0.074	0.010	B377758
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Boron (B)	mg/L	0.046	0.020	B377758	0.053	0.020	B377758

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX430			CNX431		
Sampling Date		2024/05/22 12:00			2024/05/22 12:30		
COC Number		C#725060-02-01			C#725060-02-01		
	UNITS	WQ-02	RDL	QC Batch	WQ-03	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	85	0.30	B377758	130	0.30	B377758
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B376811	<0.00030	0.00030	B376811
Dissolved Copper (Cu)	mg/L	0.0037	0.0010	B376811	0.0017	0.0010	B376811
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B377758	<0.060	0.060	B377758
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Lithium (Li)	mg/L	0.028	0.020	B377758	0.033	0.020	B377758
Dissolved Magnesium (Mg)	mg/L	56	0.20	B377758	61	0.20	B377758
Dissolved Manganese (Mn)	mg/L	0.0040	0.0040	B377758	0.012	0.0040	B377758
Dissolved Molybdenum (Mo)	mg/L	0.0060	0.00020	B376811	0.0060	0.00020	B376811
Dissolved Nickel (Ni)	mg/L	0.0012	0.00050	B376811	0.0014	0.00050	B376811
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B377758	<0.10	0.10	B377758
Dissolved Potassium (K)	mg/L	4.8	0.30	B377758	7.7	0.30	B377758
Dissolved Selenium (Se)	mg/L	0.00096	0.00020	B376811	0.0030	0.00020	B376811
Dissolved Silicon (Si)	mg/L	4.8	0.50	B377758	2.8	0.50	B377758
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B376811	<0.00010	0.00010	B376811
Dissolved Sodium (Na)	mg/L	56	0.50	B377758	33	0.50	B377758
Dissolved Strontium (Sr)	mg/L	0.69	0.020	B377758	0.73	0.020	B377758
Dissolved Sulphur (S)	mg/L	53	0.20	B377758	91	0.20	B377758
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Uranium (U)	mg/L	0.012	0.00010	B376811	0.010	0.00010	B376811
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	B376811	<0.0030	0.0030	B376811
RDL = Reportable Detection Limit							

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX432		CNX433			CNX434		
Sampling Date		2024/05/22 13:45		2024/05/22 09:30			2024/05/22 11:40		
COC Number		C#725060-02-01		C#725060-02-01			C#725060-02-01		
	UNITS	WQ-4A	RDL	WQ-4B	RDL	QC Batch	WQ-4C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.0	N/A	12	N/A	B376223	9.8	N/A	B376223
Cation Sum	meq/L	9.6	N/A	12	N/A	B376223	10	N/A	B376223
Hardness (CaCO3)	mg/L	380	0.50	350	0.50	B376359	390	0.50	B376359
Ion Balance (% Difference)	%	3.5	N/A	0.42	N/A	B376222	0.79	N/A	B376222
Nitrate (N)	mg/L	0.66	0.010	0.61	0.010	B376361	0.022	0.010	B376361
Nitrate (NO3)	mg/L	2.9	0.044	2.7	0.044	B377784	0.096	0.044	B377784
Nitrite (NO2)	mg/L	<0.033	0.033	0.067	0.033	B377784	<0.033	0.033	B377784
Calculated Total Dissolved Solids	mg/L	470	10	650	10	B376225	500	10	B376225
Elements									
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	<0.000020	0.000020	B375674	<0.000020	0.000020	B376553
Misc. Inorganics									
Conductivity	uS/cm	780	2.0	1400	2.0	B382429	800	2.0	B378351
pH	pH	8.06	N/A	8.22	N/A	B382428	8.34	N/A	B378349
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	B382425	6.9	1.0	B378348
Alkalinity (Total as CaCO3)	mg/L	380	1.0	200	1.0	B382425	400	1.0	B378348
Bicarbonate (HCO3)	mg/L	460	1.0	250	1.0	B382425	470	1.0	B378348
Carbonate (CO3)	mg/L	<1.0	1.0	<1.0	1.0	B382425	8.3	1.0	B378348
Hydroxide (OH)	mg/L	<1.0	1.0	<1.0	1.0	B382425	<1.0	1.0	B378348
Chloride (Cl)	mg/L	7.4	1.0	260	5.0	B377868	18	1.0	B377868
Sulphate (SO4)	mg/L	57	1.0	32	1.0	B377868	68	1.0	B377868
Nutrients									
Nitrite (N)	mg/L	<0.010	0.010	0.020	0.010	B378306	<0.010	0.010	B378306
Nitrate plus Nitrite (N)	mg/L	0.66	0.010	0.63	0.010	B378306	0.022	0.010	B378306
Elements									
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	0.0044	0.0030	B376811	<0.0030	0.0030	B376811
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	0.00060	B376811	<0.00060	0.00060	B376811
Dissolved Arsenic (As)	mg/L	<0.00020	0.00020	0.00026	0.00020	B376811	0.00039	0.00020	B376811
Dissolved Barium (Ba)	mg/L	0.063	0.010	0.11	0.010	B377140	0.078	0.010	B377140
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Boron (B)	mg/L	0.039	0.020	0.031	0.020	B377140	0.043	0.020	B377140

RDL = Reportable Detection Limit
N/A = Not Applicable

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX432		CNX433			CNX434		
Sampling Date		2024/05/22 13:45		2024/05/22 09:30			2024/05/22 11:40		
COC Number		C#725060-02-01		C#725060-02-01			C#725060-02-01		
	UNITS	**WQ-4A**	**RDL**	**WQ-4B**	**RDL**	**QC Batch**	**WQ-4C**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	79	0.30	72	0.30	B377140	68	0.30	B377140
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	0.0011	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	0.0014	0.00030	B376811	<0.00030	0.00030	B376811
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	0.0033	0.0010	B376811	0.0011	0.0010	B376811
Dissolved Iron (Fe)	mg/L	<0.060	0.060	<0.060	0.060	B377140	<0.060	0.060	B377140
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Lithium (Li)	mg/L	0.043	0.020	0.036	0.020	B377140	0.035	0.020	B377140
Dissolved Magnesium (Mg)	mg/L	45	0.20	42	0.20	B377140	53	0.20	B377140
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	0.023	0.0040	B377140	<0.0040	0.0040	B377140
Dissolved Molybdenum (Mo)	mg/L	0.0026	0.00020	0.0032	0.00020	B376811	0.0018	0.00020	B376811
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	0.0014	0.00050	B376811	0.00052	0.00050	B376811
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	<0.10	0.10	B377140	<0.10	0.10	B377140
Dissolved Potassium (K)	mg/L	4.2	0.30	4.6	0.30	B377140	4.0	0.30	B377140
Dissolved Selenium (Se)	mg/L	0.0020	0.00020	0.00087	0.00020	B376811	0.0020	0.00020	B376811
Dissolved Silicon (Si)	mg/L	4.6	0.50	2.8	0.50	B377140	5.1	0.50	B377140
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	0.00010	B376811	<0.00010	0.00010	B376811
Dissolved Sodium (Na)	mg/L	44	0.50	120	0.50	B377140	48	0.50	B377140
Dissolved Strontium (Sr)	mg/L	0.67	0.020	0.59	0.020	B377140	0.65	0.020	B377140
Dissolved Sulphur (S)	mg/L	18	0.20	9.3	0.20	B377140	21	0.20	B377140
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Uranium (U)	mg/L	0.0039	0.00010	0.0020	0.00010	B376811	0.0063	0.00010	B376811
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	0.0099	0.0030	B376811	0.0050	0.0030	B376811
RDL = Reportable Detection Limit									

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX435			CNX436		
Sampling Date		2024/05/22 09:00			2024/05/22 08:30		
COC Number		C#725060-02-01			C#725060-02-01		
	UNITS	WQ-4D	RDL	QC Batch	WQ-5B	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	9.1	N/A	B376223	12	N/A	B376223
Cation Sum	meq/L	9.5	N/A	B376223	13	N/A	B376223
Hardness (CaCO3)	mg/L	370	0.50	B376359	550	0.50	B376359
Ion Balance (% Difference)	%	2.2	N/A	B376222	4.1	N/A	B376222
Nitrate (N)	mg/L	<0.010	0.010	B376361	<0.050	0.050	B376361
Nitrate (NO3)	mg/L	<0.044	0.044	B377784	<0.22	0.22	B377784
Nitrite (NO2)	mg/L	<0.033	0.033	B377784	<0.033	0.033	B377784
Calculated Total Dissolved Solids	mg/L	460	10	B376225	610	10	B376559
Elements							
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B376553	<0.000020	0.000020	B376553
Misc. Inorganics							
Conductivity	uS/cm	770	2.0	B382429	980	2.0	B382009
pH	pH	8.46	N/A	B382428	7.86	N/A	B382008
Anions							
Alkalinity (PP as CaCO3)	mg/L	10	1.0	B382425	<1.0	1.0	B382004
Alkalinity (Total as CaCO3)	mg/L	380	1.0	B382425	450	1.0	B382004
Bicarbonate (HCO3)	mg/L	440	1.0	B382425	550	1.0	B382004
Carbonate (CO3)	mg/L	12	1.0	B382425	<1.0	1.0	B382004
Hydroxide (OH)	mg/L	<1.0	1.0	B382425	<1.0	1.0	B382004
Chloride (Cl)	mg/L	14	1.0	B377868	23	1.0	B377867
Sulphate (SO4)	mg/L	52	1.0	B377868	99	1.0	B377867
Nutrients							
Nitrite (N)	mg/L	<0.010	0.010	B378306	<0.010	0.010	B377890
Nitrate plus Nitrite (N)	mg/L	<0.010	0.010	B378306	<0.050 (1)	0.050	B377890
Elements							
Dissolved Aluminum (Al)	mg/L	0.0045	0.0030	B376811	<0.0030	0.0030	B376811
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B376811	<0.00060	0.00060	B376811
Dissolved Arsenic (As)	mg/L	0.00028	0.00020	B376811	0.00091	0.00020	B376811
Dissolved Barium (Ba)	mg/L	0.069	0.010	B377140	0.16	0.010	B377140
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Boron (B)	mg/L	0.039	0.020	B377140	0.029	0.020	B377140

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX435			CNX436		
Sampling Date		2024/05/22 09:00			2024/05/22 08:30		
COC Number		C#725060-02-01			C#725060-02-01		
	UNITS	**WQ-4D**	**RDL**	**QC Batch**	**WQ-5B**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	70	0.30	B377140	95	0.30	B377140
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B376811	<0.00030	0.00030	B376811
Dissolved Copper (Cu)	mg/L	0.0073	0.0010	B376811	0.0013	0.0010	B376811
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B377140	<0.060	0.060	B377140
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Lithium (Li)	mg/L	0.034	0.020	B377140	0.033	0.020	B377140
Dissolved Magnesium (Mg)	mg/L	48	0.20	B377140	75	0.20	B377140
Dissolved Manganese (Mn)	mg/L	0.013	0.0040	B377140	0.062	0.0040	B377140
Dissolved Molybdenum (Mo)	mg/L	0.0010	0.00020	B376811	0.0025	0.00020	B376811
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	B376811	0.0011	0.00050	B376811
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B377140	<0.10	0.10	B377140
Dissolved Potassium (K)	mg/L	3.9	0.30	B377140	5.1	0.30	B377140
Dissolved Selenium (Se)	mg/L	0.00047	0.00020	B376811	0.0016	0.00020	B376811
Dissolved Silicon (Si)	mg/L	5.2	0.50	B377140	3.2	0.50	B377140
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B376811	<0.00010	0.00010	B376811
Dissolved Sodium (Na)	mg/L	44	0.50	B377140	40	0.50	B377140
Dissolved Strontium (Sr)	mg/L	0.63	0.020	B377140	0.64	0.020	B377140
Dissolved Sulphur (S)	mg/L	16	0.20	B377140	35	0.20	B377140
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Uranium (U)	mg/L	0.0024	0.00010	B376811	0.0073	0.00010	B376811
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Zinc (Zn)	mg/L	0.035	0.0030	B376811	<0.0030	0.0030	B376811
RDL = Reportable Detection Limit							

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX437		CNX438		
Sampling Date		2024/05/22 11:25		2024/05/22 11:15		
COC Number		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-06	QC Batch	WQ-07	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	11	B376557	11	N/A	B376557
Cation Sum	meq/L	12	B376557	11	N/A	B376557
Hardness (CaCO3)	mg/L	460	B376359	450	0.50	B376555
Ion Balance (% Difference)	%	2.5	B376556	2.5	N/A	B376556
Nitrate (N)	mg/L	<0.010	B376361	<0.010	0.010	B376361
Nitrate (NO3)	mg/L	<0.044	B377784	<0.044	0.044	B377784
Nitrite (NO2)	mg/L	<0.033	B377784	<0.033	0.033	B377784
Calculated Total Dissolved Solids	mg/L	610	B376559	600	10	B376559
Elements						
Dissolved Cadmium (Cd)	mg/L	<0.000020	B376553	<0.000020	0.000020	B376553
Misc. Inorganics						
Conductivity	uS/cm	940	B382429	930	2.0	B382429
pH	pH	8.41	B382428	8.35	N/A	B382428
Anions						
Alkalinity (PP as CaCO3)	mg/L	7.6	B382425	4.1	1.0	B382425
Alkalinity (Total as CaCO3)	mg/L	330	B382425	300	1.0	B382425
Bicarbonate (HCO3)	mg/L	380	B382425	360	1.0	B382425
Carbonate (CO3)	mg/L	9.1	B382425	4.9	1.0	B382425
Hydroxide (OH)	mg/L	<1.0	B382425	<1.0	1.0	B382425
Chloride (Cl)	mg/L	27	B377868	28	1.0	B377868
Sulphate (SO4)	mg/L	180	B377868	190	5.0	B377868
Nutrients						
Nitrite (N)	mg/L	<0.010	B377890	<0.010	0.010	B377890
Nitrate plus Nitrite (N)	mg/L	<0.010	B377890	<0.010	0.010	B377890
Elements						
Dissolved Aluminum (Al)	mg/L	<0.0030	B376811	<0.0030	0.0030	B376811
Dissolved Antimony (Sb)	mg/L	<0.00060	B376811	<0.00060	0.00060	B376811
Dissolved Arsenic (As)	mg/L	0.0010	B376811	0.00095	0.00020	B376811
Dissolved Barium (Ba)	mg/L	0.074	B377140	0.069	0.010	B377140
Dissolved Beryllium (Be)	mg/L	<0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Boron (B)	mg/L	0.047	B377140	0.048	0.020	B377140

RDL = Reportable Detection Limit
N/A = Not Applicable

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CNX437		CNX438		
Sampling Date		2024/05/22 11:25		2024/05/22 11:15		
COC Number		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-06	QC Batch	WQ-07	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	74	B377140	74	0.30	B377140
Dissolved Chromium (Cr)	mg/L	<0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Cobalt (Co)	mg/L	<0.00030	B376811	<0.00030	0.00030	B376811
Dissolved Copper (Cu)	mg/L	0.0011	B376811	0.0012	0.0010	B376811
Dissolved Iron (Fe)	mg/L	<0.060	B377140	<0.060	0.060	B377140
Dissolved Lead (Pb)	mg/L	<0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Lithium (Li)	mg/L	0.040	B377140	0.044	0.020	B377140
Dissolved Magnesium (Mg)	mg/L	66	B377140	65	0.20	B377140
Dissolved Manganese (Mn)	mg/L	0.010	B377140	0.025	0.0040	B377140
Dissolved Molybdenum (Mo)	mg/L	0.0048	B376811	0.012	0.00020	B376811
Dissolved Nickel (Ni)	mg/L	0.0016	B376811	0.0012	0.00050	B376811
Dissolved Phosphorus (P)	mg/L	<0.10	B377140	<0.10	0.10	B377140
Dissolved Potassium (K)	mg/L	5.2	B377140	5.7	0.30	B377140
Dissolved Selenium (Se)	mg/L	0.0017	B376811	0.0016	0.00020	B376811
Dissolved Silicon (Si)	mg/L	2.4	B377140	1.9	0.50	B377140
Dissolved Silver (Ag)	mg/L	<0.00010	B376811	<0.00010	0.00010	B376811
Dissolved Sodium (Na)	mg/L	54	B377140	52	0.50	B377140
Dissolved Strontium (Sr)	mg/L	0.71	B377140	0.70	0.020	B377140
Dissolved Sulphur (S)	mg/L	56	B377140	61	0.20	B377140
Dissolved Thallium (Tl)	mg/L	<0.00020	B376811	<0.00020	0.00020	B376811
Dissolved Tin (Sn)	mg/L	<0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Titanium (Ti)	mg/L	<0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Uranium (U)	mg/L	0.010	B376811	0.0097	0.00010	B376811
Dissolved Vanadium (V)	mg/L	<0.0010	B376811	<0.0010	0.0010	B376811
Dissolved Zinc (Zn)	mg/L	<0.0030	B376811	<0.0030	0.0030	B376811

RDL = Reportable Detection Limit

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TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		CNX430			CNX431			CNX432		
Sampling Date		2024/05/22 12:00			2024/05/22 12:30			2024/05/22 13:45		
COC Number		C#725060-02-01			C#725060-02-01			C#725060-02-01		
	UNITS	WQ-02	RDL	QC Batch	WQ-03	RDL	QC Batch	WQ-4A	RDL	QC Batch
Calculated Parameters										
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.963	0.020	B377787	0.853	0.050	B377787	0.170	0.020	B377787
Nutrients										
Total Nitrogen (N)	mg/L	0.96	0.020	B380912	0.91	0.020	B380914	0.83	0.020	B380912
RDL = Reportable Detection Limit										

Bureau Veritas ID		CNX433		CNX434	CNX435		
Sampling Date		2024/05/22 09:30		2024/05/22 11:40	2024/05/22 09:00		
COC Number		C#725060-02-01		C#725060-02-01	C#725060-02-01		
	UNITS	WQ-4B	QC Batch	WQ-4C	WQ-4D	RDL	QC Batch
Calculated Parameters							
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.701	B377787	0.475	0.502	0.020	B377787
Nutrients							
Total Nitrogen (N)	mg/L	1.3	B380912	0.50	0.50	0.020	B380914
RDL = Reportable Detection Limit							

Bureau Veritas ID		CNX436		CNX437	CNX438		
Sampling Date		2024/05/22 08:30		2024/05/22 11:25	2024/05/22 11:15		
COC Number		C#725060-02-01		C#725060-02-01	C#725060-02-01		
	UNITS	WQ-5B	RDL	WQ-06	WQ-07	RDL	QC Batch
Calculated Parameters							
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.830	0.050	0.865	0.981	0.020	B377787
Nutrients							
Total Nitrogen (N)	mg/L	0.83	0.020	0.87	0.98	0.020	B378437
RDL = Reportable Detection Limit							

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RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CNX430		CNX431			CNX432		
Sampling Date		2024/05/22 12:00		2024/05/22 12:30			2024/05/22 13:45		
COC Number		C#725060-02-01		C#725060-02-01			C#725060-02-01		
	UNITS	WQ-02	QC Batch	WQ-03	RDL	QC Batch	WQ-4A	RDL	QC Batch
Demand Parameters									
Biochemical Oxygen Demand	mg/L	3.0	B376629	<2.0	2.0	B376629	<2.0	2.0	B376629
Chemical Oxygen Demand	mg/L	37	B377383	27	10	B377383	<10	10	B377383
Misc. Inorganics									
Dissolved Oxygen (O2)	mg/L	9.0	B376917	6.6	0.10	B376917	1.6	0.10	B376917
Total Dissolved Solids	mg/L	810	B380007	840	10	B380007	500	10	B380007
Total Suspended Solids	mg/L	4.6	B378867	<1.0	1.0	B378867	22	0.99	B378867
Nutrients									
Total Ammonia (N)	mg/L	<0.015	B378406	0.025	0.015	B378406	<0.015	0.015	B378406
Orthophosphate (P)	mg/L	<0.0030	B377553	<0.0030	0.0030	B377553	<0.0030	0.0030	B377553
Dissolved Phosphorus (P)	mg/L	0.010	B378439	0.0031	0.0030	B378439	<0.0030	0.0030	B378439
Total Phosphorus (P)	mg/L	0.017	B378466	0.0065	0.0030	B378453	<0.0030	0.0030	B378466
Physical Properties									
Turbidity	NTU	1.4	B377419	0.98	0.10	B377419	8.3	0.10	B377419
RDL = Reportable Detection Limit									

Bureau Veritas ID		CNX433			CNX434		CNX435		
Sampling Date		2024/05/22 09:30			2024/05/22 11:40		2024/05/22 09:00		
COC Number		C#725060-02-01			C#725060-02-01		C#725060-02-01		
	UNITS	WQ-4B	RDL	QC Batch	WQ-4C	QC Batch	WQ-4D	RDL	QC Batch
Demand Parameters									
Biochemical Oxygen Demand	mg/L	4.9	2.0	B376629	<2.0	B376629	<2.0	2.0	B376629
Chemical Oxygen Demand	mg/L	60	10	B377383	10	B378220	10	10	B378220
Misc. Inorganics									
Dissolved Oxygen (O2)	mg/L	10	0.10	B376917	10	B376917	9.8	0.10	B376917
Total Dissolved Solids	mg/L	750	10	B380007	520	B380007	500	10	B380007
Total Suspended Solids	mg/L	53	0.99	B378867	2.7	B378867	31	1.0	B378867
Nutrients									
Total Ammonia (N)	mg/L	0.034	0.015	B378406	<0.015	B378406	<0.015	0.015	B378406
Orthophosphate (P)	mg/L	<0.0030	0.0030	B377553	<0.0030	B377553	0.0035	0.0030	B377553
Dissolved Phosphorus (P)	mg/L	0.0067	0.0030	B378439	<0.0030	B378439	<0.0030 (1)	0.0030	B378439
Total Phosphorus (P)	mg/L	0.039	0.0030	B378466	0.0031	B378453	0.0065	0.0030	B378466
Physical Properties									
Turbidity	NTU	59	0.10	B377419	2.5	B377419	7.8	0.10	B377419
RDL = Reportable Detection Limit									
(1) Phosphorus < Orthophosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.									

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RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CNX436			CNX437	CNX438		
Sampling Date		2024/05/22 08:30			2024/05/22 11:25	2024/05/22 11:15		
COC Number		C#725060-02-01			C#725060-02-01	C#725060-02-01		
	UNITS	**WQ-5B**	**RDL**	**QC Batch**	**WQ-06**	**WQ-07**	**RDL**	**QC Batch**
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	2.0	B376629	<2.0	2.3	2.0	B376629
Chemical Oxygen Demand	mg/L	18	10	B378220	27	30	10	B378220
Misc. Inorganics								
Dissolved Oxygen (O2)	mg/L	3.6	0.10	B376917	8.8	7.2	0.10	B376917
Total Dissolved Solids	mg/L	600	10	B378024	650	650	10	B380007
Total Suspended Solids	mg/L	11	0.96	B377191	4.2	1.3	1.0	B378867
Nutrients								
Total Ammonia (N)	mg/L	<0.015	0.015	B378406	<0.015	<0.015	0.015	B378406
Orthophosphate (P)	mg/L	0.0063	0.0030	B377553	<0.0030	<0.0030	0.0030	B377553
Dissolved Phosphorus (P)	mg/L	0.0034 (1)	0.0030	B378439	0.0065	0.0080	0.0030	B378439
Total Phosphorus (P)	mg/L	0.012	0.0030	B381473	0.016	0.016	0.0030	B381473
Physical Properties								
Turbidity	NTU	8.0	0.10	B376656	2.8	2.9	0.10	B377419

RDL = Reportable Detection Limit

(1) Phosphorus < Orthophosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.4°C
Package 2	10.0°C
Package 3	7.5°C

Sample CNX430 [WQ-02] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX431 [WQ-03] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX432 [WQ-4A] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX433 [WQ-4B] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX434 [WQ-4C] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX435 [WQ-4D] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX436 [WQ-5B] : Sample was analyzed past method specified hold time for Orthophosphate by Automated Analyzer. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Turbidity. CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt. Sample was analyzed past method specified hold time for Total Suspended Solids (NFR). Sample was analyzed past method specified hold time for Chloride/Sulphate by Auto Colourimetry. Sample was analyzed past method specified hold time for NO2 (N); NO2 (N) + NO3 (N) in Water. Sample was analyzed past method specified hold time for Total Dissolved Solids (Filt. Residue). Sample was analyzed past method specified hold time for Total Phosphorus Dissolved client FF/FP. Sample was analyzed past method specified hold time for Ammonia-N (Total). Sample was analyzed past method specified hold time for COD by Colorimeter.

Sample CNX437 [WQ-06] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CNX438 [WQ-07] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B376629	BYM	Spiked Blank	Biochemical Oxygen Demand	2024/05/28		93	%	85 - 115
B376629	BYM	Method Blank	Biochemical Oxygen Demand	2024/05/28	<2.0		mg/L	
B376629	BYM	RPD	Biochemical Oxygen Demand	2024/05/28	5.8		%	20
B376656	CT6	Spiked Blank	Turbidity	2024/05/23		100	%	80 - 120
B376656	CT6	Method Blank	Turbidity	2024/05/23	<0.10		NTU	
B376656	CT6	RPD [CNX436-01]	Turbidity	2024/05/23	18		%	20
B376811	JAB	Matrix Spike	Dissolved Aluminum (Al)	2024/05/23		95	%	80 - 120
			Dissolved Antimony (Sb)	2024/05/23		97	%	80 - 120
			Dissolved Arsenic (As)	2024/05/23		107	%	80 - 120
			Dissolved Beryllium (Be)	2024/05/23		104	%	80 - 120
			Dissolved Chromium (Cr)	2024/05/23		102	%	80 - 120
			Dissolved Cobalt (Co)	2024/05/23		104	%	80 - 120
			Dissolved Copper (Cu)	2024/05/23		102	%	80 - 120
			Dissolved Lead (Pb)	2024/05/23		97	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/05/23		110	%	80 - 120
			Dissolved Nickel (Ni)	2024/05/23		106	%	80 - 120
			Dissolved Selenium (Se)	2024/05/23		109	%	80 - 120
			Dissolved Silver (Ag)	2024/05/23		97	%	80 - 120
			Dissolved Thallium (Tl)	2024/05/23		98	%	80 - 120
			Dissolved Tin (Sn)	2024/05/23		98	%	80 - 120
			Dissolved Titanium (Ti)	2024/05/23		100	%	80 - 120
			Dissolved Uranium (U)	2024/05/23		97	%	80 - 120
			Dissolved Vanadium (V)	2024/05/23		104	%	80 - 120
			Dissolved Zinc (Zn)	2024/05/23		109	%	80 - 120
B376811	JAB	Spiked Blank	Dissolved Aluminum (Al)	2024/05/23		99	%	80 - 120
			Dissolved Antimony (Sb)	2024/05/23		96	%	80 - 120
			Dissolved Arsenic (As)	2024/05/23		104	%	80 - 120
			Dissolved Beryllium (Be)	2024/05/23		105	%	80 - 120
			Dissolved Chromium (Cr)	2024/05/23		102	%	80 - 120
			Dissolved Cobalt (Co)	2024/05/23		105	%	80 - 120
			Dissolved Copper (Cu)	2024/05/23		106	%	80 - 120
			Dissolved Lead (Pb)	2024/05/23		101	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/05/23		104	%	80 - 120
			Dissolved Nickel (Ni)	2024/05/23		104	%	80 - 120
			Dissolved Selenium (Se)	2024/05/23		105	%	80 - 120
			Dissolved Silver (Ag)	2024/05/23		100	%	80 - 120
			Dissolved Thallium (Tl)	2024/05/23		100	%	80 - 120
			Dissolved Tin (Sn)	2024/05/23		95	%	80 - 120
			Dissolved Titanium (Ti)	2024/05/23		100	%	80 - 120
			Dissolved Uranium (U)	2024/05/23		98	%	80 - 120
			Dissolved Vanadium (V)	2024/05/23		102	%	80 - 120
			Dissolved Zinc (Zn)	2024/05/23		107	%	80 - 120
B376811	JAB	Method Blank	Dissolved Aluminum (Al)	2024/05/24	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2024/05/24	<0.00060		mg/L	
			Dissolved Arsenic (As)	2024/05/24	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2024/05/24	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2024/05/24	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2024/05/24	<0.00030		mg/L	
			Dissolved Copper (Cu)	2024/05/24	<0.0010		mg/L	
			Dissolved Lead (Pb)	2024/05/24	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2024/05/24	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2024/05/24	<0.00050		mg/L	
			Dissolved Selenium (Se)	2024/05/24	<0.00020		mg/L	
			Dissolved Silver (Ag)	2024/05/24	<0.00010		mg/L	

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			Dissolved Thallium (Tl)	2024/05/24	<0.00020		mg/L	
			Dissolved Tin (Sn)	2024/05/24	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2024/05/24	<0.0010		mg/L	
			Dissolved Uranium (U)	2024/05/24	<0.00010		mg/L	
			Dissolved Vanadium (V)	2024/05/24	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2024/05/24	<0.0030		mg/L	
B376811	JAB	RPD	Dissolved Aluminum (Al)	2024/05/24	NC		%	20
			Dissolved Antimony (Sb)	2024/05/24	NC		%	20
			Dissolved Arsenic (As)	2024/05/24	9.3		%	20
			Dissolved Beryllium (Be)	2024/05/24	NC		%	20
			Dissolved Chromium (Cr)	2024/05/24	NC		%	20
			Dissolved Cobalt (Co)	2024/05/24	0		%	20
			Dissolved Copper (Cu)	2024/05/24	NC		%	20
			Dissolved Lead (Pb)	2024/05/24	NC		%	20
			Dissolved Molybdenum (Mo)	2024/05/24	37 (1)		%	20
			Dissolved Nickel (Ni)	2024/05/24	3.8		%	20
			Dissolved Selenium (Se)	2024/05/24	NC		%	20
			Dissolved Silver (Ag)	2024/05/24	NC		%	20
			Dissolved Thallium (Tl)	2024/05/24	NC		%	20
			Dissolved Tin (Sn)	2024/05/24	NC		%	20
			Dissolved Titanium (Ti)	2024/05/24	NC		%	20
			Dissolved Uranium (U)	2024/05/24	0.48		%	20
			Dissolved Vanadium (V)	2024/05/24	NC		%	20
			Dissolved Zinc (Zn)	2024/05/24	NC		%	20
B376917	BYM	Spiked Blank	Dissolved Oxygen (O2)	2024/05/23		95	%	80 - 120
B376917	BYM	RPD [CNX430-07]	Dissolved Oxygen (O2)	2024/05/23	0		%	20
B377140	S1D	Matrix Spike	Dissolved Barium (Ba)	2024/05/23		26 (1)	%	80 - 120
			Dissolved Boron (B)	2024/05/23		93	%	80 - 120
			Dissolved Calcium (Ca)	2024/05/23		NC	%	80 - 120
			Dissolved Iron (Fe)	2024/05/23		111	%	80 - 120
			Dissolved Lithium (Li)	2024/05/23		89	%	80 - 120
			Dissolved Manganese (Mn)	2024/05/23		111	%	80 - 120
			Dissolved Phosphorus (P)	2024/05/23		108	%	80 - 120
			Dissolved Potassium (K)	2024/05/23		100	%	80 - 120
			Dissolved Silicon (Si)	2024/05/23		101	%	80 - 120
			Dissolved Strontium (Sr)	2024/05/23		77 (1)	%	80 - 120
B377140	S1D	Spiked Blank	Dissolved Barium (Ba)	2024/05/23		94	%	80 - 120
			Dissolved Boron (B)	2024/05/23		97	%	80 - 120
			Dissolved Calcium (Ca)	2024/05/23		100	%	80 - 120
			Dissolved Iron (Fe)	2024/05/23		107	%	80 - 120
			Dissolved Lithium (Li)	2024/05/23		93	%	80 - 120
			Dissolved Magnesium (Mg)	2024/05/23		102	%	80 - 120
			Dissolved Manganese (Mn)	2024/05/23		105	%	80 - 120
			Dissolved Phosphorus (P)	2024/05/23		103	%	80 - 120
			Dissolved Potassium (K)	2024/05/23		101	%	80 - 120
			Dissolved Silicon (Si)	2024/05/23		101	%	80 - 120
			Dissolved Sodium (Na)	2024/05/23		98	%	80 - 120
			Dissolved Strontium (Sr)	2024/05/23		93	%	80 - 120
			Dissolved Sulphur (S)	2024/05/23		99	%	80 - 120
B377140	S1D	Method Blank	Dissolved Barium (Ba)	2024/05/23	<0.010		mg/L	
			Dissolved Boron (B)	2024/05/23	<0.020		mg/L	
			Dissolved Calcium (Ca)	2024/05/23	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/05/23	<0.060		mg/L	
			Dissolved Lithium (Li)	2024/05/23	<0.020		mg/L	

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			Dissolved Magnesium (Mg)	2024/05/23	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/05/23	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2024/05/23	<0.10		mg/L	
			Dissolved Potassium (K)	2024/05/23	<0.30		mg/L	
			Dissolved Silicon (Si)	2024/05/23	<0.50		mg/L	
			Dissolved Sodium (Na)	2024/05/23	<0.50		mg/L	
			Dissolved Strontium (Sr)	2024/05/23	<0.020		mg/L	
			Dissolved Sulphur (S)	2024/05/23	<0.20		mg/L	
B377140	S1D	RPD	Dissolved Calcium (Ca)	2024/05/24	0.48		%	20
			Dissolved Magnesium (Mg)	2024/05/24	0.67		%	20
			Dissolved Potassium (K)	2024/05/24	1.6		%	20
			Dissolved Sodium (Na)	2024/05/24	0.83		%	20
B377191	TNY	Matrix Spike	Total Suspended Solids	2024/05/23		NC (2)	%	80 - 120
B377191	TNY	Spiked Blank	Total Suspended Solids	2024/05/23		87	%	80 - 120
B377191	TNY	Method Blank	Total Suspended Solids	2024/05/23	<0.96		mg/L	
B377191	TNY	RPD	Total Suspended Solids	2024/05/23	2.7		%	20
B377383	AP1	Matrix Spike	Chemical Oxygen Demand	2024/05/23		103	%	80 - 120
B377383	AP1	Spiked Blank	Chemical Oxygen Demand	2024/05/23		102	%	80 - 120
B377383	AP1	Method Blank	Chemical Oxygen Demand	2024/05/23	<10		mg/L	
B377383	AP1	RPD	Chemical Oxygen Demand	2024/05/23	11		%	20
B377419	CT6	Spiked Blank	Turbidity	2024/05/23		99	%	80 - 120
B377419	CT6	Method Blank	Turbidity	2024/05/23	<0.10		NTU	
B377419	CT6	RPD	Turbidity	2024/05/23	NC		%	20
B377553	MB5	Matrix Spike	Orthophosphate (P)	2024/05/23		NC	%	80 - 120
B377553	MB5	Spiked Blank	Orthophosphate (P)	2024/05/23		95	%	80 - 120
B377553	MB5	Method Blank	Orthophosphate (P)	2024/05/23	<0.0030		mg/L	
B377553	MB5	RPD	Orthophosphate (P)	2024/05/23	0.84		%	20
B377758	HQV	Matrix Spike	Dissolved Barium (Ba)	2024/05/23		95	%	80 - 120
			Dissolved Boron (B)	2024/05/23		101	%	80 - 120
			Dissolved Calcium (Ca)	2024/05/23		91	%	80 - 120
			Dissolved Iron (Fe)	2024/05/23		97	%	80 - 120
			Dissolved Lithium (Li)	2024/05/23		96	%	80 - 120
			Dissolved Magnesium (Mg)	2024/05/23		98	%	80 - 120
			Dissolved Manganese (Mn)	2024/05/23		101	%	80 - 120
			Dissolved Phosphorus (P)	2024/05/23		99	%	80 - 120
			Dissolved Potassium (K)	2024/05/23		102	%	80 - 120
			Dissolved Silicon (Si)	2024/05/23		90	%	80 - 120
			Dissolved Sodium (Na)	2024/05/23		100	%	80 - 120
			Dissolved Strontium (Sr)	2024/05/23		96	%	80 - 120
			Dissolved Sulphur (S)	2024/05/23		100	%	80 - 120
B377758	HQV	Spiked Blank	Dissolved Barium (Ba)	2024/05/23		97	%	80 - 120
			Dissolved Boron (B)	2024/05/23		101	%	80 - 120
			Dissolved Calcium (Ca)	2024/05/23		98	%	80 - 120
			Dissolved Iron (Fe)	2024/05/23		104	%	80 - 120
			Dissolved Lithium (Li)	2024/05/23		97	%	80 - 120
			Dissolved Magnesium (Mg)	2024/05/23		102	%	80 - 120
			Dissolved Manganese (Mn)	2024/05/23		105	%	80 - 120
			Dissolved Phosphorus (P)	2024/05/23		100	%	80 - 120
			Dissolved Potassium (K)	2024/05/23		102	%	80 - 120
			Dissolved Silicon (Si)	2024/05/23		97	%	80 - 120
			Dissolved Sodium (Na)	2024/05/23		100	%	80 - 120
			Dissolved Strontium (Sr)	2024/05/23		97	%	80 - 120
			Dissolved Sulphur (S)	2024/05/23		99	%	80 - 120
B377758	HQV	Method Blank	Dissolved Barium (Ba)	2024/05/23	<0.010		mg/L	

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			Dissolved Boron (B)	2024/05/23	<0.020		mg/L	
			Dissolved Calcium (Ca)	2024/05/23	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/05/23	<0.060		mg/L	
			Dissolved Lithium (Li)	2024/05/23	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2024/05/23	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/05/23	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2024/05/23	<0.10		mg/L	
			Dissolved Potassium (K)	2024/05/23	<0.30		mg/L	
			Dissolved Silicon (Si)	2024/05/23	<0.50		mg/L	
			Dissolved Sodium (Na)	2024/05/23	<0.50		mg/L	
			Dissolved Strontium (Sr)	2024/05/23	<0.020		mg/L	
			Dissolved Sulphur (S)	2024/05/23	<0.20		mg/L	
B377758	HQV	RPD	Dissolved Barium (Ba)	2024/05/23	1.5		%	20
			Dissolved Boron (B)	2024/05/23	NC		%	20
			Dissolved Calcium (Ca)	2024/05/23	0.11		%	20
			Dissolved Iron (Fe)	2024/05/23	NC		%	20
			Dissolved Lithium (Li)	2024/05/23	NC		%	20
			Dissolved Magnesium (Mg)	2024/05/23	0.42		%	20
			Dissolved Manganese (Mn)	2024/05/23	4.6		%	20
			Dissolved Phosphorus (P)	2024/05/23	NC		%	20
			Dissolved Potassium (K)	2024/05/23	4.5		%	20
			Dissolved Silicon (Si)	2024/05/23	3.6		%	20
			Dissolved Sodium (Na)	2024/05/23	0.28		%	20
			Dissolved Sulphur (S)	2024/05/23	2.6		%	20
B377867	SKM	Matrix Spike [CNX436-03]	Chloride (Cl)	2024/05/23		99	%	80 - 120
			Sulphate (SO4)	2024/05/23		NC	%	80 - 120
B377867	SKM	Spiked Blank	Chloride (Cl)	2024/05/23		97	%	80 - 120
			Sulphate (SO4)	2024/05/23		106	%	80 - 120
B377867	SKM	Method Blank	Chloride (Cl)	2024/05/23	<1.0		mg/L	
			Sulphate (SO4)	2024/05/23	<1.0		mg/L	
B377867	SKM	RPD [CNX436-03]	Chloride (Cl)	2024/05/23	1.5		%	20
			Sulphate (SO4)	2024/05/23	10		%	20
B377868	SKM	Matrix Spike [CNX434-03]	Chloride (Cl)	2024/05/23		99	%	80 - 120
			Sulphate (SO4)	2024/05/23		NC	%	80 - 120
B377868	SKM	Spiked Blank	Chloride (Cl)	2024/05/23		95	%	80 - 120
			Sulphate (SO4)	2024/05/23		104	%	80 - 120
B377868	SKM	Method Blank	Chloride (Cl)	2024/05/23	<1.0		mg/L	
			Sulphate (SO4)	2024/05/23	<1.0		mg/L	
B377868	SKM	RPD [CNX434-03]	Chloride (Cl)	2024/05/23	1.9		%	20
			Sulphate (SO4)	2024/05/23	5.9		%	20
B377890	MAP	Matrix Spike	Nitrite (N)	2024/05/24		105	%	80 - 120
			Nitrate plus Nitrite (N)	2024/05/24		124 (1)	%	80 - 120
B377890	MAP	Spiked Blank	Nitrite (N)	2024/05/24		101	%	80 - 120
			Nitrate plus Nitrite (N)	2024/05/24		102	%	80 - 120
B377890	MAP	Method Blank	Nitrite (N)	2024/05/23	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2024/05/23	<0.010		mg/L	
B377890	MAP	RPD	Nitrite (N)	2024/05/24	NC		%	20
			Nitrate plus Nitrite (N)	2024/05/24	NC		%	20
B378024	TNY	Matrix Spike	Total Dissolved Solids	2024/05/27		96	%	80 - 120
B378024	TNY	Spiked Blank	Total Dissolved Solids	2024/05/27		102	%	80 - 120
B378024	TNY	Method Blank	Total Dissolved Solids	2024/05/27	<10		mg/L	
B378024	TNY	RPD	Total Dissolved Solids	2024/05/27	4.4		%	20
B378220	AP1	Matrix Spike [CNX434-05]	Chemical Oxygen Demand	2024/05/24		107	%	80 - 120
B378220	AP1	Spiked Blank	Chemical Oxygen Demand	2024/05/24		101	%	80 - 120

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B378220	AP1	Method Blank	Chemical Oxygen Demand	2024/05/24	<10		mg/L	
B378220	AP1	RPD [CNX434-05]	Chemical Oxygen Demand	2024/05/24	9.5		%	20
B378306	MAP	Matrix Spike [CNX431-03]	Nitrite (N)	2024/05/24		103	%	80 - 120
			Nitrate plus Nitrite (N)	2024/05/24		107	%	80 - 120
B378306	MAP	Spiked Blank	Nitrite (N)	2024/05/24		99	%	80 - 120
			Nitrate plus Nitrite (N)	2024/05/24		103	%	80 - 120
B378306	MAP	Method Blank	Nitrite (N)	2024/05/24	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2024/05/24	<0.010		mg/L	
B378306	MAP	RPD [CNX431-03]	Nitrite (N)	2024/05/24	NC		%	20
			Nitrate plus Nitrite (N)	2024/05/24	9.2		%	20
B378348	A5S	Spiked Blank	Alkalinity (Total as CaCO3)	2024/05/24		99	%	80 - 120
B378348	A5S	Method Blank	Alkalinity (PP as CaCO3)	2024/05/24	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2024/05/24	<1.0		mg/L	
			Bicarbonate (HCO3)	2024/05/24	<1.0		mg/L	
			Carbonate (CO3)	2024/05/24	<1.0		mg/L	
			Hydroxide (OH)	2024/05/24	<1.0		mg/L	
B378348	A5S	RPD [CNX434-03]	Alkalinity (PP as CaCO3)	2024/05/24	NC		%	20
			Alkalinity (Total as CaCO3)	2024/05/24	2.4		%	20
			Bicarbonate (HCO3)	2024/05/24	1.8		%	20
			Carbonate (CO3)	2024/05/24	NC		%	20
			Hydroxide (OH)	2024/05/24	NC		%	20
B378349	A5S	Spiked Blank	pH	2024/05/24		100	%	97 - 103
B378349	A5S	RPD [CNX434-03]	pH	2024/05/24	0.21		%	N/A
B378351	A5S	Spiked Blank	Conductivity	2024/05/24		100	%	90 - 110
B378351	A5S	Method Blank	Conductivity	2024/05/24	<2.0		uS/cm	
B378351	A5S	RPD [CNX434-03]	Conductivity	2024/05/24	0.88		%	10
B378406	MAP	Matrix Spike	Total Ammonia (N)	2024/05/24		117	%	80 - 120
B378406	MAP	Spiked Blank	Total Ammonia (N)	2024/05/24		103	%	80 - 120
B378406	MAP	Method Blank	Total Ammonia (N)	2024/05/24	<0.015		mg/L	
B378406	MAP	RPD	Total Ammonia (N)	2024/05/24	2.3		%	20
B378437	CTU	Matrix Spike [CNX437-05]	Total Nitrogen (N)	2024/05/24		101	%	80 - 120
B378437	CTU	QC Standard	Total Nitrogen (N)	2024/05/24		103	%	80 - 120
B378437	CTU	Spiked Blank	Total Nitrogen (N)	2024/05/24		99	%	80 - 120
B378437	CTU	Method Blank	Total Nitrogen (N)	2024/05/24	<0.020		mg/L	
B378437	CTU	RPD [CNX437-05]	Total Nitrogen (N)	2024/05/24	6.9		%	20
B378439	CTU	Matrix Spike	Dissolved Phosphorus (P)	2024/05/24		100	%	80 - 120
B378439	CTU	QC Standard	Dissolved Phosphorus (P)	2024/05/24		89	%	80 - 120
B378439	CTU	Spiked Blank	Dissolved Phosphorus (P)	2024/05/24		95	%	80 - 120
B378439	CTU	Method Blank	Dissolved Phosphorus (P)	2024/05/24	<0.0030		mg/L	
B378439	CTU	RPD	Dissolved Phosphorus (P)	2024/05/24	NC		%	20
B378453	CTU	Matrix Spike	Total Phosphorus (P)	2024/05/24		98	%	80 - 120
B378453	CTU	QC Standard	Total Phosphorus (P)	2024/05/24		89	%	80 - 120
B378453	CTU	Spiked Blank	Total Phosphorus (P)	2024/05/24		97	%	80 - 120
B378453	CTU	Method Blank	Total Phosphorus (P)	2024/05/24	<0.0030		mg/L	
B378453	CTU	RPD	Total Phosphorus (P)	2024/05/24	10		%	20
B378466	CTU	Matrix Spike	Total Phosphorus (P)	2024/05/24		102	%	80 - 120
B378466	CTU	QC Standard	Total Phosphorus (P)	2024/05/24		89	%	80 - 120
B378466	CTU	Spiked Blank	Total Phosphorus (P)	2024/05/24		97	%	80 - 120
B378466	CTU	Method Blank	Total Phosphorus (P)	2024/05/24	<0.0030		mg/L	
B378466	CTU	RPD [CNX432-05]	Total Phosphorus (P)	2024/05/24	NC		%	20
B378867	EH2	Matrix Spike	Total Suspended Solids	2024/05/28		97	%	80 - 120
B378867	EH2	Spiked Blank	Total Suspended Solids	2024/05/28		94	%	80 - 120
B378867	EH2	Method Blank	Total Suspended Solids	2024/05/28	<1.0		mg/L	
B378867	EH2	RPD	Total Suspended Solids	2024/05/28	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B380007	TNY	Matrix Spike	Total Dissolved Solids	2024/05/28		92	%	80 - 120
B380007	TNY	Spiked Blank	Total Dissolved Solids	2024/05/28		102	%	80 - 120
B380007	TNY	Method Blank	Total Dissolved Solids	2024/05/28	<10		mg/L	
B380007	TNY	RPD	Total Dissolved Solids	2024/05/28	10		%	20
B380912	YL7	Matrix Spike [CNX432-05]	Total Nitrogen (N)	2024/05/28		95	%	80 - 120
B380912	YL7	QC Standard	Total Nitrogen (N)	2024/05/28		107	%	80 - 120
B380912	YL7	Spiked Blank	Total Nitrogen (N)	2024/05/28		109	%	80 - 120
B380912	YL7	Method Blank	Total Nitrogen (N)	2024/05/28	<0.020		mg/L	
B380912	YL7	RPD [CNX432-05]	Total Nitrogen (N)	2024/05/28	1.6		%	20
B380914	YL7	Matrix Spike	Total Nitrogen (N)	2024/05/29		NC	%	80 - 120
B380914	YL7	QC Standard	Total Nitrogen (N)	2024/05/28		107	%	80 - 120
B380914	YL7	Spiked Blank	Total Nitrogen (N)	2024/05/28		106	%	80 - 120
B380914	YL7	Method Blank	Total Nitrogen (N)	2024/05/28	<0.020		mg/L	
B380914	YL7	RPD	Total Nitrogen (N)	2024/05/29	1.0		%	20
B381473	MAP	Matrix Spike	Total Phosphorus (P)	2024/05/28		96	%	80 - 120
B381473	MAP	QC Standard	Total Phosphorus (P)	2024/05/28		90	%	80 - 120
B381473	MAP	Spiked Blank	Total Phosphorus (P)	2024/05/28		96	%	80 - 120
B381473	MAP	Method Blank	Total Phosphorus (P)	2024/05/28	<0.0030		mg/L	
B381473	MAP	RPD	Total Phosphorus (P)	2024/05/28	NC		%	20
B382004	JVM	Spiked Blank	Alkalinity (Total as CaCO3)	2024/05/28		98	%	80 - 120
B382004	JVM	Method Blank	Alkalinity (PP as CaCO3)	2024/05/28	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2024/05/28	<1.0		mg/L	
			Bicarbonate (HCO3)	2024/05/28	<1.0		mg/L	
			Carbonate (CO3)	2024/05/28	<1.0		mg/L	
			Hydroxide (OH)	2024/05/28	<1.0		mg/L	
B382004	JVM	RPD	Alkalinity (PP as CaCO3)	2024/05/28	NC		%	20
			Alkalinity (Total as CaCO3)	2024/05/28	0.23		%	20
			Bicarbonate (HCO3)	2024/05/28	0.23		%	20
			Carbonate (CO3)	2024/05/28	NC		%	20
			Hydroxide (OH)	2024/05/28	NC		%	20
B382008	JVM	Spiked Blank	pH	2024/05/28		100	%	97 - 103
B382008	JVM	RPD	pH	2024/05/28	0.20		%	N/A
B382009	JVM	Spiked Blank	Conductivity	2024/05/28		99	%	90 - 110
B382009	JVM	Method Blank	Conductivity	2024/05/28	<2.0		uS/cm	
B382009	JVM	RPD	Conductivity	2024/05/28	0.36		%	10
B382425	JVM	Spiked Blank	Alkalinity (Total as CaCO3)	2024/05/28		99	%	80 - 120
B382425	JVM	Method Blank	Alkalinity (PP as CaCO3)	2024/05/29	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2024/05/29	<1.0		mg/L	
			Bicarbonate (HCO3)	2024/05/29	<1.0		mg/L	
			Carbonate (CO3)	2024/05/29	<1.0		mg/L	
			Hydroxide (OH)	2024/05/29	<1.0		mg/L	
B382425	JVM	RPD	Alkalinity (PP as CaCO3)	2024/05/28	NC		%	20
			Alkalinity (Total as CaCO3)	2024/05/28	0.11		%	20
			Bicarbonate (HCO3)	2024/05/28	0.11		%	20
			Carbonate (CO3)	2024/05/28	NC		%	20
			Hydroxide (OH)	2024/05/28	NC		%	20
B382428	JVM	Spiked Blank	pH	2024/05/28		100	%	97 - 103
B382428	JVM	RPD	pH	2024/05/28	0.24		%	N/A
B382429	JVM	Spiked Blank	Conductivity	2024/05/28		101	%	90 - 110
B382429	JVM	Method Blank	Conductivity	2024/05/29	<2.0		uS/cm	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B382429	JVM	RPD	Conductivity	2024/05/28	0.59		%	10

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Detection limit raised based on sample volume used for analysis.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Sandy Yuan, M.Sc., QP, Scientific Specialist

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

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4000 19st N.E, Calgary, Alberta Canada T2E 6P8 Tel:(403) 291-3077 Toll-free:800-563-6266 Fax:(403) 291-9468 www.bvna.com

Page of

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#10658 Ausenco Sustainability Inc.	Company Name:		Quotation #:	C40333
Attention:	Accounts Payable	Attention:	Erin Moffatt	P.O. #:	
Address:	Suite 1430, 401-9 Avenue	Address:		Project:	102604-01
	CALGARY AB T2P 3C5			Project Name:	
Tel:	(403) 264-0671 Fax: (403) 264-0670	Tel:	Fax:	Site #:	
Email:	procure2pay.na@ausenco.com	Email:	erin.moffatt@ausenco.com	Sampled By:	Chelsea K Kidd

Laboratory Use Only:

Bureau Veritas Job #:	Bottle Order #:
C436402	725060
COC #:	Project Manager:
C#725060-01-01	Danielle Boisvert

Regulatory Criteria:

- [ ] ATI
- [x] CCME
- [ ] Other

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: [x]
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details

Job Specific Rush TAT (if applies to entire submission) [ ]
Date Required:
Rush Confirmation Number: (call lab for #)

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Konelab	Ammonia-N (Total)	Total Kjeldahl Nitrogen (Total)	Biochemical Oxygen Demand	COD by Colorimeter	Oxygen (Dissolved)	Total Phosphorus	Phosphorus -P (Total, Dissolved)	TSS, TDS, TURB	# of Bottles	Comments
1		WQ-02	24/05/22	1200	W/S	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	Soil and water
2		WQ-03		1230		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
3		WQ-4a		1345		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
4		WQ-4b		930		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
5		WQ-4C		1140		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
6		WQ-4d		900		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
7		WQ-5B		830		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
8		WQ-06		1125		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
9		WQ-07		1115		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
10																		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
[signature]	24/05/22	430	Ekta Patel	2024/05/22	16:25	

Laboratory Use Only		
Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
[ ]	9.8/7.4/8.1	[ ] Yes [x] No
	9.8/9.9/10.4	CM: Yes
	6.5/7.2/8.8	

White: Bureau Veritas Yellow: Client

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

MCAL-2024-05-1428

2/2

Bureau Veritas Canada (2019) Inc.

Your Project #: 102604-01
Your C.O.C. #: C#725060-01-01, C#725060-02-01

Attention: CGY SAR LAB REPORTS

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/05/29
Report #: R3506216
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C436408
Received: 2024/05/22, 16:25

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	9	N/A	2024/05/26		Auto Calc
Chloride (Soluble)	9	2024/05/25	2024/05/25	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1)	9	2024/05/24	2024/05/24	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble)	9	2024/05/25	2024/05/25	AB SOP-00033 / AB SOP-00004	SM 24 2510 B m
Elements by ICPMS - Soils	9	2024/05/26	2024/05/26	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions	9	N/A	2024/05/26		Auto Calc
Moisture	9	N/A	2024/05/25	AB SOP-00002	CCME PHC-CWS m
pH @25C (1:2 Calcium Chloride Extract)	9	2024/05/24	2024/05/24	CAL SOP-00180 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio	9	N/A	2024/05/26		Auto Calc
Soluble Ions	9	2024/05/25	2024/05/25	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	9	2024/05/25	2024/05/25	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation	9	N/A	2024/05/26		Auto Calc
Soluble Ions Calculation	9	N/A	2024/05/24		Auto Calc
Theoretical Gypsum Requirement (2)	9	N/A	2024/05/26		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

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Your Project #: 102604-01
Your C.O.C. #: C#725060-01-01, C#725060-02-01

Attention: CGY SAR LAB REPORTS

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/05/29
Report #: R3506216
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C436408
Received: 2024/05/22, 16:25
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(2) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key

Bureau Veritas
29 May 2024 18:11:28

Please direct all questions regarding this Certificate of Analysis to:
Danielle Boisvert, Customer Solutions Representative
Email: danielle-andrea.boisvert@bureauveritas.com
Phone# (780)577-7178

==========

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX519		CNX520		CNX522		
Sampling Date		2024/05/22 12:00		2024/05/22 12:30		2024/05/22 08:30		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-02	RDL	WQ-03	RDL	WQ-05B	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	11	N/A	49	N/A	3.1	N/A	B376683
Cation Sum	meq/L	16	N/A	57	N/A	8.6	N/A	B376683
Cation/EC Ratio	N/A	12	0.10	15	0.10	12	0.10	B376673
Calculated Calcium (Ca)	mg/kg	110	1.2	400	1.0	32	0.70	B376690
Calculated Magnesium (Mg)	mg/kg	47	0.79	180	0.67	13	0.47	B376690
Calculated Sodium (Na)	mg/kg	61	2.0	53	1.7	29	1.2	B376690
Calculated Potassium (K)	mg/kg	7.8	1.0	26	0.86	4.0	0.61	B376690
Calculated Boron (B)	mg/kg	<0.079	0.079	<0.067	0.067	<0.047	0.047	B376689
Calculated Chloride (Cl)	mg/kg	16	7.9	19	6.7	12	4.7	B376690
Calculated Sulphate (SO4)	mg/kg	400	3.9	1500	3.3	54	2.3	B376690
Elements								
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	<0.080	0.080	<0.080	0.080	B379017
Soluble Parameters								
Soluble Boron (B)	mg/L	<0.10	0.10	<0.10	0.10	<0.10	0.10	B379620
Soluble Chloride (Cl)	mg/L	20	10	29	10	26	10	B379502
Soluble Conductivity	dS/m	1.3	0.020	3.7	0.020	0.69	0.020	B379524
Soluble (CaCl2) pH	pH	7.71	N/A	7.77	N/A	7.81	N/A	B378414
Sodium Adsorption Ratio	N/A	1.4	0.10	0.67	0.10	1.6	0.10	B376685
Soluble Calcium (Ca)	mg/L	140	1.5	610	1.5	68	1.5	B379620
Soluble Magnesium (Mg)	mg/L	60	1.0	270	1.0	27	1.0	B379620
Soluble Sodium (Na)	mg/L	78	2.5	79	2.5	62	2.5	B379620
Soluble Potassium (K)	mg/L	9.9	1.3	39	1.3	8.5	1.3	B379620
Saturation %	%	79	N/A	67	N/A	47	N/A	B378411
Soluble Sulphate (SO4)	mg/L	510	5.0	2300	5.0	120	5.0	B379620
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	B376693
Elements								
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	B379747
Total Arsenic (As)	mg/kg	2.9	1.0	3.3	1.0	5.7	1.0	B379747
Total Barium (Ba)	mg/kg	170	1.0	200	1.0	190	1.0	B379747
Total Beryllium (Be)	mg/kg	<0.40	0.40	0.48	0.40	0.45	0.40	B379747
Total Cadmium (Cd)	mg/kg	0.37	0.050	0.38	0.050	0.34	0.050	B379747
Total Chromium (Cr)	mg/kg	9.5	1.0	11	1.0	12	1.0	B379747

RDL = Reportable Detection Limit
N/A = Not Applicable

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX519		CNX520		CNX522		
Sampling Date		2024/05/22 12:00		2024/05/22 12:30		2024/05/22 08:30		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-02	RDL	WQ-03	RDL	WQ-05B	RDL	QC Batch
Total Cobalt (Co)	mg/kg	4.5	0.50	4.8	0.50	5.0	0.50	B379747
Total Copper (Cu)	mg/kg	12	1.0	12	1.0	12	1.0	B379747
Total Lead (Pb)	mg/kg	7.6	0.50	7.8	0.50	7.2	0.50	B379747
Total Mercury (Hg)	mg/kg	<0.050	0.050	<0.050	0.050	<0.050	0.050	B379747
Total Molybdenum (Mo)	mg/kg	0.62	0.40	0.60	0.40	0.56	0.40	B379747
Total Nickel (Ni)	mg/kg	14	1.0	15	1.0	15	1.0	B379747
Total Selenium (Se)	mg/kg	3.3	0.50	1.2	0.50	<0.50	0.50	B379747
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	B379747
Total Thallium (Tl)	mg/kg	0.11	0.10	0.12	0.10	0.12	0.10	B379747
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	B379747
Total Uranium (U)	mg/kg	1.5	0.20	1.5	0.20	0.58	0.20	B379747
Total Vanadium (V)	mg/kg	16	1.0	19 (1)	1.0	22	1.0	B379747
Total Zinc (Zn)	mg/kg	59	10	59	10	53	10	B379747

RDL = Reportable Detection Limit
(1) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX523		CNX524		CNX525		
Sampling Date		2024/05/22 13:45		2024/05/22 09:30		2024/05/22 09:00		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-04A	RDL	WQ-04B	RDL	WQ-04D	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	28	N/A	24	N/A	4.5	N/A	B376683
Cation Sum	meq/L	22	N/A	20	N/A	11	N/A	B376683
Cation/EC Ratio	N/A	12	0.10	11	0.10	12	0.10	B376673
Calculated Calcium (Ca)	mg/kg	200	1.5	93	0.87	87	1.7	B376690
Calculated Magnesium (Mg)	mg/kg	83	1.0	35	0.58	41	1.1	B376690
Calculated Sodium (Na)	mg/kg	100	2.5	84	1.4	86	2.8	B376690
Calculated Potassium (K)	mg/kg	25	1.3	16	0.75	23	1.5	B376690
Calculated Boron (B)	mg/kg	0.13	0.10	0.073	0.058	<0.11	0.11	B376689
Calculated Chloride (Cl)	mg/kg	180	10	220	5.8	53	11	B376690
Calculated Sulphate (SO4)	mg/kg	1100	5.0	380	2.9	170	5.7	B376690
Elements								
Hex. Chromium (Cr 6+)	mg/kg	<0.20 (1)	0.20	<0.080	0.080	<0.22 (1)	0.22	B379017
Soluble Parameters								
Soluble Boron (B)	mg/L	0.13	0.10	0.13	0.10	<0.10	0.10	B379620
Soluble Chloride (Cl)	mg/L	180	10	370	10	47	10	B379502
Soluble Conductivity	dS/m	1.8	0.020	1.9	0.020	0.87	0.020	B379524
Soluble (CaCl2) pH	pH	7.54	N/A	7.54	N/A	7.74	N/A	B378414
Sodium Adsorption Ratio	N/A	1.6	0.10	2.5	0.10	1.8	0.10	B376685
Soluble Calcium (Ca)	mg/L	200	1.5	160	1.5	77	1.5	B379620
Soluble Magnesium (Mg)	mg/L	82	1.0	61	1.0	37	1.0	B379620
Soluble Sodium (Na)	mg/L	100	2.5	150	2.5	76	2.5	B379620
Soluble Potassium (K)	mg/L	25	1.3	27	1.3	20	1.3	B379620
Saturation %	%	100	N/A	58	N/A	110	N/A	B378411
Soluble Sulphate (SO4)	mg/L	1100	5.0	660	5.0	150	5.0	B379620
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	B376693
Elements								
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	B379747
Total Arsenic (As)	mg/kg	1.8	1.0	5.5	1.0	4.7	1.0	B379747
Total Barium (Ba)	mg/kg	97	1.0	170	1.0	210	1.0	B379747
Total Beryllium (Be)	mg/kg	<0.40	0.40	0.58	0.40	<0.40	0.40	B379747
Total Cadmium (Cd)	mg/kg	0.53	0.050	0.34	0.050	0.39	0.050	B379747

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX523		CNX524		CNX525		
Sampling Date		2024/05/22 13:45		2024/05/22 09:30		2024/05/22 09:00		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	**WQ-04A**	**RDL**	**WQ-04B**	**RDL**	**WQ-04D**	**RDL**	**QC Batch**
Total Chromium (Cr)	mg/kg	9.7	1.0	17	1.0	10	1.0	B379747
Total Cobalt (Co)	mg/kg	2.9	0.50	9.0	0.50	5.5	0.50	B379747
Total Copper (Cu)	mg/kg	13	1.0	16	1.0	12	1.0	B379747
Total Lead (Pb)	mg/kg	7.1	0.50	11	0.50	6.9	0.50	B379747
Total Mercury (Hg)	mg/kg	<0.050	0.050	0.051	0.050	<0.050	0.050	B379747
Total Molybdenum (Mo)	mg/kg	1.5	0.40	0.89	0.40	0.55	0.40	B379747
Total Nickel (Ni)	mg/kg	10	1.0	19	1.0	13	1.0	B379747
Total Selenium (Se)	mg/kg	5.0	0.50	0.63	0.50	3.0	0.50	B379747
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	B379747
Total Thallium (Tl)	mg/kg	0.15	0.10	0.14	0.10	0.11	0.10	B379747
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	B379747
Total Uranium (U)	mg/kg	2.1	0.20	0.62	0.20	0.74	0.20	B379747
Total Vanadium (V)	mg/kg	14	1.0	26	1.0	16	1.0	B379747
Total Zinc (Zn)	mg/kg	41	10	93	10	1600	10	B379747
RDL = Reportable Detection Limit								

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX526		CNX527		CNX528		
Sampling Date		2024/05/22 11:40		2024/05/22 11:15		2024/05/22 11:25		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-04C	RDL	WQ-07	RDL	WQ-06	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	3.0	N/A	14	N/A	26	N/A	B376683
Cation Sum	meq/L	10	N/A	17	N/A	31	N/A	B376683
Cation/EC Ratio	N/A	12	0.10	12	0.10	13	0.10	B376673
Calculated Calcium (Ca)	mg/kg	42	0.91	110	1.4	230	1.3	B376690
Calculated Magnesium (Mg)	mg/kg	25	0.61	66	0.91	120	0.84	B376690
Calculated Sodium (Na)	mg/kg	44	1.5	87	2.3	110	2.1	B376690
Calculated Potassium (K)	mg/kg	6.1	0.79	19	1.2	22	1.1	B376690
Calculated Boron (B)	mg/kg	<0.061	0.061	<0.091	0.091	<0.084	0.084	B376689
Calculated Chloride (Cl)	mg/kg	16	6.1	80	9.1	62	8.4	B376690
Calculated Sulphate (SO4)	mg/kg	65	3.0	490	4.5	960	4.2	B376690
Elements								
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	<0.18 (1)	0.18	<0.17 (1)	0.17	B379017
Soluble Parameters								
Soluble Boron (B)	mg/L	<0.10	0.10	<0.10	0.10	<0.10	0.10	B379620
Soluble Chloride (Cl)	mg/L	27	10	88	10	74	10	B379502
Soluble Conductivity	dS/m	0.83	0.020	1.4	0.020	2.5	0.020	B379524
Soluble (CaCl2) pH	pH	7.81	N/A	7.78	N/A	7.73	N/A	B378414
Sodium Adsorption Ratio	N/A	1.7	0.10	1.7	0.10	1.6	0.10	B376685
Soluble Calcium (Ca)	mg/L	69	1.5	120	1.5	270	1.5	B379620
Soluble Magnesium (Mg)	mg/L	41	1.0	72	1.0	140	1.0	B379620
Soluble Sodium (Na)	mg/L	72	2.5	96	2.5	130	2.5	B379620
Soluble Potassium (K)	mg/L	10	1.3	21	1.3	27	1.3	B379620
Saturation %	%	61	N/A	91	N/A	84	N/A	B378411
Soluble Sulphate (SO4)	mg/L	110	5.0	550	5.0	1100	5.0	B379620
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	B376693
Elements								
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	0.52	0.50	B379747
Total Arsenic (As)	mg/kg	3.7	1.0	4.7	1.0	6.2	1.0	B379747
Total Barium (Ba)	mg/kg	190	1.0	210	1.0	250	1.0	B379747
Total Beryllium (Be)	mg/kg	0.40	0.40	0.51	0.40	0.65	0.40	B379747
Total Cadmium (Cd)	mg/kg	0.34	0.050	0.43	0.050	0.49	0.050	B379747

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CNX526		CNX527		CNX528		
Sampling Date		2024/05/22 11:40		2024/05/22 11:15		2024/05/22 11:25		
COC Number		C#725060-02-01		C#725060-02-01		C#725060-02-01		
	UNITS	WQ-04C	RDL	WQ-07	RDL	WQ-06	RDL	QC Batch
Total Chromium (Cr)	mg/kg	10	1.0	13	1.0	16	1.0	B379747
Total Cobalt (Co)	mg/kg	4.6	0.50	5.9	0.50	7.0	0.50	B379747
Total Copper (Cu)	mg/kg	10	1.0	16	1.0	19	1.0	B379747
Total Lead (Pb)	mg/kg	7.0	0.50	10	0.50	11	0.50	B379747
Total Mercury (Hg)	mg/kg	<0.050	0.050	<0.050	0.050	<0.050	0.050	B379747
Total Molybdenum (Mo)	mg/kg	0.53	0.40	0.61	0.40	1.4	0.40	B379747
Total Nickel (Ni)	mg/kg	13	1.0	19	1.0	23	1.0	B379747
Total Selenium (Se)	mg/kg	1.9	0.50	1.1	0.50	1.2	0.50	B379747
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	B379747
Total Thallium (Tl)	mg/kg	0.11	0.10	0.15	0.10	0.19	0.10	B379747
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	B379747
Total Uranium (U)	mg/kg	0.78	0.20	1.3	0.20	2.0	0.20	B379747
Total Vanadium (V)	mg/kg	18	1.0	22	1.0	28	1.0	B379747
Total Zinc (Zn)	mg/kg	83	10	73	10	84	10	B379747
RDL = Reportable Detection Limit								

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PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CNX519	CNX520	CNX522	CNX523	CNX524		
Sampling Date		2024/05/22 12:00	2024/05/22 12:30	2024/05/22 08:30	2024/05/22 13:45	2024/05/22 09:30		
COC Number		C#725060-02-01	C#725060-02-01	C#725060-02-01	C#725060-02-01	C#725060-02-01		
	UNITS	WQ-02	WQ-03	WQ-05B	WQ-04A	WQ-04B	RDL	QC Batch
Physical Properties								
Moisture	%	48	44	37	60	34	0.30	B378774
RDL = Reportable Detection Limit								

Bureau Veritas ID		CNX525	CNX526	CNX527	CNX528		
Sampling Date		2024/05/22 09:00	2024/05/22 11:40	2024/05/22 11:15	2024/05/22 11:25		
COC Number		C#725060-02-01	C#725060-02-01	C#725060-02-01	C#725060-02-01		
	UNITS	WQ-04D	WQ-04C	WQ-07	WQ-06	RDL	QC Batch
Physical Properties							
Moisture	%	63	38	56	52	0.30	B378774
RDL = Reportable Detection Limit							

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.4°C
Package 2	10.0°C
Package 3	7.5°C

AT1 METALS & SALINITY IN SOIL (SOIL) Comments

Sample CNX523 [WQ-04A] Elements by ICPMS - Soils: Detection limits raised due to matrix interference.
Sample CNX525 [WQ-04D] Elements by ICPMS - Soils: Detection limits raised due to matrix interference.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B378411	STB	QC Standard	Saturation %	2024/05/25		104	%	75 - 125
B378411	STB	RPD	Saturation %	2024/05/25	8.8		%	12
B378414	HAP	QC Standard	Soluble (CaCl2) pH	2024/05/24		98	%	97 - 103
B378414	HAP	Spiked Blank	Soluble (CaCl2) pH	2024/05/24		100	%	97 - 103
B378414	HAP	RPD	Soluble (CaCl2) pH	2024/05/24	0.50		%	N/A
B378774	MPL	Method Blank	Moisture	2024/05/25	<0.30		%	
B378774	MPL	RPD [CNX527-01]	Moisture	2024/05/25	8.3		%	20
B379017	MOP	Matrix Spike	Hex. Chromium (Cr 6+)	2024/05/24		88	%	75 - 125
B379017	MOP	Spiked Blank	Hex. Chromium (Cr 6+)	2024/05/24		100	%	80 - 120
B379017	MOP	Method Blank	Hex. Chromium (Cr 6+)	2024/05/24	<0.080		mg/kg	
B379017	MOP	RPD	Hex. Chromium (Cr 6+)	2024/05/24	NC		%	35
B379502	ZI	Matrix Spike	Soluble Chloride (Cl)	2024/05/25		101	%	75 - 125
B379502	ZI	QC Standard	Soluble Chloride (Cl)	2024/05/25		93	%	75 - 125
B379502	ZI	Spiked Blank	Soluble Chloride (Cl)	2024/05/25		101	%	80 - 120
B379502	ZI	Method Blank	Soluble Chloride (Cl)	2024/05/25	<10		mg/L	
B379502	ZI	RPD	Soluble Chloride (Cl)	2024/05/25	14		%	30
B379524	RDL	QC Standard	Soluble Conductivity	2024/05/25		102	%	75 - 125
B379524	RDL	Spiked Blank	Soluble Conductivity	2024/05/25		98	%	90 - 110
B379524	RDL	Method Blank	Soluble Conductivity	2024/05/25	<0.020		dS/m	
B379524	RDL	RPD	Soluble Conductivity	2024/05/25	16		%	20
B379620	HQV	Matrix Spike	Soluble Boron (B)	2024/05/25		91	%	75 - 125
			Soluble Calcium (Ca)	2024/05/25		95	%	75 - 125
			Soluble Magnesium (Mg)	2024/05/25		95	%	75 - 125
			Soluble Sodium (Na)	2024/05/25		96	%	75 - 125
			Soluble Potassium (K)	2024/05/25		95	%	75 - 125
B379620	HQV	QC Standard	Soluble Calcium (Ca)	2024/05/25		101	%	75 - 125
			Soluble Magnesium (Mg)	2024/05/25		99	%	75 - 125
			Soluble Sodium (Na)	2024/05/25		106	%	75 - 125
			Soluble Potassium (K)	2024/05/25		115	%	75 - 125
			Soluble Sulphate (SO4)	2024/05/25		87	%	75 - 125
B379620	HQV	Spiked Blank	Soluble Boron (B)	2024/05/25		91	%	80 - 120
			Soluble Calcium (Ca)	2024/05/25		96	%	80 - 120
			Soluble Magnesium (Mg)	2024/05/25		96	%	80 - 120
			Soluble Sodium (Na)	2024/05/25		97	%	80 - 120
			Soluble Potassium (K)	2024/05/25		95	%	80 - 120
B379620	HQV	Method Blank	Soluble Boron (B)	2024/05/25	<0.10		mg/L	
			Soluble Calcium (Ca)	2024/05/25	<1.5		mg/L	
			Soluble Magnesium (Mg)	2024/05/25	<1.0		mg/L	
			Soluble Sodium (Na)	2024/05/25	<2.5		mg/L	
			Soluble Potassium (K)	2024/05/25	<1.3		mg/L	
			Soluble Sulphate (SO4)	2024/05/25	<5.0		mg/L	
B379620	HQV	RPD	Soluble Calcium (Ca)	2024/05/25	18		%	30
			Soluble Magnesium (Mg)	2024/05/25	21		%	30
			Soluble Sodium (Na)	2024/05/25	9.7		%	30
			Soluble Potassium (K)	2024/05/25	10		%	30
			Soluble Sulphate (SO4)	2024/05/25	3.9		%	30
B379747	JAB	Matrix Spike [CNX520-01]	Total Antimony (Sb)	2024/05/26		83	%	75 - 125
			Total Arsenic (As)	2024/05/26		93	%	75 - 125
			Total Barium (Ba)	2024/05/26		NC	%	75 - 125
			Total Beryllium (Be)	2024/05/26		90	%	75 - 125
			Total Cadmium (Cd)	2024/05/26		91	%	75 - 125
			Total Chromium (Cr)	2024/05/26		110	%	75 - 125
			Total Cobalt (Co)	2024/05/26		88	%	75 - 125
			Total Copper (Cu)	2024/05/26		87	%	75 - 125
			Total Lead (Pb)	2024/05/26		87	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Mercury (Hg)	2024/05/26		87	%	75 - 125
			Total Molybdenum (Mo)	2024/05/26		94	%	75 - 125
			Total Nickel (Ni)	2024/05/26		91	%	75 - 125
			Total Selenium (Se)	2024/05/26		90	%	75 - 125
			Total Silver (Ag)	2024/05/26		90	%	75 - 125
			Total Thallium (Tl)	2024/05/26		88	%	75 - 125
			Total Tin (Sn)	2024/05/26		92	%	75 - 125
			Total Uranium (U)	2024/05/26		90	%	75 - 125
			Total Vanadium (V)	2024/05/26		138 (1)	%	75 - 125
			Total Zinc (Zn)	2024/05/26		NC	%	75 - 125
B379747	JAB	QC Standard	Total Arsenic (As)	2024/05/26		105	%	68 - 133
			Total Barium (Ba)	2024/05/26		90	%	77 - 123
			Total Beryllium (Be)	2024/05/26		93	%	46 - 154
			Total Cadmium (Cd)	2024/05/26		98	%	56 - 147
			Total Chromium (Cr)	2024/05/26		84	%	65 - 136
			Total Cobalt (Co)	2024/05/26		91	%	79 - 122
			Total Copper (Cu)	2024/05/26		90	%	83 - 117
			Total Lead (Pb)	2024/05/26		92	%	87 - 113
			Total Mercury (Hg)	2024/05/26		78	%	71 - 129
			Total Molybdenum (Mo)	2024/05/26		102	%	69 - 132
			Total Nickel (Ni)	2024/05/26		96	%	85 - 115
			Total Silver (Ag)	2024/05/26		97	%	82 - 118
			Total Uranium (U)	2024/05/26		88	%	78 - 121
			Total Vanadium (V)	2024/05/26		95	%	69 - 131
B379747	JAB	Spiked Blank	Total Antimony (Sb)	2024/05/26		92	%	80 - 120
			Total Arsenic (As)	2024/05/26		96	%	80 - 120
			Total Barium (Ba)	2024/05/26		95	%	80 - 120
			Total Beryllium (Be)	2024/05/26		97	%	80 - 120
			Total Cadmium (Cd)	2024/05/26		94	%	80 - 120
			Total Chromium (Cr)	2024/05/26		93	%	80 - 120
			Total Cobalt (Co)	2024/05/26		95	%	80 - 120
			Total Copper (Cu)	2024/05/26		94	%	80 - 120
			Total Lead (Pb)	2024/05/26		94	%	80 - 120
			Total Mercury (Hg)	2024/05/26		99	%	80 - 120
			Total Molybdenum (Mo)	2024/05/26		96	%	80 - 120
			Total Nickel (Ni)	2024/05/26		94	%	80 - 120
			Total Selenium (Se)	2024/05/26		96	%	80 - 120
			Total Silver (Ag)	2024/05/26		94	%	80 - 120
			Total Thallium (Tl)	2024/05/26		95	%	80 - 120
			Total Tin (Sn)	2024/05/26		93	%	80 - 120
			Total Uranium (U)	2024/05/26		98	%	80 - 120
			Total Vanadium (V)	2024/05/26		94	%	80 - 120
			Total Zinc (Zn)	2024/05/26		93	%	80 - 120
B379747	JAB	Method Blank	Total Antimony (Sb)	2024/05/26	<0.50		mg/kg	
			Total Arsenic (As)	2024/05/26	<1.0		mg/kg	
			Total Barium (Ba)	2024/05/26	<1.0		mg/kg	
			Total Beryllium (Be)	2024/05/26	<0.40		mg/kg	
			Total Cadmium (Cd)	2024/05/26	<0.050		mg/kg	
			Total Chromium (Cr)	2024/05/26	<1.0		mg/kg	
			Total Cobalt (Co)	2024/05/26	<0.50		mg/kg	
			Total Copper (Cu)	2024/05/26	<1.0		mg/kg	
			Total Lead (Pb)	2024/05/26	<0.50		mg/kg	
			Total Mercury (Hg)	2024/05/26	<0.050		mg/kg	
			Total Molybdenum (Mo)	2024/05/26	<0.40		mg/kg	
			Total Nickel (Ni)	2024/05/26	<1.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2024/05/26	<0.50		mg/kg	
			Total Silver (Ag)	2024/05/26	<0.20		mg/kg	
			Total Thallium (Tl)	2024/05/26	<0.10		mg/kg	
			Total Tin (Sn)	2024/05/26	<1.0		mg/kg	
			Total Uranium (U)	2024/05/26	<0.20		mg/kg	
			Total Vanadium (V)	2024/05/26	<1.0		mg/kg	
			Total Zinc (Zn)	2024/05/26	<10		mg/kg	
B379747	JAB	RPD [CNX520-01]	Total Antimony (Sb)	2024/05/26	NC		%	30
			Total Arsenic (As)	2024/05/26	2.6		%	30
			Total Barium (Ba)	2024/05/26	3.2		%	35
			Total Beryllium (Be)	2024/05/26	11		%	30
			Total Cadmium (Cd)	2024/05/26	0.81		%	30
			Total Chromium (Cr)	2024/05/26	0.97		%	30
			Total Cobalt (Co)	2024/05/26	1.6		%	30
			Total Copper (Cu)	2024/05/26	1.4		%	30
			Total Lead (Pb)	2024/05/26	3.2		%	35
			Total Mercury (Hg)	2024/05/26	NC		%	35
			Total Molybdenum (Mo)	2024/05/26	29		%	35
			Total Nickel (Ni)	2024/05/26	2.6		%	30
			Total Selenium (Se)	2024/05/26	2.3		%	30
			Total Silver (Ag)	2024/05/26	NC		%	35
			Total Thallium (Tl)	2024/05/26	9.9		%	30
			Total Tin (Sn)	2024/05/26	NC		%	35
			Total Uranium (U)	2024/05/26	0.14		%	30
			Total Vanadium (V)	2024/05/26	0.21		%	30
			Total Zinc (Zn)	2024/05/26	0.61		%	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Jingyuan Song, QP, Organics – Senior Analyst

Sandy Yuan, M.Sc., QP, Scientific Specialist

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Bureau Veritas
4000 19st N.E. Calgary, Alberta Canada T2E 6P8 Tel:(403) 291-3077 Toll-free:800-563-6266 Fax:(403) 291-9468 www.bvna.com

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#10658 Ausenco Sustainability Inc.	Company Name:		Quotation #:	C40333
Attention:	Accounts Payable	Attention:	Erin Moffatt	P.O. #:	
Address:	Suite 1430, 401-9 Avenue	Address:		Project:	102604-01
	CALGARY AB T2P 3C5			Project Name:	
Tel:	(403) 264-0671 Fax: (403) 264-0670	Tel:	Fax:	Site #:	
Email:	procure2pay.na@ausenco.com	Email:	erin.moffatt@ausenco.com	Sampled By:	

Laboratory Use Only:

Bureau Veritas Job #:	Bottle Order #:
C436408	725060
COC #:	Project Manager:
C#725060-02-01	Danielle Boisvert

Regulatory Criteria:
- ☐ ATI
- ☑ CCME
- ☐ Other

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Konelab	Ammonia-N (Total)	Total Kjeldahl Nitrogen (Total)	Biochemical Oxygen Demand	COD by Colorimeter	Oxygen (Dissolved)	Total Phosphorus	Phosphorus -P (Total, Dissolved)	TSS, TDS, TURB	# of Bottles	Comments
1		WQ-02	2024/05/22	1200	Soil												1	For analysis: Hexavalent
2		WQ-03	↓	~~1230~~	↓												↓	Chromium, elements by
3		WQ-05b		830														~~AA~~ ICPMS, moisture,
4		WQ-04a		1345														soluble Ions, soluble
5		WQ-04b		930														paste, soluble boron
6		WQ-04d		900														calculation. Same
7		WQ-04C		1140														analysis for all sites.
8		WQ07		1115														
9		WQ-06		1125														
10																		

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details

Job Specific Rush TAT (if applies to entire submission) ☐
Date Required:
Rush Confirmation Number: (call lab for #)

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Erin Moffatt [signature]	24/05/22	430	[signature] Ekta Patel	2024/05/22	16:25		☐	9.8/7.4/8.1 9.8/9.9/10.4 6.5/7.2/8.8	☐ Yes ☑ No CM: Yes

Laboratory Use Only

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

White: Bureau Veritas Yellow: Client

MCAL-2024-05-1·29

2/2

Bureau Veritas Canada (2019) Inc.

Appendix C

Raw Fall Sampling Data

Your Project #: 102604-01
Your C.O.C. #: 740516-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/05
Report #: R3583186
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C487432
Received: 2024/10/29, 15:40

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	7	N/A	2024/10/31	AB SOP-00005	SM 24 2320 B m
Biochemical Oxygen Demand	7	2024/10/30	2024/11/04	AB SOP-00017	SM 24 5210B m
Cadmium - low level CCME - Dissolved	7	N/A	2024/11/01		Auto Calc
Chloride/Sulphate by Auto Colourimetry	7	N/A	2024/10/30	AB SOP-00020	SM24-4500-Cl/SO4-E m
COD by Colorimeter	7	N/A	2024/11/01	AB SOP-00016	SM 24 5220D m
Oxygen (Dissolved) (1)	7	N/A	2024/10/30	AB SOP-00058	SM 24 4500-O C m
Conductivity @25C	7	N/A	2024/10/31	AB SOP-00005	SM 24 2510 B m
Hardness	4	N/A	2024/11/01		Auto Calc
Hardness	3	N/A	2024/11/05		Auto Calc
Elements by ICP - Dissolved (2)	4	N/A	2024/10/31	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Dissolved (2)	3	N/A	2024/11/04	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (2)	7	N/A	2024/10/31	AB SOP-00043	EPA 6020b R2 m
Ion Balance	4	N/A	2024/11/01		Auto Calc
Ion Balance	3	N/A	2024/11/05		Auto Calc
Sum of cations, anions	4	N/A	2024/11/01		Auto Calc
Sum of cations, anions	3	N/A	2024/11/05		Auto Calc
Ammonia-N (Total)	1	N/A	2024/10/31	AB SOP-00007	SM 24 4500 NH3 A G m
Ammonia-N (Total)	6	N/A	2024/11/04	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite	7	N/A	2024/10/31		Auto Calc
NO2 (N); NO2 (N) + NO3 (N) in Water	7	N/A	2024/10/30	AB SOP-00091	SM 24 4500 NO3m
Nitrate (as N)	7	2024/10/29	2024/10/31		Auto Calc
pH @25°C (3)	7	N/A	2024/10/31	AB SOP-00005	SM 24 4500-H+B m
Orthophosphate by Automated Analyzer (4)	6	N/A	2024/10/30	AB SOP-00025	SM 24 4500-P A,F m
Orthophosphate by Automated Analyzer (4)	1	N/A	2024/11/05	AB SOP-00025	SM 24 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	7	2024/10/30	2024/10/31	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Calculated)	4	N/A	2024/11/01		Auto Calc
Total Dissolved Solids (Calculated)	3	N/A	2024/11/05		Auto Calc
Total Kjeldahl Nitrogen (Total)	7	N/A	2024/11/01	BBY WI-00033	Auto Calc
Nitrogen (Total)	7	2024/10/31	2024/11/01	AB SOP-00093	SM 24 4500-N C m
Total Phosphorus Dissolved client FF/FP (5)	2	2024/10/31	2024/10/31	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus Dissolved client FF/FP (5)	5	2024/11/01	2024/11/01	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	7	2024/10/31	2024/10/31	AB SOP-00024	SM 24 4500-P A,B,F m

Your Project #: 102604-01
Your C.O.C. #: 740516-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/05
Report #: R3583186
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C487432
Received: 2024/10/29, 15:40

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Suspended Solids (NFR)	7	2024/10/30	2024/10/31	AB SOP-00061	SM 24 2540 D m
Turbidity	7	N/A	2024/10/30	CAL SOP-00081	SM 24 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) The APHA Standard Method requires dissolved oxygen to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory dissolved oxygen analyses in this report are reported past the APHA Standard Method holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt.
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
(4) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(5) Dissolved Phosphorus > Total Phosphorus Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 102604-01
Your C.O.C. #: 740516-02-01

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/05
Report #: R3583186
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C487432
Received: 2024/10/29, 15:40

Encryption Key

Bureau Veritas
05 Nov 2024 17:52:11

Please direct all questions regarding this Certificate of Analysis to:
Danielle Boisvert, Customer Solutions Representative
Email: danielle-andrea.boisvert@bureauveritas.com
Phone# (780)577-7178

==========

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ882		CYZ883		CYZ884		
Sampling Date		2024/10/29 09:15		2024/10/29 09:50		2024/10/29 10:20		
COC Number		740516-02-01		740516-02-01		740516-02-01		
	UNITS	WQ-05B	RDL	WQ-04B	QC Batch	WQ-04A	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	14	N/A	11	B585348	8.9	N/A	B585348
Cation Sum	meq/L	14	N/A	12	B585348	9.4	N/A	B585348
Hardness (CaCO3)	mg/L	590	0.50	460	B585344	370	0.50	B585344
Ion Balance (% Difference)	%	0.93	N/A	1.6	B585346	2.3	N/A	B585346
Nitrate (N)	mg/L	0.12	0.010	0.72	B585141	0.63	0.010	B585141
Nitrate (NO3)	mg/L	0.55	0.044	3.2	B585086	2.8	0.044	B585086
Nitrite (NO2)	mg/L	<0.033	0.033	<0.033	B585086	<0.033	0.033	B585086
Calculated Total Dissolved Solids	mg/L	700	10	580	B585357	460	10	B585357
Elements								
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	<0.000020	B585340	<0.000020	0.000020	B585340
Misc. Inorganics								
Conductivity	uS/cm	1100	2.0	1000	B586767	780	2.0	B586767
pH	pH	7.92	N/A	8.16	B586766	7.93	N/A	B586766
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	<1.0	B586764	<1.0	1.0	B586764
Alkalinity (Total as CaCO3)	mg/L	450	1.0	350	B586764	380	1.0	B586764
Bicarbonate (HCO3)	mg/L	550	1.0	420	B586764	460	1.0	B586764
Carbonate (CO3)	mg/L	<1.0	1.0	<1.0	B586764	<1.0	1.0	B586764
Hydroxide (OH)	mg/L	<1.0	1.0	<1.0	B586764	<1.0	1.0	B586764
Chloride (Cl)	mg/L	37	1.0	110	B586714	8.2	1.0	B586714
Sulphate (SO4)	mg/L	170	5.0	56	B586714	52	1.0	B586714
Nutrients								
Nitrite (N)	mg/L	<0.010	0.010	<0.010	B587007	<0.010	0.010	B587007
Nitrate plus Nitrite (N)	mg/L	0.12	0.010	0.72	B587007	0.63	0.010	B587007
Elements								
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	0.012	B588568	<0.0030	0.0030	B588568
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	B588568	<0.00060	0.00060	B588568
Dissolved Arsenic (As)	mg/L	0.00049	0.00020	<0.00020	B588568	<0.00020	0.00020	B588568
Dissolved Barium (Ba)	mg/L	0.12	0.010	0.072	B591327	0.067	0.010	B588100
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	B588568	<0.0010	0.0010	B588568
Dissolved Boron (B)	mg/L	0.046	0.020	0.065	B591327	0.048	0.020	B588100
Dissolved Calcium (Ca)	mg/L	100	0.30	96	B591327	76	0.30	B588100

RDL = Reportable Detection Limit
N/A = Not Applicable

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ882		CYZ883		CYZ884		
Sampling Date		2024/10/29 09:15		2024/10/29 09:50		2024/10/29 10:20		
COC Number		740516-02-01		740516-02-01		740516-02-01		
	UNITS	WQ-05B	RDL	WQ-04B	QC Batch	WQ-04A	RDL	QC Batch
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	<0.0010	B588568	<0.0010	0.0010	B588568
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	<0.00030	B588568	<0.00030	0.00030	B588568
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	0.0013	B588568	0.0018	0.0010	B588568
Dissolved Iron (Fe)	mg/L	<0.060	0.060	<0.060	B591327	<0.060	0.060	B588100
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	<0.00020	B588568	<0.00020	0.00020	B588568
Dissolved Lithium (Li)	mg/L	0.024	0.020	0.029	B591327	0.022	0.020	B588100
Dissolved Magnesium (Mg)	mg/L	83	0.20	54	B591327	43	0.20	B588100
Dissolved Manganese (Mn)	mg/L	0.035	0.0040	<0.0040	B591327	<0.0040	0.0040	B588100
Dissolved Molybdenum (Mo)	mg/L	0.0019	0.00020	0.0015	B588568	0.0025	0.00020	B588568
Dissolved Nickel (Ni)	mg/L	0.00074	0.00050	<0.00050	B588568	<0.00050	0.00050	B588568
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	<0.10	B591327	<0.10	0.10	B588100
Dissolved Potassium (K)	mg/L	4.3	0.30	5.1	B591327	4.1	0.30	B588100
Dissolved Selenium (Se)	mg/L	0.0030	0.00020	0.0017	B588568	0.0019	0.00020	B588568
Dissolved Silicon (Si)	mg/L	4.2	0.50	3.7	B591327	4.7	0.50	B588100
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	B588568	<0.00010	0.00010	B588568
Dissolved Sodium (Na)	mg/L	42	0.50	50	B591327	44	0.50	B588100
Dissolved Strontium (Sr)	mg/L	0.87	0.020	0.98	B591327	0.70	0.020	B588100
Dissolved Sulphur (S)	mg/L	59	0.20	19	B591327	19	0.20	B588100
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	B588568	<0.00020	0.00020	B588568
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	B588568	<0.0010	0.0010	B588568
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	<0.0010	B588568	<0.0010	0.0010	B588568
Dissolved Uranium (U)	mg/L	0.011	0.00010	0.0038	B588568	0.0042	0.00010	B588568
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	<0.0010	B588568	<0.0010	0.0010	B588568
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	<0.0030	B588568	<0.0030	0.0030	B588568
RDL = Reportable Detection Limit								

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ885		CYZ886			CYZ887		
Sampling Date		2024/10/29 11:15		2024/10/29 11:30			2024/10/29 11:45		
COC Number		740516-02-01		740516-02-01			740516-02-01		
	UNITS	WQ-07	QC Batch	WQ-06	RDL	QC Batch	WQ-04C	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	9.9	B585348	10	N/A	B585348	9.8	N/A	B585348
Cation Sum	meq/L	9.6	B585348	11	N/A	B585348	10	N/A	B585348
Hardness (CaCO3)	mg/L	380	B585344	420	0.50	B585557	410	0.50	B585557
Ion Balance (% Difference)	%	1.5	B585346	3.7	N/A	B585346	2.8	N/A	B585346
Nitrate (N)	mg/L	<0.050	B585141	<0.050	0.050	B585141	0.012	0.010	B585141
Nitrate (NO3)	mg/L	<0.22	B585086	<0.22	0.22	B585086	0.053	0.044	B585086
Nitrite (NO2)	mg/L	<0.033	B585086	<0.033	0.033	B585086	<0.033	0.033	B585086
Calculated Total Dissolved Solids	mg/L	500	B585357	520	10	B585357	500	10	B585357
Elements									
Dissolved Cadmium (Cd)	mg/L	<0.000020	B585340	<0.000020	0.000020	B585340	<0.000020	0.000020	B585340
Misc. Inorganics									
Conductivity	uS/cm	860	B586767	880	2.0	B586767	840	2.0	B586767
pH	pH	8.30	B586766	8.21	N/A	B586766	8.40	N/A	B586766
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	B586764	<1.0	1.0	B586764	6.7	1.0	B586764
Alkalinity (Total as CaCO3)	mg/L	390	B586764	390	1.0	B586764	400	1.0	B586764
Bicarbonate (HCO3)	mg/L	470	B586764	480	1.0	B586764	470	1.0	B586764
Carbonate (CO3)	mg/L	<1.0	B586764	<1.0	1.0	B586764	8.1	1.0	B586764
Hydroxide (OH)	mg/L	<1.0	B586764	<1.0	1.0	B586764	<1.0	1.0	B586764
Chloride (Cl)	mg/L	21	B586714	22	1.0	B586714	19	1.0	B586714
Sulphate (SO4)	mg/L	75	B586714	77	1.0	B586714	64	1.0	B586714
Nutrients									
Nitrite (N)	mg/L	<0.010	B587007	<0.010	0.010	B587007	<0.010	0.010	B587007
Nitrate plus Nitrite (N)	mg/L	<0.050 (1)	B587007	<0.050 (1)	0.050	B587007	0.012	0.010	B587007
Elements									
Dissolved Aluminum (Al)	mg/L	0.0041	B588568	0.0058	0.0030	B588568	0.0044	0.0030	B588517
Dissolved Antimony (Sb)	mg/L	<0.00060	B588568	<0.00060	0.00060	B588568	<0.00060	0.00060	B588517
Dissolved Arsenic (As)	mg/L	0.00048	B588568	0.00060	0.00020	B588568	0.00039	0.00020	B588517
Dissolved Barium (Ba)	mg/L	0.092	B591327	0.10	0.010	B588100	0.077	0.010	B588100
Dissolved Beryllium (Be)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Boron (B)	mg/L	0.050	B591327	0.040	0.020	B588100	0.041	0.020	B588100

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ885		CYZ886			CYZ887		
Sampling Date		2024/10/29 11:15		2024/10/29 11:30			2024/10/29 11:45		
COC Number		740516-02-01		740516-02-01			740516-02-01		
	UNITS	WQ-07	QC Batch	WQ-06	RDL	QC Batch	WQ-04C	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	63	B591327	72	0.30	B588100	72	0.30	B588100
Dissolved Chromium (Cr)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Cobalt (Co)	mg/L	<0.00030	B588568	<0.00030	0.00030	B588568	<0.00030	0.00030	B588517
Dissolved Copper (Cu)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Iron (Fe)	mg/L	<0.060	B591327	<0.060	0.060	B588100	<0.060	0.060	B588100
Dissolved Lead (Pb)	mg/L	0.00021	B588568	<0.00020	0.00020	B588568	<0.00020	0.00020	B588517
Dissolved Lithium (Li)	mg/L	<0.020	B591327	0.023	0.020	B588100	0.023	0.020	B588100
Dissolved Magnesium (Mg)	mg/L	53	B591327	59	0.20	B588100	55	0.20	B588100
Dissolved Manganese (Mn)	mg/L	0.0050	B591327	0.011	0.0040	B588100	<0.0040	0.0040	B588100
Dissolved Molybdenum (Mo)	mg/L	0.0022	B588568	0.0020	0.00020	B588568	0.0023	0.00020	B588517
Dissolved Nickel (Ni)	mg/L	0.00052	B588568	0.00073	0.00050	B588568	<0.00050	0.00050	B588517
Dissolved Phosphorus (P)	mg/L	<0.10	B591327	<0.10	0.10	B588100	<0.10	0.10	B588100
Dissolved Potassium (K)	mg/L	3.7	B591327	4.2	0.30	B588100	4.0	0.30	B588100
Dissolved Selenium (Se)	mg/L	0.00048	B588568	0.00048	0.00020	B588568	0.00079	0.00020	B588517
Dissolved Silicon (Si)	mg/L	3.0	B591327	3.1	0.50	B588100	5.3	0.50	B588100
Dissolved Silver (Ag)	mg/L	<0.00010	B588568	<0.00010	0.00010	B588568	<0.00010	0.00010	B588517
Dissolved Sodium (Na)	mg/L	46	B591327	51	0.50	B588100	49	0.50	B588100
Dissolved Strontium (Sr)	mg/L	0.73	B591327	0.75	0.020	B588100	0.74	0.020	B588100
Dissolved Sulphur (S)	mg/L	27	B591327	28	0.20	B588100	24	0.20	B588100
Dissolved Thallium (Tl)	mg/L	<0.00020	B588568	<0.00020	0.00020	B588568	<0.00020	0.00020	B588517
Dissolved Tin (Sn)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Titanium (Ti)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Uranium (U)	mg/L	0.0047	B588568	0.0044	0.00010	B588568	0.0048	0.00010	B588517
Dissolved Vanadium (V)	mg/L	<0.0010	B588568	<0.0010	0.0010	B588568	<0.0010	0.0010	B588517
Dissolved Zinc (Zn)	mg/L	<0.0030	B588568	<0.0030	0.0030	B588568	0.0043	0.0030	B588517
RDL = Reportable Detection Limit									

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ888		
Sampling Date		2024/10/29 12:20		
COC Number		740516-02-01		
	UNITS	WQ-03	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	30	N/A	B585348
Cation Sum	meq/L	29	N/A	B585348
Hardness (CaCO3)	mg/L	1300	0.50	B585557
Ion Balance (% Difference)	%	2.3	N/A	B585559
Nitrate (N)	mg/L	<0.050	0.050	B585141
Nitrate (NO3)	mg/L	<0.22	0.22	B585561
Nitrite (NO2)	mg/L	<0.033	0.033	B585561
Calculated Total Dissolved Solids	mg/L	1800	25	B585357
Elements				
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B585340
Misc. Inorganics				
Conductivity	uS/cm	2200	2.0	B586767
pH	pH	7.78	N/A	B586766
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B586764
Alkalinity (Total as CaCO3)	mg/L	500	1.0	B586764
Bicarbonate (HCO3)	mg/L	610	1.0	B586764
Carbonate (CO3)	mg/L	<1.0	1.0	B586764
Hydroxide (OH)	mg/L	<1.0	1.0	B586764
Chloride (Cl)	mg/L	31	1.0	B586714
Sulphate (SO4)	mg/L	930	25	B586714
Nutrients				
Nitrite (N)	mg/L	<0.010	0.010	B587007
Nitrate plus Nitrite (N)	mg/L	<0.050 (1)	0.050	B587007
Elements				
Dissolved Aluminum (Al)	mg/L	0.0038	0.0030	B588568
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B588568
Dissolved Arsenic (As)	mg/L	0.0025	0.00020	B588568
Dissolved Barium (Ba)	mg/L	0.092	0.010	B588100
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B588568
Dissolved Boron (B)	mg/L	0.064	0.020	B588100

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

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ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CYZ888		
Sampling Date		2024/10/29 12:20		
COC Number		740516-02-01		
	UNITS	**WQ-03**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	290	0.30	B588100
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B588568
Dissolved Cobalt (Co)	mg/L	0.0021	0.00030	B588568
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	B588568
Dissolved Iron (Fe)	mg/L	0.29	0.060	B588100
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B588568
Dissolved Lithium (Li)	mg/L	0.036	0.020	B588100
Dissolved Magnesium (Mg)	mg/L	140	0.20	B588100
Dissolved Manganese (Mn)	mg/L	1.3	0.0040	B588100
Dissolved Molybdenum (Mo)	mg/L	0.0036	0.00020	B588568
Dissolved Nickel (Ni)	mg/L	0.0035	0.00050	B588568
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B588100
Dissolved Potassium (K)	mg/L	20	0.30	B588100
Dissolved Selenium (Se)	mg/L	0.00039	0.00020	B588568
Dissolved Silicon (Si)	mg/L	1.8	0.50	B588100
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B588568
Dissolved Sodium (Na)	mg/L	52	0.50	B588100
Dissolved Strontium (Sr)	mg/L	1.6	0.020	B588100
Dissolved Sulphur (S)	mg/L	280	0.20	B588100
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B588568
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B588568
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B588568
Dissolved Uranium (U)	mg/L	0.019	0.00010	B588568
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B588568
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	B588568
RDL = Reportable Detection Limit				

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TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		CYZ882	CYZ883		CYZ884			CYZ885		
Sampling Date		2024/10/29 09:15	2024/10/29 09:50		2024/10/29 10:20			2024/10/29 11:15		
COC Number		740516-02-01	740516-02-01		740516-02-01			740516-02-01		
	UNITS	WQ-05B	WQ-04B	QC Batch	WQ-04A	RDL	QC Batch	WQ-07	RDL	QC Batch
Calculated Parameters										
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.58	0.40	B584116	<0.020	0.020	B584116	0.42	0.050	B584116
Nutrients										
Total Nitrogen (N)	mg/L	0.70	1.1	B588217	0.63 (1)	0.020	B588228	0.42	0.020	B588217

RDL = Reportable Detection Limit
(1) Nitrogen < Nitrate: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Bureau Veritas ID		CYZ886			CYZ887		CYZ888		
Sampling Date		2024/10/29 11:30			2024/10/29 11:45		2024/10/29 12:20		
COC Number		740516-02-01			740516-02-01		740516-02-01		
	UNITS	WQ-06	RDL	QC Batch	WQ-04C	RDL	WQ-03	RDL	QC Batch
Calculated Parameters									
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.39	0.050	B585563	0.30	0.020	2.1	0.20	B585563
Nutrients									
Total Nitrogen (N)	mg/L	0.39	0.020	B588228	0.31	0.020	2.1 (1)	0.20	B588217

RDL = Reportable Detection Limit
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

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RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CYZ882		CYZ883		CYZ884		CYZ885		
Sampling Date		2024/10/29 09:15		2024/10/29 09:50		2024/10/29 10:20		2024/10/29 11:15		
COC Number		740516-02-01		740516-02-01		740516-02-01		740516-02-01		
	UNITS	WQ-05B	QC Batch	WQ-04B	QC Batch	WQ-04A	QC Batch	WQ-07	RDL	QC Batch
Demand Parameters										
Biochemical Oxygen Demand	mg/L	4.4	B585751	<2.0	B585751	<2.0	B585751	<2.0	2.0	B585751
Chemical Oxygen Demand	mg/L	19	B590463	<10	B590463	10	B590463	16	10	B590463
Misc. Inorganics										
Dissolved Oxygen (O2)	mg/L	8.0	B586351	12	B586351	3.6	B586351	8.6	0.10	B586351
Total Dissolved Solids	mg/L	700	B585648	590	B585648	440	B585648	500	10	B585648
Total Suspended Solids	mg/L	98	B585634	16	B585634	290	B585634	86	1.0	B585634
Nutrients										
Total Ammonia (N)	mg/L	<0.015	B588923	<0.015	B588918	<0.015	B588918	<0.015	0.015	B588918
Orthophosphate (P)	mg/L	<0.0030	B586706	<0.0030	B586706	<0.0030	B586706	<0.0030	0.0030	B594258
Dissolved Phosphorus (P)	mg/L	<0.0030	B589393	<0.0030	B589393	<0.0030	B587676	<0.0030	0.0030	B589393
Total Phosphorus (P)	mg/L	0.015	B587654	0.018	B587654	0.0049	B587654	0.0096	0.0030	B587654
Physical Properties										
Turbidity	NTU	46	B585709	6.2	B585709	63	B585709	45	0.10	B585709

RDL = Reportable Detection Limit

Bureau Veritas ID		CYZ886		CYZ887			CYZ888		
Sampling Date		2024/10/29 11:30		2024/10/29 11:45			2024/10/29 12:20		
COC Number		740516-02-01		740516-02-01			740516-02-01		
	UNITS	WQ-06	QC Batch	WQ-04C	RDL	QC Batch	WQ-03	RDL	QC Batch
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	B585751	<2.0	2.0	B585751	5.0	2.0	B585751
Chemical Oxygen Demand	mg/L	13	B590463	12	10	B590463	62	10	B590463
Misc. Inorganics									
Dissolved Oxygen (O2)	mg/L	6.2	B586351	5.2	0.10	B586351	1.8	0.10	B586351
Total Dissolved Solids	mg/L	510	B585648	490	10	B585648	1800	10	B585648
Total Suspended Solids	mg/L	57	B585634	18	1.0	B585634	3500 (1)	5.0	B585634
Nutrients									
Total Ammonia (N)	mg/L	<0.015	B588918	<0.015	0.015	B588121	0.25	0.015	B588918
Orthophosphate (P)	mg/L	<0.0030	B586706	<0.0030	0.0030	B586706	<0.0030	0.0030	B586706
Dissolved Phosphorus (P)	mg/L	<0.0030	B589393	<0.0030	0.0030	B589393	0.012	0.0030	B587676
Total Phosphorus (P)	mg/L	0.0063	B587654	<0.0030	0.0030	B587654	0.13 (2)	0.030	B587654
Physical Properties									
Turbidity	NTU	27	B585709	9.4	0.10	B585709	2100	0.10	B585709

RDL = Reportable Detection Limit
(1) Detection limit raised based on sample volume used for analysis.
(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
Package 2	8.6°C
Package 3	4.6°C

Sample CYZ882 [WQ-05B] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CYZ883 [WQ-04B] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CYZ884 [WQ-04A] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CYZ885 [WQ-07] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt. Sample was analyzed past method specified hold time for Orthophosphate by Automated Analyzer. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CYZ886 [WQ-06] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CYZ887 [WQ-04C] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Sample CYZ888 [WQ-03] : CSR/CCME requires Dissolved Oxygen to be analysed within 8 hours of sampling. This sample was analyzed past the hold time. Bureau Veritas Laboratories endeavors to analyze samples as soon as possible after receipt.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B585634	HE1	Matrix Spike	Total Suspended Solids	2024/10/31		93	%	80 - 120
B585634	HE1	Spiked Blank	Total Suspended Solids	2024/10/31		99	%	80 - 120
B585634	HE1	Method Blank	Total Suspended Solids	2024/10/31	<1.0		mg/L	
B585634	HE1	RPD	Total Suspended Solids	2024/10/31	13		%	20
B585648	HE1	Matrix Spike [CYZ882-08]	Total Dissolved Solids	2024/10/31		87	%	80 - 120
B585648	HE1	Spiked Blank	Total Dissolved Solids	2024/10/31		98	%	80 - 120
B585648	HE1	Method Blank	Total Dissolved Solids	2024/10/31	<10		mg/L	
B585648	HE1	RPD [CYZ882-08]	Total Dissolved Solids	2024/10/31	1.7		%	20
B585709	DVN	Spiked Blank	Turbidity	2024/10/30		99	%	80 - 120
B585709	DVN	Method Blank	Turbidity	2024/10/30	<0.10		NTU	
B585709	DVN	RPD	Turbidity	2024/10/30	0.66		%	20
B585751	LYV	Spiked Blank	Biochemical Oxygen Demand	2024/11/04		98	%	85 - 115
B585751	LYV	Method Blank	Biochemical Oxygen Demand	2024/11/04	<2.0		mg/L	
B585751	LYV	RPD	Biochemical Oxygen Demand	2024/11/04	NC		%	20
B586351	AP1	Spiked Blank	Dissolved Oxygen (O2)	2024/10/30		100	%	80 - 120
B586351	AP1	RPD [CYZ882-01]	Dissolved Oxygen (O2)	2024/10/30	0		%	20
B586706	YL7	Matrix Spike [CYZ887-03]	Orthophosphate (P)	2024/10/30		97	%	80 - 120
B586706	YL7	Spiked Blank	Orthophosphate (P)	2024/10/30		99	%	80 - 120
B586706	YL7	Method Blank	Orthophosphate (P)	2024/10/30	<0.0030		mg/L	
B586706	YL7	RPD [CYZ884-03]	Orthophosphate (P)	2024/10/30	NC		%	20
B586714	TOR	Matrix Spike	Chloride (Cl)	2024/10/30		102	%	80 - 120
			Sulphate (SO4)	2024/10/30		NC	%	80 - 120
B586714	TOR	Spiked Blank	Chloride (Cl)	2024/10/30		94	%	80 - 120
			Sulphate (SO4)	2024/10/30		100	%	80 - 120
B586714	TOR	Method Blank	Chloride (Cl)	2024/10/30	<1.0		mg/L	
			Sulphate (SO4)	2024/10/30	<1.0		mg/L	
B586714	TOR	RPD	Chloride (Cl)	2024/10/30	10		%	20
			Sulphate (SO4)	2024/10/30	1.4		%	20
B586764	AYE	Spiked Blank	Alkalinity (Total as CaCO3)	2024/10/31		99	%	80 - 120
B586764	AYE	Method Blank	Alkalinity (PP as CaCO3)	2024/10/31	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2024/10/31	<1.0		mg/L	
			Bicarbonate (HCO3)	2024/10/31	<1.0		mg/L	
			Carbonate (CO3)	2024/10/31	<1.0		mg/L	
			Hydroxide (OH)	2024/10/31	<1.0		mg/L	
B586764	AYE	RPD [CYZ884-03]	Alkalinity (PP as CaCO3)	2024/10/31	NC		%	20
			Alkalinity (Total as CaCO3)	2024/10/31	0.55		%	20
			Bicarbonate (HCO3)	2024/10/31	0.55		%	20
			Carbonate (CO3)	2024/10/31	NC		%	20
			Hydroxide (OH)	2024/10/31	NC		%	20
B586766	AYE	Spiked Blank	pH	2024/10/31		100	%	97 - 103
B586766	AYE	RPD [CYZ884-03]	pH	2024/10/31	0.18		%	N/A
B586767	AYE	Spiked Blank	Conductivity	2024/10/31		101	%	90 - 110
B586767	AYE	Method Blank	Conductivity	2024/10/31	<2.0		uS/cm	
B586767	AYE	RPD [CYZ884-03]	Conductivity	2024/10/31	0.13		%	10
B587007	AFI	Matrix Spike	Nitrite (N)	2024/10/30		NC	%	80 - 120
			Nitrate plus Nitrite (N)	2024/10/30		NC	%	80 - 120
B587007	AFI	Spiked Blank	Nitrite (N)	2024/10/30		100	%	80 - 120
			Nitrate plus Nitrite (N)	2024/10/30		99	%	80 - 120
B587007	AFI	Method Blank	Nitrite (N)	2024/10/30	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2024/10/30	<0.010		mg/L	
B587007	AFI	RPD	Nitrite (N)	2024/10/30	0.34		%	20
			Nitrate plus Nitrite (N)	2024/10/30	5.4		%	20
B587654	MAP	Matrix Spike	Total Phosphorus (P)	2024/10/31		96	%	80 - 120
B587654	MAP	QC Standard	Total Phosphorus (P)	2024/10/31		90	%	80 - 120
B587654	MAP	Spiked Blank	Total Phosphorus (P)	2024/10/31		96	%	80 - 120

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B587654	MAP	Method Blank	Total Phosphorus (P)	2024/10/31	<0.0030		mg/L	
B587654	MAP	RPD	Total Phosphorus (P)	2024/10/31	NC		%	20
B587676	MAP	Matrix Spike [CYZ884-05]	Dissolved Phosphorus (P)	2024/10/31		96	%	80 - 120
B587676	MAP	QC Standard	Dissolved Phosphorus (P)	2024/10/31		92	%	80 - 120
B587676	MAP	Spiked Blank	Dissolved Phosphorus (P)	2024/10/31		99	%	80 - 120
B587676	MAP	Method Blank	Dissolved Phosphorus (P)	2024/10/31	<0.0030		mg/L	
B587676	MAP	RPD [CYZ884-05]	Dissolved Phosphorus (P)	2024/10/31	NC		%	20
B588100	VSC	Matrix Spike	Dissolved Barium (Ba)	2024/10/31		84	%	80 - 120
			Dissolved Boron (B)	2024/10/31		87	%	80 - 120
			Dissolved Iron (Fe)	2024/10/31		108	%	80 - 120
			Dissolved Lithium (Li)	2024/10/31		92	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/31		NC	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/31		NC	%	80 - 120
			Dissolved Phosphorus (P)	2024/10/31		109	%	80 - 120
			Dissolved Potassium (K)	2024/10/31		98	%	80 - 120
			Dissolved Silicon (Si)	2024/10/31		97	%	80 - 120
B588100	VSC	Spiked Blank	Dissolved Barium (Ba)	2024/10/31		95	%	80 - 120
			Dissolved Boron (B)	2024/10/31		96	%	80 - 120
			Dissolved Calcium (Ca)	2024/10/31		102	%	80 - 120
			Dissolved Iron (Fe)	2024/10/31		109	%	80 - 120
			Dissolved Lithium (Li)	2024/10/31		99	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/31		107	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/31		103	%	80 - 120
			Dissolved Phosphorus (P)	2024/10/31		106	%	80 - 120
			Dissolved Potassium (K)	2024/10/31		103	%	80 - 120
			Dissolved Silicon (Si)	2024/10/31		103	%	80 - 120
			Dissolved Sodium (Na)	2024/10/31		102	%	80 - 120
			Dissolved Strontium (Sr)	2024/10/31		94	%	80 - 120
			Dissolved Sulphur (S)	2024/10/31		102	%	80 - 120
B588100	VSC	Method Blank	Dissolved Barium (Ba)	2024/10/31	<0.010		mg/L	
			Dissolved Boron (B)	2024/10/31	<0.020		mg/L	
			Dissolved Calcium (Ca)	2024/10/31	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/10/31	<0.060		mg/L	
			Dissolved Lithium (Li)	2024/10/31	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2024/10/31	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/10/31	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2024/10/31	<0.10		mg/L	
			Dissolved Potassium (K)	2024/10/31	<0.30		mg/L	
			Dissolved Silicon (Si)	2024/10/31	<0.50		mg/L	
			Dissolved Sodium (Na)	2024/10/31	<0.50		mg/L	
			Dissolved Strontium (Sr)	2024/10/31	<0.020		mg/L	
			Dissolved Sulphur (S)	2024/10/31	<0.20		mg/L	
B588100	VSC	RPD	Dissolved Barium (Ba)	2024/11/01	8.5		%	20
			Dissolved Boron (B)	2024/11/01	2.0		%	20
			Dissolved Calcium (Ca)	2024/11/01	1.2		%	20
			Dissolved Iron (Fe)	2024/11/01	NC		%	20
			Dissolved Lithium (Li)	2024/11/01	0.92		%	20
			Dissolved Magnesium (Mg)	2024/11/01	1.4		%	20
			Dissolved Manganese (Mn)	2024/11/01	1.6		%	20
			Dissolved Phosphorus (P)	2024/11/01	NC		%	20
			Dissolved Potassium (K)	2024/11/01	0.96		%	20
			Dissolved Silicon (Si)	2024/11/01	2.1		%	20
			Dissolved Sodium (Na)	2024/11/01	1.2		%	20
			Dissolved Strontium (Sr)	2024/11/01	1.4		%	20
			Dissolved Sulphur (S)	2024/11/01	1.9		%	20

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B588121	ISW	Matrix Spike [CYZ887-06]	Total Ammonia (N)	2024/10/31		113	%	80 - 120
B588121	ISW	Spiked Blank	Total Ammonia (N)	2024/10/31		106	%	80 - 120
B588121	ISW	Method Blank	Total Ammonia (N)	2024/10/31	<0.015		mg/L	
B588121	ISW	RPD [CYZ887-06]	Total Ammonia (N)	2024/10/31	NC		%	20
B588217	YL7	Matrix Spike [CYZ887-04]	Total Nitrogen (N)	2024/11/01		99	%	80 - 120
B588217	YL7	QC Standard	Total Nitrogen (N)	2024/11/01		105	%	80 - 120
B588217	YL7	Spiked Blank	Total Nitrogen (N)	2024/11/01		97	%	80 - 120
B588217	YL7	Method Blank	Total Nitrogen (N)	2024/11/01	<0.020		mg/L	
B588217	YL7	RPD [CYZ887-04]	Total Nitrogen (N)	2024/11/01	6.2		%	20
B588228	YL7	Matrix Spike [CYZ884-04]	Total Nitrogen (N)	2024/11/01		102	%	80 - 120
B588228	YL7	QC Standard	Total Nitrogen (N)	2024/11/01		103	%	N/A
B588228	YL7	Spiked Blank	Total Nitrogen (N)	2024/11/01		105	%	80 - 120
B588228	YL7	Method Blank	Total Nitrogen (N)	2024/11/01	<0.020		mg/L	
B588228	YL7	RPD [CYZ884-04]	Total Nitrogen (N)	2024/11/01	4.2		%	20
B588517	JAB	Matrix Spike	Dissolved Aluminum (Al)	2024/10/31		85	%	80 - 120
			Dissolved Antimony (Sb)	2024/10/31		94	%	80 - 120
			Dissolved Arsenic (As)	2024/10/31		98	%	80 - 120
			Dissolved Beryllium (Be)	2024/10/31		90	%	80 - 120
			Dissolved Chromium (Cr)	2024/10/31		94	%	80 - 120
			Dissolved Cobalt (Co)	2024/10/31		91	%	80 - 120
			Dissolved Copper (Cu)	2024/10/31		87	%	80 - 120
			Dissolved Lead (Pb)	2024/10/31		90	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/10/31		105	%	80 - 120
			Dissolved Nickel (Ni)	2024/10/31		87	%	80 - 120
			Dissolved Selenium (Se)	2024/10/31		94	%	80 - 120
			Dissolved Silver (Ag)	2024/10/31		92	%	80 - 120
			Dissolved Thallium (Tl)	2024/10/31		88	%	80 - 120
			Dissolved Tin (Sn)	2024/10/31		105	%	80 - 120
			Dissolved Titanium (Ti)	2024/10/31		96	%	80 - 120
			Dissolved Uranium (U)	2024/10/31		NC	%	80 - 120
			Dissolved Vanadium (V)	2024/10/31		97	%	80 - 120
			Dissolved Zinc (Zn)	2024/10/31		89	%	80 - 120
B588517	JAB	Spiked Blank	Dissolved Aluminum (Al)	2024/10/31		108	%	80 - 120
			Dissolved Antimony (Sb)	2024/10/31		97	%	80 - 120
			Dissolved Arsenic (As)	2024/10/31		99	%	80 - 120
			Dissolved Beryllium (Be)	2024/10/31		93	%	80 - 120
			Dissolved Chromium (Cr)	2024/10/31		96	%	80 - 120
			Dissolved Cobalt (Co)	2024/10/31		96	%	80 - 120
			Dissolved Copper (Cu)	2024/10/31		97	%	80 - 120
			Dissolved Lead (Pb)	2024/10/31		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/10/31		99	%	80 - 120
			Dissolved Nickel (Ni)	2024/10/31		96	%	80 - 120
			Dissolved Selenium (Se)	2024/10/31		98	%	80 - 120
			Dissolved Silver (Ag)	2024/10/31		97	%	80 - 120
			Dissolved Thallium (Tl)	2024/10/31		96	%	80 - 120
			Dissolved Tin (Sn)	2024/10/31		100	%	80 - 120
			Dissolved Titanium (Ti)	2024/10/31		95	%	80 - 120
			Dissolved Uranium (U)	2024/10/31		92	%	80 - 120
			Dissolved Vanadium (V)	2024/10/31		96	%	80 - 120
			Dissolved Zinc (Zn)	2024/10/31		102	%	80 - 120
B588517	JAB	Method Blank	Dissolved Aluminum (Al)	2024/10/31	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2024/10/31	<0.00060		mg/L	
			Dissolved Arsenic (As)	2024/10/31	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2024/10/31	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2024/10/31	<0.0010		mg/L	

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			Dissolved Cobalt (Co)	2024/10/31	<0.00030		mg/L	
			Dissolved Copper (Cu)	2024/10/31	<0.0010		mg/L	
			Dissolved Lead (Pb)	2024/10/31	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2024/10/31	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2024/10/31	<0.00050		mg/L	
			Dissolved Selenium (Se)	2024/10/31	<0.00020		mg/L	
			Dissolved Silver (Ag)	2024/10/31	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2024/10/31	<0.00020		mg/L	
			Dissolved Tin (Sn)	2024/10/31	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2024/10/31	<0.0010		mg/L	
			Dissolved Uranium (U)	2024/10/31	<0.00010		mg/L	
			Dissolved Vanadium (V)	2024/10/31	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2024/10/31	<0.0030		mg/L	
B588517	JAB	RPD	Dissolved Aluminum (Al)	2024/10/31	NC		%	20
			Dissolved Antimony (Sb)	2024/10/31	2.9		%	20
			Dissolved Arsenic (As)	2024/10/31	11		%	20
			Dissolved Beryllium (Be)	2024/10/31	NC		%	20
			Dissolved Chromium (Cr)	2024/10/31	NC		%	20
			Dissolved Cobalt (Co)	2024/10/31	2.4		%	20
			Dissolved Copper (Cu)	2024/10/31	5.6		%	20
			Dissolved Lead (Pb)	2024/10/31	NC		%	20
			Dissolved Molybdenum (Mo)	2024/10/31	0.84		%	20
			Dissolved Nickel (Ni)	2024/10/31	1.4		%	20
			Dissolved Selenium (Se)	2024/10/31	8.1		%	20
			Dissolved Silver (Ag)	2024/10/31	NC		%	20
			Dissolved Thallium (Tl)	2024/10/31	NC		%	20
			Dissolved Tin (Sn)	2024/10/31	NC		%	20
			Dissolved Titanium (Ti)	2024/10/31	NC		%	20
			Dissolved Uranium (U)	2024/10/31	1.2		%	20
			Dissolved Vanadium (V)	2024/10/31	NC		%	20
			Dissolved Zinc (Zn)	2024/10/31	2.4		%	20
B588568	JAB	Matrix Spike	Dissolved Aluminum (Al)	2024/10/31		92	%	80 - 120
			Dissolved Antimony (Sb)	2024/10/31		94	%	80 - 120
			Dissolved Arsenic (As)	2024/10/31		NC	%	80 - 120
			Dissolved Beryllium (Be)	2024/10/31		91	%	80 - 120
			Dissolved Chromium (Cr)	2024/10/31		93	%	80 - 120
			Dissolved Cobalt (Co)	2024/10/31		93	%	80 - 120
			Dissolved Copper (Cu)	2024/10/31		92	%	80 - 120
			Dissolved Lead (Pb)	2024/10/31		97	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/10/31		103	%	80 - 120
			Dissolved Nickel (Ni)	2024/10/31		NC	%	80 - 120
			Dissolved Selenium (Se)	2024/10/31		97	%	80 - 120
			Dissolved Silver (Ag)	2024/10/31		97	%	80 - 120
			Dissolved Thallium (Tl)	2024/10/31		96	%	80 - 120
			Dissolved Tin (Sn)	2024/10/31		102	%	80 - 120
			Dissolved Titanium (Ti)	2024/10/31		90	%	80 - 120
			Dissolved Uranium (U)	2024/10/31		91	%	80 - 120
			Dissolved Vanadium (V)	2024/10/31		96	%	80 - 120
			Dissolved Zinc (Zn)	2024/10/31		NC	%	80 - 120
B588568	JAB	Spiked Blank	Dissolved Aluminum (Al)	2024/10/31		108	%	80 - 120
			Dissolved Antimony (Sb)	2024/10/31		98	%	80 - 120
			Dissolved Arsenic (As)	2024/10/31		100	%	80 - 120
			Dissolved Beryllium (Be)	2024/10/31		89	%	80 - 120
			Dissolved Chromium (Cr)	2024/10/31		97	%	80 - 120
			Dissolved Cobalt (Co)	2024/10/31		96	%	80 - 120

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			Dissolved Copper (Cu)	2024/10/31		97	%	80 - 120
			Dissolved Lead (Pb)	2024/10/31		101	%	80 - 120
			Dissolved Molybdenum (Mo)	2024/10/31		99	%	80 - 120
			Dissolved Nickel (Ni)	2024/10/31		104	%	80 - 120
			Dissolved Selenium (Se)	2024/10/31		97	%	80 - 120
			Dissolved Silver (Ag)	2024/10/31		95	%	80 - 120
			Dissolved Thallium (Tl)	2024/10/31		99	%	80 - 120
			Dissolved Tin (Sn)	2024/10/31		102	%	80 - 120
			Dissolved Titanium (Ti)	2024/10/31		96	%	80 - 120
			Dissolved Uranium (U)	2024/10/31		93	%	80 - 120
			Dissolved Vanadium (V)	2024/10/31		97	%	80 - 120
			Dissolved Zinc (Zn)	2024/10/31		106	%	80 - 120
B588568	JAB	Method Blank	Dissolved Aluminum (Al)	2024/10/31	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2024/10/31	<0.00060		mg/L	
			Dissolved Arsenic (As)	2024/10/31	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2024/10/31	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2024/10/31	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2024/10/31	<0.00030		mg/L	
			Dissolved Copper (Cu)	2024/10/31	<0.0010		mg/L	
			Dissolved Lead (Pb)	2024/10/31	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2024/10/31	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2024/10/31	<0.00050		mg/L	
			Dissolved Selenium (Se)	2024/10/31	<0.00020		mg/L	
			Dissolved Silver (Ag)	2024/10/31	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2024/10/31	<0.00020		mg/L	
			Dissolved Tin (Sn)	2024/10/31	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2024/10/31	<0.0010		mg/L	
			Dissolved Uranium (U)	2024/10/31	<0.00010		mg/L	
			Dissolved Vanadium (V)	2024/10/31	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2024/10/31	<0.0030		mg/L	
B588568	JAB	RPD	Dissolved Aluminum (Al)	2024/10/31	9.7		%	20
			Dissolved Antimony (Sb)	2024/10/31	NC		%	20
			Dissolved Arsenic (As)	2024/10/31	2.8		%	20
			Dissolved Beryllium (Be)	2024/10/31	NC		%	20
			Dissolved Chromium (Cr)	2024/10/31	NC		%	20
			Dissolved Cobalt (Co)	2024/10/31	2.1		%	20
			Dissolved Copper (Cu)	2024/10/31	8.7		%	20
			Dissolved Lead (Pb)	2024/10/31	11		%	20
			Dissolved Molybdenum (Mo)	2024/10/31	3.0		%	20
			Dissolved Nickel (Ni)	2024/10/31	4.1		%	20
			Dissolved Selenium (Se)	2024/10/31	NC		%	20
			Dissolved Silver (Ag)	2024/10/31	NC		%	20
			Dissolved Thallium (Tl)	2024/10/31	NC		%	20
			Dissolved Tin (Sn)	2024/10/31	NC		%	20
			Dissolved Titanium (Ti)	2024/10/31	NC		%	20
			Dissolved Uranium (U)	2024/10/31	4.6		%	20
			Dissolved Vanadium (V)	2024/10/31	NC		%	20
			Dissolved Zinc (Zn)	2024/10/31	3.4		%	20
B588918	ISW	Matrix Spike	Total Ammonia (N)	2024/11/04		98	%	80 - 120
B588918	ISW	Spiked Blank	Total Ammonia (N)	2024/11/04		104	%	80 - 120
B588918	ISW	Method Blank	Total Ammonia (N)	2024/11/04	<0.015		mg/L	
B588918	ISW	RPD	Total Ammonia (N)	2024/11/04	4.1		%	20
B588923	ISW	Matrix Spike [CYZ882-06]	Total Ammonia (N)	2024/11/04		105	%	80 - 120
B588923	ISW	Spiked Blank	Total Ammonia (N)	2024/11/04		105	%	80 - 120
B588923	ISW	Method Blank	Total Ammonia (N)	2024/11/04	<0.015		mg/L	

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B588923	ISW	RPD [CYZ882-06]	Total Ammonia (N)	2024/11/04	NC		%	20
B589393	MAP	Matrix Spike [CYZ883-05]	Dissolved Phosphorus (P)	2024/11/01		97	%	80 - 120
B589393	MAP	QC Standard	Dissolved Phosphorus (P)	2024/11/01		91	%	80 - 120
B589393	MAP	Spiked Blank	Dissolved Phosphorus (P)	2024/11/01		97	%	80 - 120
B589393	MAP	Method Blank	Dissolved Phosphorus (P)	2024/11/01	<0.0030		mg/L	
B589393	MAP	RPD [CYZ883-05]	Dissolved Phosphorus (P)	2024/11/01	NC		%	20
B590463	AP1	Matrix Spike	Chemical Oxygen Demand	2024/11/01		100	%	80 - 120
B590463	AP1	Spiked Blank	Chemical Oxygen Demand	2024/11/01		102	%	80 - 120
B590463	AP1	Method Blank	Chemical Oxygen Demand	2024/11/01	<10		mg/L	
B590463	AP1	RPD	Chemical Oxygen Demand	2024/11/01	4.7		%	20
B591327	IK0	Matrix Spike	Dissolved Barium (Ba)	2024/11/04		96	%	80 - 120
			Dissolved Boron (B)	2024/11/04		96	%	80 - 120
			Dissolved Calcium (Ca)	2024/11/04		103	%	80 - 120
			Dissolved Iron (Fe)	2024/11/04		105	%	80 - 120
			Dissolved Lithium (Li)	2024/11/04		96	%	80 - 120
			Dissolved Magnesium (Mg)	2024/11/04		96	%	80 - 120
			Dissolved Manganese (Mn)	2024/11/04		95	%	80 - 120
			Dissolved Phosphorus (P)	2024/11/04		103	%	80 - 120
			Dissolved Potassium (K)	2024/11/04		101	%	80 - 120
			Dissolved Silicon (Si)	2024/11/04		92	%	80 - 120
			Dissolved Sodium (Na)	2024/11/04		99	%	80 - 120
			Dissolved Strontium (Sr)	2024/11/04		93	%	80 - 120
			Dissolved Sulphur (S)	2024/11/04		101	%	80 - 120
B591327	IK0	Spiked Blank	Dissolved Barium (Ba)	2024/11/04		99	%	80 - 120
			Dissolved Boron (B)	2024/11/04		97	%	80 - 120
			Dissolved Calcium (Ca)	2024/11/04		95	%	80 - 120
			Dissolved Iron (Fe)	2024/11/04		110	%	80 - 120
			Dissolved Lithium (Li)	2024/11/04		92	%	80 - 120
			Dissolved Magnesium (Mg)	2024/11/04		100	%	80 - 120
			Dissolved Manganese (Mn)	2024/11/04		98	%	80 - 120
			Dissolved Phosphorus (P)	2024/11/04		104	%	80 - 120
			Dissolved Potassium (K)	2024/11/04		96	%	80 - 120
			Dissolved Silicon (Si)	2024/11/04		98	%	80 - 120
			Dissolved Sodium (Na)	2024/11/04		97	%	80 - 120
			Dissolved Strontium (Sr)	2024/11/04		98	%	80 - 120
			Dissolved Sulphur (S)	2024/11/04		100	%	80 - 120
B591327	IK0	Method Blank	Dissolved Barium (Ba)	2024/11/04	<0.010		mg/L	
			Dissolved Boron (B)	2024/11/04	<0.020		mg/L	
			Dissolved Calcium (Ca)	2024/11/04	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/11/04	<0.060		mg/L	
			Dissolved Lithium (Li)	2024/11/04	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2024/11/04	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/11/04	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2024/11/04	<0.10		mg/L	
			Dissolved Potassium (K)	2024/11/04	<0.30		mg/L	
			Dissolved Silicon (Si)	2024/11/04	<0.50		mg/L	
			Dissolved Sodium (Na)	2024/11/04	<0.50		mg/L	
			Dissolved Strontium (Sr)	2024/11/04	<0.020		mg/L	
			Dissolved Sulphur (S)	2024/11/04	<0.20		mg/L	
B591327	IK0	RPD	Dissolved Barium (Ba)	2024/11/04	0.44		%	20
			Dissolved Boron (B)	2024/11/04	0.58		%	20
			Dissolved Calcium (Ca)	2024/11/04	11		%	20
			Dissolved Iron (Fe)	2024/11/04	0.24		%	20
			Dissolved Lithium (Li)	2024/11/04	16		%	20
			Dissolved Magnesium (Mg)	2024/11/04	0.95		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Manganese (Mn)	2024/11/04	0.56		%	20
			Dissolved Phosphorus (P)	2024/11/04	0.70		%	20
			Dissolved Potassium (K)	2024/11/04	11		%	20
			Dissolved Silicon (Si)	2024/11/04	1.2		%	20
			Dissolved Sodium (Na)	2024/11/04	10		%	20
			Dissolved Strontium (Sr)	2024/11/04	0.67		%	20
			Dissolved Sulphur (S)	2024/11/04	1.1		%	20
B594258	YL7	Matrix Spike	Orthophosphate (P)	2024/11/05		NC	%	80 - 120
B594258	YL7	Spiked Blank	Orthophosphate (P)	2024/11/05		104	%	80 - 120
B594258	YL7	Method Blank	Orthophosphate (P)	2024/11/05	<0.0030		mg/L	
B594258	YL7	RPD	Orthophosphate (P)	2024/11/05	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Bureau Veritas Certified by Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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C487432
2024/10/29 15:40

Page of

Bureau Veritas
4000 19st N E, Calgary, Alberta Canada T2E 6P8 Tel (403) 291-3077 Toll-free 800-563-6266 Fax (403) 291-9468 www.bvna.com

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#10658 Ausenco Sustainability Inc.	Company Name:		Quotation #:	C40333	Bureau Veritas Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Erin Moffatt	P.O. #:			740516
Address:	Suite 1430, 401-9 Avenue	Address:		Project:	102604-01	COC #:	Project Manager:
	CALGARY AB T2P 3C5			Project Name:		C#740516-02-01	Danielle Boisvert
Tel:	(403) 264-0671 Fax: (403) 264-0670	Tel:	Fax:	Site #:			
Email:	procure2pay.na@ausenco.com	Email:	erin.moffatt@ausenco.com	Sampled By:			

Regulatory Criteria:
- [ ] ATI
- [x] CCME
- [ ] Other

Special Instructions:

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details
[x]

Job Specific Rush TAT (if applies to entire submission)
Date Required:
Rush Confirmation Number: *(call lab for #)*
[ ]

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Konelab	Ammonia-N (Total)	Total Kjeldahl Nitrogen (Total)	Biochemical Oxygen Demand	COD by Colorimeter	Oxygen (Dissolved)	Total Phosphorus	Phosphorus -P (Total, Dissolved)	TSS, TDS, TURB	# of Bottles	Comments
1		WQ-05B	24/10/29	915	W	N	→	→	→	→	→	→	→	→	→	→	8	
2		WQ-04B		950	W		→	→	→	→	→	→	→	→	→	→	8	
3		WQ-04A		1020	W		→	→	→	→	→	→	→	→	→	→	8	
4		WQ-07		1115	W		→	→	→	→	→	→	→	→	→	→	8	
5		WQ-06		1130	W		→	→	→	→	→	→	→	→	→	→	8	
6		WQ-04C		1145	W		→	→	→	→	→	→	→	→	→	→	8	
7		WQ-03		1220	W		→	→	→	→	→	→	→	→	→	→	8	
8																		
9																		
10																		

MCAL-2024-10-2715

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Erin Moffatt	24/10/29	1630	ERIN MUHAMMAD	24/10/29	15:40			SEE ATR	Yes [ ] No [x]

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

White: Bureau Veritas Yellow: Client

ICE - Y

Bureau Veritas Canada (2019) Inc.

Your Project #: 102604-01
Your C.O.C. #: 1/1

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/06
Report #: R3583524
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C487435
Received: 2024/10/29, 15:40

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	6	N/A	2024/11/05		Auto Calc
Chloride (Soluble)	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1)	8	2024/11/04	2024/11/04	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble)	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00004	SM 24 2510 B m
Elements by ICPMS - Soils	6	2024/11/05	2024/11/05	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions	6	N/A	2024/11/05		Auto Calc
Moisture	8	N/A	2024/11/04	AB SOP-00002	CCME PHC-CWS m
pH @25C (1:2 Calcium Chloride Extract)	6	2024/11/05	2024/11/05	CAL SOP-00180 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio	6	N/A	2024/11/05		Auto Calc
Soluble Ions	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	6	2024/11/05	2024/11/05	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation	6	N/A	2024/11/05		Auto Calc
Soluble Ions Calculation	6	N/A	2024/11/04		Auto Calc
Theoretical Gypsum Requirement (2)	6	N/A	2024/11/05		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your Project #: 102604-01
Your C.O.C. #: 1/1

Attention: Erin Moffatt

Ausenco Sustainability Inc.
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/06
Report #: R3583524
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C487435
Received: 2024/10/29, 15:40
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(2) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key

Bureau Veritas
06 Nov 2024 12:50:01

Please direct all questions regarding this Certificate of Analysis to:
Danielle Boisvert, Customer Solutions Representative
Email: danielle-andrea.boisvert@bureauveritas.com
Phone# (780)577-7178

==========

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ989			CYZ990			CYZ991		
Sampling Date		2024/10/29 09:15			2024/10/29 09:40			2024/10/29 09:50		
COC Number		1/1			1/1			1/1		
	UNITS	WQ-05B	RDL	QC Batch	WQ-04D	RDL	QC Batch	WQ-04B	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L				21	N/A	B585138			
Cation Sum	meq/L				15	N/A	B585138			
Cation/EC Ratio	N/A				11	0.10	B585127			
Calculated Calcium (Ca)	mg/kg				130	1.4	B585356			
Calculated Magnesium (Mg)	mg/kg				56	0.93	B585356			
Calculated Sodium (Na)	mg/kg				62	2.3	B585356			
Calculated Potassium (K)	mg/kg				13	1.2	B585356			
Calculated Boron (B)	mg/kg				0.16	0.093	B584823			
Calculated Chloride (Cl)	mg/kg				110	9.3	B585356			
Calculated Sulphate (SO4)	mg/kg				810	4.7	B585356			
Elements										
Hex. Chromium (Cr 6+)	mg/kg	<0.18 (1)	0.18	B593281	<0.17 (1)	0.17	B593281	<0.18 (1)	0.18	B593281
Soluble Parameters										
Soluble Boron (B)	mg/L				0.17	0.10	B594824			
Soluble Chloride (Cl)	mg/L				120	10	B594804			
Soluble Conductivity	dS/m				1.3	0.020	B594803			
Soluble (CaCl2) pH	pH				7.28	N/A	B593968			
Sodium Adsorption Ratio	N/A				1.2	0.10	B585353			
Soluble Calcium (Ca)	mg/L				140	1.5	B594824			
Soluble Magnesium (Mg)	mg/L				60	1.0	B594824			
Soluble Sodium (Na)	mg/L				67	2.5	B594824			
Soluble Potassium (K)	mg/L				14	1.3	B594824			
Saturation %	%				93	N/A	B593965			
Soluble Sulphate (SO4)	mg/L				870	5.0	B594824			
Theoretical Gypsum Requirement	tonnes/ha				<0.20	0.20	B585251			
Elements										
Total Antimony (Sb)	mg/kg				<0.50	0.50	B594273			
Total Arsenic (As)	mg/kg				4.2	1.0	B594273			
Total Barium (Ba)	mg/kg				220	1.0	B594273			
Total Beryllium (Be)	mg/kg				0.42	0.40	B594273			
Total Cadmium (Cd)	mg/kg				0.33	0.050	B594273			

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ989			CYZ990			CYZ991		
Sampling Date		2024/10/29 09:15			2024/10/29 09:40			2024/10/29 09:50		
COC Number		1/1			1/1			1/1		
	UNITS	**WQ-05B**	**RDL**	**QC Batch**	**WQ-04D**	**RDL**	**QC Batch**	**WQ-04B**	**RDL**	**QC Batch**
Total Chromium (Cr)	mg/kg				12	1.0	B594273			
Total Cobalt (Co)	mg/kg				5.6	0.50	B594273			
Total Copper (Cu)	mg/kg				12	1.0	B594273			
Total Lead (Pb)	mg/kg				7.2	0.50	B594273			
Total Mercury (Hg)	mg/kg				<0.050	0.050	B594273			
Total Molybdenum (Mo)	mg/kg				0.54	0.40	B594273			
Total Nickel (Ni)	mg/kg				14	1.0	B594273			
Total Selenium (Se)	mg/kg				2.0	0.50	B594273			
Total Silver (Ag)	mg/kg				<0.20	0.20	B594273			
Total Thallium (Tl)	mg/kg				0.13	0.10	B594273			
Total Tin (Sn)	mg/kg				<1.0	1.0	B594273			
Total Uranium (U)	mg/kg				0.81	0.20	B594273			
Total Vanadium (V)	mg/kg				19	1.0	B594273			
Total Zinc (Zn)	mg/kg				1100	10	B594273			
RDL = Reportable Detection Limit										

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ992			CYZ993			CYZ994		
Sampling Date		2024/10/29 10:20			2024/10/29 11:15			2024/10/29 11:30		
COC Number		1/1			1/1			1/1		
	UNITS	WQ-04A	RDL	QC Batch	WQ-07	RDL	QC Batch	WQ-06	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	8.8	N/A	B585138	5.0	N/A	B585138	4.8	N/A	B585138
Cation Sum	meq/L	11	N/A	B585138	8.6	N/A	B585138	8.2	N/A	B585138
Cation/EC Ratio	N/A	11	0.10	B585127	11	0.10	B585127	11	0.10	B585127
Calculated Calcium (Ca)	mg/kg	180	2.9	B585356	48	1.4	B585356	40	1.2	B585602
Calculated Magnesium (Mg)	mg/kg	71	1.9	B585356	30	0.97	B585356	24	0.79	B585602
Calculated Sodium (Na)	mg/kg	140	4.8	B585356	71	2.4	B585356	52	2.0	B585602
Calculated Potassium (K)	mg/kg	30	2.5	B585356	10	1.3	B585356	9.4	1.0	B585602
Calculated Boron (B)	mg/kg	0.25	0.19	B584823	<0.097	0.097	B584823	<0.079	0.079	B584823
Calculated Chloride (Cl)	mg/kg	52	19	B585356	28	9.7	B585356	18	7.9	B585602
Calculated Sulphate (SO4)	mg/kg	740	9.6	B585356	190	4.8	B585356	160	4.0	B585602
Elements										
Hex. Chromium (Cr 6+)	mg/kg	<0.33 (1)	0.33	B593281	<0.18 (1)	0.18	B593281	<0.17 (1)	0.17	B593281
Soluble Parameters										
Soluble Boron (B)	mg/L	0.13	0.10	B594824	<0.10	0.10	B594824	<0.10	0.10	B594824
Soluble Chloride (Cl)	mg/L	27	10	B594804	29	10	B594804	23	10	B594804
Soluble Conductivity	dS/m	1.0	0.020	B594803	0.79	0.020	B594803	0.77	0.020	B594803
Soluble (CaCl2) pH	pH	7.63 (2)	N/A	B593968	7.76	N/A	B593968	7.80	N/A	B593968
Sodium Adsorption Ratio	N/A	1.6	0.10	B585353	2.0	0.10	B585353	1.8	0.10	B585353
Soluble Calcium (Ca)	mg/L	93	1.5	B594824	50	1.5	B594824	50	1.5	B594824
Soluble Magnesium (Mg)	mg/L	37	1.0	B594824	31	1.0	B594824	31	1.0	B594824
Soluble Sodium (Na)	mg/L	71	2.5	B594824	73	2.5	B594824	65	2.5	B594824
Soluble Potassium (K)	mg/L	16	1.3	B594824	11	1.3	B594824	12	1.3	B594824
Saturation %	%	190	N/A	B593965	97	N/A	B593965	79	N/A	B593965
Soluble Sulphate (SO4)	mg/L	380	5.0	B594824	200	5.0	B594824	200	5.0	B594824
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B585251	<0.20	0.20	B585605	<0.20	0.20	B585605
Elements										
Total Antimony (Sb)	mg/kg	<0.50	0.50	B594273	<0.50	0.50	B594273	0.60	0.50	B594273
Total Arsenic (As)	mg/kg	1.9	1.0	B594273	4.7	1.0	B594273	6.9	1.0	B594273
Total Barium (Ba)	mg/kg	140	1.0	B594273	250	1.0	B594273	280	1.0	B594273
Total Beryllium (Be)	mg/kg	<0.40	0.40	B594273	0.66	0.40	B594273	0.82	0.40	B594273
Total Cadmium (Cd)	mg/kg	0.68	0.050	B594273	0.51	0.050	B594273	0.54	0.050	B594273

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.
(2) pH was done on a 10:1 Calcium Chloride to soil ratio due to the matrix of the sample.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ992			CYZ993			CYZ994		
Sampling Date		2024/10/29 10:20			2024/10/29 11:15			2024/10/29 11:30		
COC Number		1/1			1/1			1/1		
	UNITS	WQ-04A	RDL	QC Batch	WQ-07	RDL	QC Batch	WQ-06	RDL	QC Batch
Total Chromium (Cr)	mg/kg	11	1.0	B594273	18	1.0	B594273	21	1.0	B594273
Total Cobalt (Co)	mg/kg	3.1	0.50	B594273	7.2	0.50	B594273	8.2	0.50	B594273
Total Copper (Cu)	mg/kg	16	1.0	B594273	20	1.0	B594273	22	1.0	B594273
Total Lead (Pb)	mg/kg	9.9	0.50	B594273	12	0.50	B594273	12	0.50	B594273
Total Mercury (Hg)	mg/kg	<0.050	0.050	B594273	<0.050	0.050	B594273	<0.050	0.050	B594273
Total Molybdenum (Mo)	mg/kg	2.5	0.40	B594273	0.70	0.40	B594273	1.2	0.40	B594273
Total Nickel (Ni)	mg/kg	13	1.0	B594273	23	1.0	B594273	26	1.0	B594273
Total Selenium (Se)	mg/kg	11	0.50	B594273	1.2	0.50	B594273	1.1	0.50	B594273
Total Silver (Ag)	mg/kg	<0.20	0.20	B594273	<0.20	0.20	B594273	<0.20	0.20	B594273
Total Thallium (Tl)	mg/kg	0.14	0.10	B594273	0.20	0.10	B594273	0.21	0.10	B594273
Total Tin (Sn)	mg/kg	<1.0	1.0	B594273	<1.0	1.0	B594273	<1.0	1.0	B594273
Total Uranium (U)	mg/kg	2.8	0.20	B594273	1.6	0.20	B594273	1.8	0.20	B594273
Total Vanadium (V)	mg/kg	16	1.0	B594273	31	1.0	B594273	36	1.0	B594273
Total Zinc (Zn)	mg/kg	55	10	B594273	89	10	B594273	98	10	B594273

RDL = Reportable Detection Limit

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ995			CYZ996		
Sampling Date		2024/10/29 11:45			2024/10/29 12:20		
COC Number		1/1			1/1		
	UNITS	WQ-04C	RDL	QC Batch	WQ-03	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	2.6	N/A	B585138	19	N/A	B585138
Cation Sum	meq/L	7.3	N/A	B585138	22	N/A	B585138
Cation/EC Ratio	N/A	11	0.10	B585127	12	0.10	B585127
Calculated Calcium (Ca)	mg/kg	29	0.91	B585604	180	1.1	B585602
Calculated Magnesium (Mg)	mg/kg	16	0.61	B585604	69	0.76	B585602
Calculated Sodium (Na)	mg/kg	36	1.5	B585604	45	1.9	B585602
Calculated Potassium (K)	mg/kg	4.8	0.79	B585604	17	0.99	B585602
Calculated Boron (B)	mg/kg	0.074	0.061	B584823	<0.076	0.076	B584823
Calculated Chloride (Cl)	mg/kg	13	6.1	B585604	24	7.6	B585602
Calculated Sulphate (SO4)	mg/kg	58	3.0	B585604	670	3.8	B585602
Elements							
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	B593281	<0.080	0.080	B593281
Soluble Parameters							
Soluble Boron (B)	mg/L	0.12	0.10	B594824	<0.10	0.10	B594824
Soluble Chloride (Cl)	mg/L	21	10	B594804	31	10	B594804
Soluble Conductivity	dS/m	0.64	0.020	B594803	1.8	0.020	B594803
Soluble (CaCl2) pH	pH	7.87	N/A	B593968	7.64	N/A	B593968
Sodium Adsorption Ratio	N/A	1.7	0.10	B585353	0.82	0.10	B585353
Soluble Calcium (Ca)	mg/L	48	1.5	B594824	240	1.5	B594824
Soluble Magnesium (Mg)	mg/L	25	1.0	B594824	90	1.0	B594824
Soluble Sodium (Na)	mg/L	59	2.5	B594824	59	2.5	B594824
Soluble Potassium (K)	mg/L	7.9	1.3	B594824	23	1.3	B594824
Saturation %	%	61	N/A	B593965	76	N/A	B593965
Soluble Sulphate (SO4)	mg/L	95	5.0	B594824	870	5.0	B594824
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B585605	<0.20	0.20	B585605
Elements							
Total Antimony (Sb)	mg/kg	<0.50	0.50	B594273	<0.50	0.50	B594273
Total Arsenic (As)	mg/kg	4.7	1.0	B594273	4.5	1.0	B594273
Total Barium (Ba)	mg/kg	280	1.0	B594273	270	1.0	B594273
Total Beryllium (Be)	mg/kg	0.60	0.40	B594273	0.60	0.40	B594273
Total Cadmium (Cd)	mg/kg	0.53	0.050	B594273	0.49	0.050	B594273
Total Chromium (Cr)	mg/kg	16	1.0	B594273	16	1.0	B594273

RDL = Reportable Detection Limit
N/A = Not Applicable

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ995			CYZ996		
Sampling Date		2024/10/29 11:45			2024/10/29 12:20		
COC Number		1/1			1/1		
	UNITS	WQ-04C	RDL	QC Batch	WQ-03	RDL	QC Batch
Total Cobalt (Co)	mg/kg	6.6	0.50	B594273	6.4	0.50	B594273
Total Copper (Cu)	mg/kg	18	1.0	B594273	17	1.0	B594273
Total Lead (Pb)	mg/kg	11	0.50	B594273	10	0.50	B594273
Total Mercury (Hg)	mg/kg	<0.050	0.050	B594273	<0.050	0.050	B594273
Total Molybdenum (Mo)	mg/kg	1.0	0.40	B594273	0.93	0.40	B594273
Total Nickel (Ni)	mg/kg	21	1.0	B594273	21	1.0	B594273
Total Selenium (Se)	mg/kg	1.5	0.50	B594273	1.5	0.50	B594273
Total Silver (Ag)	mg/kg	<0.20	0.20	B594273	<0.20	0.20	B594273
Total Thallium (Tl)	mg/kg	0.17	0.10	B594273	0.17	0.10	B594273
Total Tin (Sn)	mg/kg	<1.0	1.0	B594273	<1.0	1.0	B594273
Total Uranium (U)	mg/kg	1.8	0.20	B594273	1.7	0.20	B594273
Total Vanadium (V)	mg/kg	27	1.0	B594273	26	1.0	B594273
Total Zinc (Zn)	mg/kg	85	10	B594273	82	10	B594273
RDL = Reportable Detection Limit							

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PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CYZ989	CYZ990	CYZ991	CYZ992	CYZ993	CYZ994	CYZ995		
Sampling Date		2024/10/29 09:15	2024/10/29 09:40	2024/10/29 09:50	2024/10/29 10:20	2024/10/29 11:15	2024/10/29 11:30	2024/10/29 11:45		
COC Number		1/1	1/1	1/1	1/1	1/1	1/1	1/1		
	UNITS	WQ-05B	WQ-04D	WQ-04B	WQ-04A	WQ-07	WQ-06	WQ-04C	RDL	QC Batch
Physical Properties										
Moisture	%	56	54	55	75	55	54	42	0.30	B591970
RDL = Reportable Detection Limit										

Bureau Veritas ID		CYZ996		
Sampling Date		2024/10/29 12:20		
COC Number		1/1		
	UNITS	WQ-03	RDL	QC Batch
Physical Properties				
Moisture	%	40	0.30	B591970
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
Package 2	8.6°C
Package 3	4.6°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B591970	TLP	Method Blank	Moisture	2024/11/04	<0.30		%	
B591970	TLP	RPD	Moisture	2024/11/04	1.4		%	20
B593281	TOR	Matrix Spike	Hex. Chromium (Cr 6+)	2024/11/04		90	%	75 - 125
B593281	TOR	Spiked Blank	Hex. Chromium (Cr 6+)	2024/11/04		106	%	80 - 120
B593281	TOR	Method Blank	Hex. Chromium (Cr 6+)	2024/11/04	<0.080		mg/kg	
B593281	TOR	RPD	Hex. Chromium (Cr 6+)	2024/11/04	NC		%	35
B593965	DPL	QC Standard	Saturation %	2024/11/05		104	%	75 - 125
B593965	DPL	RPD	Saturation %	2024/11/05	3.9		%	12
B593968	JAY	QC Standard	Soluble (CaCl2) pH	2024/11/05		97	%	97 - 103
B593968	JAY	Spiked Blank	Soluble (CaCl2) pH	2024/11/05		100	%	97 - 103
B593968	JAY	RPD	Soluble (CaCl2) pH	2024/11/05	0.95		%	N/A
B594273	KH2	Matrix Spike	Total Antimony (Sb)	2024/11/05		97	%	75 - 125
			Total Arsenic (As)	2024/11/05		111	%	75 - 125
			Total Barium (Ba)	2024/11/05		NC	%	75 - 125
			Total Beryllium (Be)	2024/11/05		111	%	75 - 125
			Total Cadmium (Cd)	2024/11/05		111	%	75 - 125
			Total Chromium (Cr)	2024/11/05		144 (1)	%	75 - 125
			Total Cobalt (Co)	2024/11/05		108	%	75 - 125
			Total Copper (Cu)	2024/11/05		109	%	75 - 125
			Total Lead (Pb)	2024/11/05		106	%	75 - 125
			Total Mercury (Hg)	2024/11/05		99	%	75 - 125
			Total Molybdenum (Mo)	2024/11/05		112	%	75 - 125
			Total Nickel (Ni)	2024/11/05		115	%	75 - 125
			Total Selenium (Se)	2024/11/05		104	%	75 - 125
			Total Silver (Ag)	2024/11/05		110	%	75 - 125
			Total Thallium (Tl)	2024/11/05		100	%	75 - 125
			Total Tin (Sn)	2024/11/05		110	%	75 - 125
			Total Uranium (U)	2024/11/05		101	%	75 - 125
			Total Vanadium (V)	2024/11/05		NC	%	75 - 125
			Total Zinc (Zn)	2024/11/05		NC	%	75 - 125
B594273	KH2	QC Standard	Total Arsenic (As)	2024/11/05		118	%	68 - 133
			Total Barium (Ba)	2024/11/05		107	%	77 - 123
			Total Beryllium (Be)	2024/11/05		105	%	46 - 154
			Total Cadmium (Cd)	2024/11/05		114	%	56 - 147
			Total Chromium (Cr)	2024/11/05		97	%	65 - 136
			Total Cobalt (Co)	2024/11/05		107	%	79 - 122
			Total Copper (Cu)	2024/11/05		108	%	83 - 117
			Total Lead (Pb)	2024/11/05		110	%	87 - 113
			Total Mercury (Hg)	2024/11/05		102	%	71 - 129
			Total Molybdenum (Mo)	2024/11/05		116	%	69 - 132
			Total Nickel (Ni)	2024/11/05		110	%	85 - 115
			Total Silver (Ag)	2024/11/05		118	%	82 - 118
			Total Uranium (U)	2024/11/05		96	%	78 - 121
			Total Vanadium (V)	2024/11/05		108	%	69 - 131
B594273	KH2	Spiked Blank	Total Antimony (Sb)	2024/11/05		106	%	80 - 120
			Total Arsenic (As)	2024/11/05		106	%	80 - 120
			Total Barium (Ba)	2024/11/05		104	%	80 - 120
			Total Beryllium (Be)	2024/11/05		103	%	80 - 120
			Total Cadmium (Cd)	2024/11/05		105	%	80 - 120
			Total Chromium (Cr)	2024/11/05		105	%	80 - 120
			Total Cobalt (Co)	2024/11/05		104	%	80 - 120
			Total Copper (Cu)	2024/11/05		104	%	80 - 120
			Total Lead (Pb)	2024/11/05		101	%	80 - 120
			Total Mercury (Hg)	2024/11/05		107	%	80 - 120
			Total Molybdenum (Mo)	2024/11/05		105	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2024/11/05		104	%	80 - 120
			Total Selenium (Se)	2024/11/05		104	%	80 - 120
			Total Silver (Ag)	2024/11/05		104	%	80 - 120
			Total Thallium (Tl)	2024/11/05		100	%	80 - 120
			Total Tin (Sn)	2024/11/05		102	%	80 - 120
			Total Uranium (U)	2024/11/05		105	%	80 - 120
			Total Vanadium (V)	2024/11/05		104	%	80 - 120
			Total Zinc (Zn)	2024/11/05		107	%	80 - 120
B594273	KH2	Method Blank	Total Antimony (Sb)	2024/11/05	<0.50		mg/kg	
			Total Arsenic (As)	2024/11/05	<1.0		mg/kg	
			Total Barium (Ba)	2024/11/05	<1.0		mg/kg	
			Total Beryllium (Be)	2024/11/05	<0.40		mg/kg	
			Total Cadmium (Cd)	2024/11/05	<0.050		mg/kg	
			Total Chromium (Cr)	2024/11/05	<1.0		mg/kg	
			Total Cobalt (Co)	2024/11/05	<0.50		mg/kg	
			Total Copper (Cu)	2024/11/05	<1.0		mg/kg	
			Total Lead (Pb)	2024/11/05	<0.50		mg/kg	
			Total Mercury (Hg)	2024/11/05	<0.050		mg/kg	
			Total Molybdenum (Mo)	2024/11/05	<0.40		mg/kg	
			Total Nickel (Ni)	2024/11/05	<1.0		mg/kg	
			Total Selenium (Se)	2024/11/05	<0.50		mg/kg	
			Total Silver (Ag)	2024/11/05	<0.20		mg/kg	
			Total Thallium (Tl)	2024/11/05	<0.10		mg/kg	
			Total Tin (Sn)	2024/11/05	<1.0		mg/kg	
			Total Uranium (U)	2024/11/05	<0.20		mg/kg	
			Total Vanadium (V)	2024/11/05	<1.0		mg/kg	
			Total Zinc (Zn)	2024/11/05	<10		mg/kg	
B594273	KH2	RPD	Total Antimony (Sb)	2024/11/05	7.8		%	30
			Total Arsenic (As)	2024/11/05	1.6		%	30
			Total Barium (Ba)	2024/11/05	6.9		%	35
			Total Beryllium (Be)	2024/11/05	3.4		%	30
			Total Cadmium (Cd)	2024/11/05	0.93		%	30
			Total Chromium (Cr)	2024/11/05	1.0		%	30
			Total Cobalt (Co)	2024/11/05	3.3		%	30
			Total Copper (Cu)	2024/11/05	1.4		%	30
			Total Lead (Pb)	2024/11/05	3.8		%	35
			Total Mercury (Hg)	2024/11/05	NC		%	35
			Total Molybdenum (Mo)	2024/11/05	0.83		%	35
			Total Nickel (Ni)	2024/11/05	0.10		%	30
			Total Selenium (Se)	2024/11/05	NC		%	30
			Total Silver (Ag)	2024/11/05	NC		%	35
			Total Thallium (Tl)	2024/11/05	4.2		%	30
			Total Tin (Sn)	2024/11/05	NC		%	35
			Total Uranium (U)	2024/11/05	0.27		%	30
			Total Vanadium (V)	2024/11/05	1.0		%	30
			Total Zinc (Zn)	2024/11/05	0.74		%	30
B594803	RDL	QC Standard	Soluble Conductivity	2024/11/05		92	%	75 - 125
B594803	RDL	Spiked Blank	Soluble Conductivity	2024/11/05		99	%	90 - 110
B594803	RDL	Method Blank	Soluble Conductivity	2024/11/05	<0.020		dS/m	
B594803	RDL	RPD	Soluble Conductivity	2024/11/05	0.64		%	20
B594804	RDL	Matrix Spike	Soluble Chloride (Cl)	2024/11/05		100	%	75 - 125
B594804	RDL	QC Standard	Soluble Chloride (Cl)	2024/11/05		75	%	75 - 125
B594804	RDL	Spiked Blank	Soluble Chloride (Cl)	2024/11/05		96	%	80 - 120
B594804	RDL	Method Blank	Soluble Chloride (Cl)	2024/11/05	<10		mg/L	
B594804	RDL	RPD	Soluble Chloride (Cl)	2024/11/05	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B594824	PL	Matrix Spike	Soluble Boron (B)	2024/11/05		92	%	75 - 125
			Soluble Calcium (Ca)	2024/11/05		95	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/05		96	%	75 - 125
			Soluble Sodium (Na)	2024/11/05		94	%	75 - 125
			Soluble Potassium (K)	2024/11/05		95	%	75 - 125
B594824	PL	QC Standard	Soluble Calcium (Ca)	2024/11/05		89	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/05		84	%	75 - 125
			Soluble Sodium (Na)	2024/11/05		94	%	75 - 125
			Soluble Potassium (K)	2024/11/05		101	%	75 - 125
			Soluble Sulphate (SO4)	2024/11/05		85	%	75 - 125
B594824	PL	Spiked Blank	Soluble Boron (B)	2024/11/05		92	%	80 - 120
			Soluble Calcium (Ca)	2024/11/05		102	%	80 - 120
			Soluble Magnesium (Mg)	2024/11/05		99	%	80 - 120
			Soluble Sodium (Na)	2024/11/05		97	%	80 - 120
			Soluble Potassium (K)	2024/11/05		96	%	80 - 120
B594824	PL	Method Blank	Soluble Boron (B)	2024/11/05	<0.10		mg/L	
			Soluble Calcium (Ca)	2024/11/05	<1.5		mg/L	
			Soluble Magnesium (Mg)	2024/11/05	<1.0		mg/L	
			Soluble Sodium (Na)	2024/11/05	<2.5		mg/L	
			Soluble Potassium (K)	2024/11/05	<1.3		mg/L	
			Soluble Sulphate (SO4)	2024/11/05	<5.0		mg/L	
B594824	PL	RPD	Soluble Calcium (Ca)	2024/11/05	3.6		%	30
			Soluble Magnesium (Mg)	2024/11/05	4.6		%	30
			Soluble Sodium (Na)	2024/11/05	6.3		%	30
			Soluble Potassium (K)	2024/11/05	3.7		%	30
			Soluble Sulphate (SO4)	2024/11/05	3.7		%	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas Certified by Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

See Water COC

www.BVNA.com

Choose Location:
☒ Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
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CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

MCAL-2024-10-2716

Invoice Information	Invoice to (requires report) ☐	Report information (if differs from invoice)		Project Information	
Company:	Ausenco	Company:		Quotation #:	
Contact Name:	Erin Moffatt	Contact Name:		P.O. #/ AFE#:	
Street Address:		Street Address:		Project #:	
City:	Prov: Postal Code:	City:	Prov: Postal Code:	Site #:	
Phone:		Phone:		Site Location:	
Email:	Erin.Moffatt@ausenco.com	Email:	Erin.Moffatt@ausenco.com	Site Location Province:	
Copies:		Copies:		Sampled By:	

Regulatory Criteria

☐ AT1 ☒ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☐ Other _____

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Regular Turnaround Time (TAT)
☐ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1	5 VOCs	6 BTEX F1-F2	7 BTEX F1-F4	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	WQ05B	24	10	29	9	15	Soil																						Drying and grinding moisture BAL
2	WQ-04D	↓	↓	↓	9	40	↓																						All Metals and Salinity Soil
3	WQ-04B				9	50																							
4	WQ 04A				10	20																							
5	WQ-07				11	15																							
6	WQ-06				11	30																							
7	WQ-04C				11	45																							
8	WQ-03				12	20	↓																						
9																													
10																													
11																													
12																													

LAB USE ONLY	Yes	No		1	2	3
Seal present						
Seal intact	SEE	ACTR				
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	Erin Moffatt	24	10	24			1 ZAIN NUMMAD	2024	10	29	15	40	
2							2						

C487435
2024/10/29 15:40

Your Project #: 102604-01
Your C.O.C. #: 1/1

Attention: Erin Moffatt

AUSENCO SUSTAINABILITY ULC
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/15
Report #: R3587835
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C487435
Received: 2024/10/29, 15:40

Sample Matrix: Soil
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	2	N/A	2024/11/14		Auto Calc
Cation/EC Ratio	6	N/A	2024/11/05		Auto Calc
Chloride (Soluble)	2	2024/11/14	2024/11/14	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Chloride (Soluble)	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1)	8	2024/11/04	2024/11/04	AB SOP-00063	SM 24 3500-Cr B m
Hexavalent Chromium (1)	2	2024/11/07	2024/11/07	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble)	2	2024/11/14	2024/11/14	AB SOP-00033 / AB SOP-00004	SM 24 2510 B m
Conductivity @25C (Soluble)	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00004	SM 24 2510 B m
Elements by ICPMS - Soils	2	2024/11/13	2024/11/14	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils	6	2024/11/05	2024/11/05	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions	2	N/A	2024/11/14		Auto Calc
Sum of Cations, Anions	6	N/A	2024/11/05		Auto Calc
Moisture	8	N/A	2024/11/04	AB SOP-00002	CCME PHC-CWS m
Moisture	2	N/A	2024/11/07	AB SOP-00002	CCME PHC-CWS m
pH @25C (1:2 Calcium Chloride Extract)	2	2024/11/13	2024/11/13	CAL SOP-00180 / AB SOP-00006	SM 24 4500 H+B m
pH @25C (1:2 Calcium Chloride Extract)	6	2024/11/05	2024/11/05	CAL SOP-00180 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio	2	N/A	2024/11/14		Auto Calc
Sodium Adsorption Ratio	6	N/A	2024/11/05		Auto Calc
Soluble Ions	2	2024/11/14	2024/11/14	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Ions	6	2024/11/05	2024/11/05	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	2	2024/11/14	2024/11/14	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Paste	6	2024/11/05	2024/11/05	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation	2	N/A	2024/11/14		Auto Calc

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Your Project #: 102604-01
Your C.O.C. #: 1/1

Attention: Erin Moffatt

AUSENCO SUSTAINABILITY ULC
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/15
Report #: R3587835
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C487435
Received: 2024/10/29, 15:40

Sample Matrix: Soil
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Soluble Boron Calculation	6	N/A	2024/11/05		Auto Calc
Soluble Ions Calculation	6	N/A	2024/11/04		Auto Calc
Soluble Ions Calculation	2	N/A	2024/11/07		Auto Calc
Theoretical Gypsum Requirement (2)	2	N/A	2024/11/14		Auto Calc
Theoretical Gypsum Requirement (2)	6	N/A	2024/11/05		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(2) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

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Your Project #: 102604-01
Your C.O.C. #: 1/1

Attention: Erin Moffatt

AUSENCO SUSTAINABILITY ULC
Suite 1430, 401-9 Avenue
CALGARY, AB
CANADA T2P 3C5

Report Date: 2024/11/15
Report #: R3587835
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C487435
Received: 2024/10/29, 15:40

Encryption Key

Danielle Boisvert
Customer Solutions Representative
15 Nov 2024 12:00:38

Please direct all questions regarding this Certificate of Analysis to:
Danielle Boisvert, Customer Solutions Representative
Email: danielle-andrea.boisvert@bureauveritas.com
Phone# (780)577-7178

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ990		CYZ992			CYZ993		
Sampling Date		2024/10/29 09:40		2024/10/29 10:20			2024/10/29 11:15		
COC Number		1/1		1/1			1/1		
	UNITS	WQ-04D	RDL	WQ-04A	RDL	QC Batch	WQ-07	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	21	N/A	8.8	N/A	B585138	5.0	N/A	B585138
Cation Sum	meq/L	15	N/A	11	N/A	B585138	8.6	N/A	B585138
Cation/EC Ratio	N/A	11	0.10	11	0.10	B585127	11	0.10	B585127
Calculated Calcium (Ca)	mg/kg	130	1.4	180	2.9	B585356	48	1.4	B585356
Calculated Magnesium (Mg)	mg/kg	56	0.93	71	1.9	B585356	30	0.97	B585356
Calculated Sodium (Na)	mg/kg	62	2.3	140	4.8	B585356	71	2.4	B585356
Calculated Potassium (K)	mg/kg	13	1.2	30	2.5	B585356	10	1.3	B585356
Calculated Boron (B)	mg/kg	0.16	0.093	0.25	0.19	B584823	<0.097	0.097	B584823
Calculated Chloride (Cl)	mg/kg	110	9.3	52	19	B585356	28	9.7	B585356
Calculated Sulphate (SO4)	mg/kg	810	4.7	740	9.6	B585356	190	4.8	B585356
Elements									
Hex. Chromium (Cr 6+)	mg/kg	<0.17 (1)	0.17	<0.33 (1)	0.33	B593281	<0.18 (1)	0.18	B593281
Soluble Parameters									
Soluble Boron (B)	mg/L	0.17	0.10	0.13	0.10	B594824	<0.10	0.10	B594824
Soluble Chloride (Cl)	mg/L	120	10	27	10	B594804	29	10	B594804
Soluble Conductivity	dS/m	1.3	0.020	1.0	0.020	B594803	0.79	0.020	B594803
Soluble (CaCl2) pH	pH	7.28	N/A	7.63 (2)	N/A	B593968	7.76	N/A	B593968
Sodium Adsorption Ratio	N/A	1.2	0.10	1.6	0.10	B585353	2.0	0.10	B585353
Soluble Calcium (Ca)	mg/L	140	1.5	93	1.5	B594824	50	1.5	B594824
Soluble Magnesium (Mg)	mg/L	60	1.0	37	1.0	B594824	31	1.0	B594824
Soluble Sodium (Na)	mg/L	67	2.5	71	2.5	B594824	73	2.5	B594824
Soluble Potassium (K)	mg/L	14	1.3	16	1.3	B594824	11	1.3	B594824
Saturation %	%	93	N/A	190	N/A	B593965	97	N/A	B593965
Soluble Sulphate (SO4)	mg/L	870	5.0	380	5.0	B594824	200	5.0	B594824
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	B585251	<0.20	0.20	B585605
Elements									
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	B594273	<0.50	0.50	B594273
Total Arsenic (As)	mg/kg	4.2	1.0	1.9	1.0	B594273	4.7	1.0	B594273
Total Barium (Ba)	mg/kg	220	1.0	140	1.0	B594273	250	1.0	B594273
Total Beryllium (Be)	mg/kg	0.42	0.40	<0.40	0.40	B594273	0.66	0.40	B594273
Total Cadmium (Cd)	mg/kg	0.33	0.050	0.68	0.050	B594273	0.51	0.050	B594273

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.
(2) pH was done on a 10:1 Calcium Chloride to soil ratio due to the matrix of the sample.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ990		CYZ992			CYZ993		
Sampling Date		2024/10/29 09:40		2024/10/29 10:20			2024/10/29 11:15		
COC Number		1/1		1/1			1/1		
	UNITS	WQ-04D	RDL	WQ-04A	RDL	QC Batch	WQ-07	RDL	QC Batch
Total Chromium (Cr)	mg/kg	12	1.0	11	1.0	B594273	18	1.0	B594273
Total Cobalt (Co)	mg/kg	5.6	0.50	3.1	0.50	B594273	7.2	0.50	B594273
Total Copper (Cu)	mg/kg	12	1.0	16	1.0	B594273	20	1.0	B594273
Total Lead (Pb)	mg/kg	7.2	0.50	9.9	0.50	B594273	12	0.50	B594273
Total Mercury (Hg)	mg/kg	<0.050	0.050	<0.050	0.050	B594273	<0.050	0.050	B594273
Total Molybdenum (Mo)	mg/kg	0.54	0.40	2.5	0.40	B594273	0.70	0.40	B594273
Total Nickel (Ni)	mg/kg	14	1.0	13	1.0	B594273	23	1.0	B594273
Total Selenium (Se)	mg/kg	2.0	0.50	11	0.50	B594273	1.2	0.50	B594273
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	B594273	<0.20	0.20	B594273
Total Thallium (Tl)	mg/kg	0.13	0.10	0.14	0.10	B594273	0.20	0.10	B594273
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	B594273	<1.0	1.0	B594273
Total Uranium (U)	mg/kg	0.81	0.20	2.8	0.20	B594273	1.6	0.20	B594273
Total Vanadium (V)	mg/kg	19	1.0	16	1.0	B594273	31	1.0	B594273
Total Zinc (Zn)	mg/kg	1100	10	55	10	B594273	89	10	B594273
RDL = Reportable Detection Limit									

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ994			CYZ995			CYZ996		
Sampling Date		2024/10/29 11:30			2024/10/29 11:45			2024/10/29 12:20		
COC Number		1/1			1/1			1/1		
	UNITS	WQ-06	RDL	QC Batch	WQ-04C	RDL	QC Batch	WQ-03	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	4.8	N/A	B585138	2.6	N/A	B585138	19	N/A	B585138
Cation Sum	meq/L	8.2	N/A	B585138	7.3	N/A	B585138	22	N/A	B585138
Cation/EC Ratio	N/A	11	0.10	B585127	11	0.10	B585127	12	0.10	B585127
Calculated Calcium (Ca)	mg/kg	40	1.2	B585602	29	0.91	B585604	180	1.1	B585602
Calculated Magnesium (Mg)	mg/kg	24	0.79	B585602	16	0.61	B585604	69	0.76	B585602
Calculated Sodium (Na)	mg/kg	52	2.0	B585602	36	1.5	B585604	45	1.9	B585602
Calculated Potassium (K)	mg/kg	9.4	1.0	B585602	4.8	0.79	B585604	17	0.99	B585602
Calculated Boron (B)	mg/kg	<0.079	0.079	B584823	0.074	0.061	B584823	<0.076	0.076	B584823
Calculated Chloride (Cl)	mg/kg	18	7.9	B585602	13	6.1	B585604	24	7.6	B585602
Calculated Sulphate (SO4)	mg/kg	160	4.0	B585602	58	3.0	B585604	670	3.8	B585602
Elements										
Hex. Chromium (Cr 6+)	mg/kg	<0.17 (1)	0.17	B593281	<0.080	0.080	B593281	<0.080	0.080	B593281
Soluble Parameters										
Soluble Boron (B)	mg/L	<0.10	0.10	B594824	0.12	0.10	B594824	<0.10	0.10	B594824
Soluble Chloride (Cl)	mg/L	23	10	B594804	21	10	B594804	31	10	B594804
Soluble Conductivity	dS/m	0.77	0.020	B594803	0.64	0.020	B594803	1.8	0.020	B594803
Soluble (CaCl2) pH	pH	7.80	N/A	B593968	7.87	N/A	B593968	7.64	N/A	B593968
Sodium Adsorption Ratio	N/A	1.8	0.10	B585353	1.7	0.10	B585353	0.82	0.10	B585353
Soluble Calcium (Ca)	mg/L	50	1.5	B594824	48	1.5	B594824	240	1.5	B594824
Soluble Magnesium (Mg)	mg/L	31	1.0	B594824	25	1.0	B594824	90	1.0	B594824
Soluble Sodium (Na)	mg/L	65	2.5	B594824	59	2.5	B594824	59	2.5	B594824
Soluble Potassium (K)	mg/L	12	1.3	B594824	7.9	1.3	B594824	23	1.3	B594824
Saturation %	%	79	N/A	B593965	61	N/A	B593965	76	N/A	B593965
Soluble Sulphate (SO4)	mg/L	200	5.0	B594824	95	5.0	B594824	870	5.0	B594824
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B585605	<0.20	0.20	B585605	<0.20	0.20	B585605
Elements										
Total Antimony (Sb)	mg/kg	0.60	0.50	B594273	<0.50	0.50	B594273	<0.50	0.50	B594273
Total Arsenic (As)	mg/kg	6.9	1.0	B594273	4.7	1.0	B594273	4.5	1.0	B594273
Total Barium (Ba)	mg/kg	280	1.0	B594273	280	1.0	B594273	270	1.0	B594273
Total Beryllium (Be)	mg/kg	0.82	0.40	B594273	0.60	0.40	B594273	0.60	0.40	B594273
Total Cadmium (Cd)	mg/kg	0.54	0.050	B594273	0.53	0.050	B594273	0.49	0.050	B594273

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CYZ994			CYZ995			CYZ996		
Sampling Date		2024/10/29 11:30			2024/10/29 11:45			2024/10/29 12:20		
COC Number		1/1			1/1			1/1		
	UNITS	WQ-06	RDL	QC Batch	WQ-04C	RDL	QC Batch	WQ-03	RDL	QC Batch
Total Chromium (Cr)	mg/kg	21	1.0	B594273	16	1.0	B594273	16	1.0	B594273
Total Cobalt (Co)	mg/kg	8.2	0.50	B594273	6.6	0.50	B594273	6.4	0.50	B594273
Total Copper (Cu)	mg/kg	22	1.0	B594273	18	1.0	B594273	17	1.0	B594273
Total Lead (Pb)	mg/kg	12	0.50	B594273	11	0.50	B594273	10	0.50	B594273
Total Mercury (Hg)	mg/kg	<0.050	0.050	B594273	<0.050	0.050	B594273	<0.050	0.050	B594273
Total Molybdenum (Mo)	mg/kg	1.2	0.40	B594273	1.0	0.40	B594273	0.93	0.40	B594273
Total Nickel (Ni)	mg/kg	26	1.0	B594273	21	1.0	B594273	21	1.0	B594273
Total Selenium (Se)	mg/kg	1.1	0.50	B594273	1.5	0.50	B594273	1.5	0.50	B594273
Total Silver (Ag)	mg/kg	<0.20	0.20	B594273	<0.20	0.20	B594273	<0.20	0.20	B594273
Total Thallium (Tl)	mg/kg	0.21	0.10	B594273	0.17	0.10	B594273	0.17	0.10	B594273
Total Tin (Sn)	mg/kg	<1.0	1.0	B594273	<1.0	1.0	B594273	<1.0	1.0	B594273
Total Uranium (U)	mg/kg	1.8	0.20	B594273	1.8	0.20	B594273	1.7	0.20	B594273
Total Vanadium (V)	mg/kg	36	1.0	B594273	27	1.0	B594273	26	1.0	B594273
Total Zinc (Zn)	mg/kg	98	10	B594273	85	10	B594273	82	10	B594273

RDL = Reportable Detection Limit

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CZR562		CZR563		
Sampling Date						
COC Number		1/1		1/1		
	UNITS	WQ-05B RESAMPLE	RDL	WQ-04B RESAMPLE	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	19	N/A	21	N/A	B596425
Cation Sum	meq/L	18	N/A	21	N/A	B596425
Cation/EC Ratio	N/A	11	0.10	12	0.10	B596411
Calculated Calcium (Ca)	mg/kg	80	0.85	110	1.0	B596437
Calculated Magnesium (Mg)	mg/kg	41	0.56	59	0.67	B596437
Calculated Sodium (Na)	mg/kg	53	1.4	67	1.7	B596437
Calculated Potassium (K)	mg/kg	12	0.73	15	0.87	B596437
Calculated Boron (B)	mg/kg	<0.056	0.056	<0.067	0.067	B595486
Calculated Chloride (Cl)	mg/kg	110	5.6	120	6.7	B596437
Calculated Sulphate (SO4)	mg/kg	380	2.8	530	3.4	B596437
Elements						
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	<0.19 (1)	0.19	B597644
Soluble Parameters						
Soluble Boron (B)	mg/L	<0.10	0.10	<0.10	0.10	B607019
Soluble Chloride (Cl)	mg/L	190 (2)	10	180	10	B607021
Soluble Conductivity	dS/m	1.6	0.020	1.7	0.020	B607158
Soluble (CaCl2) pH	pH	7.74	N/A	7.65	N/A	B604203
Sodium Adsorption Ratio	N/A	1.6	0.10	1.6	0.10	B596435
Soluble Calcium (Ca)	mg/L	140	1.5	170	1.5	B607019
Soluble Magnesium (Mg)	mg/L	73	1.0	88	1.0	B607019
Soluble Sodium (Na)	mg/L	94	2.5	99	2.5	B607019
Soluble Potassium (K)	mg/L	20	1.3	22	1.3	B607019
Saturation %	%	56	N/A	67	N/A	B604197
Soluble Sulphate (SO4)	mg/L	680	5.0	790	5.0	B607019
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	B596442
Elements						
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	B604769
Total Arsenic (As)	mg/kg	4.6	1.0	5.3	1.0	B604769
Total Barium (Ba)	mg/kg	160	1.0	190	1.0	B604769
Total Beryllium (Be)	mg/kg	0.45	0.40	0.56	0.40	B604769
Total Cadmium (Cd)	mg/kg	0.31	0.050	0.35	0.050	B604769

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.
(2) Duplicate exceeds acceptance criteria due to sample non homogeneity.

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AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CZR562		CZR563		
Sampling Date						
COC Number		1/1		1/1		
	UNITS	WQ-05B RESAMPLE	RDL	WQ-04B RESAMPLE	RDL	QC Batch
Total Chromium (Cr)	mg/kg	14	1.0	15	1.0	B604769
Total Cobalt (Co)	mg/kg	6.7	0.50	7.6	0.50	B604769
Total Copper (Cu)	mg/kg	14	1.0	16	1.0	B604769
Total Lead (Pb)	mg/kg	7.9	0.50	9.2	0.50	B604769
Total Mercury (Hg)	mg/kg	<0.050	0.050	<0.050	0.050	B604769
Total Molybdenum (Mo)	mg/kg	0.55	0.40	0.59	0.40	B604769
Total Nickel (Ni)	mg/kg	16	1.0	19	1.0	B604769
Total Selenium (Se)	mg/kg	0.71	0.50	0.83	0.50	B604769
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	B604769
Total Thallium (Tl)	mg/kg	0.12	0.10	0.14	0.10	B604769
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	B604769
Total Uranium (U)	mg/kg	0.87	0.20	0.97	0.20	B604769
Total Vanadium (V)	mg/kg	23	1.0	26	1.0	B604769
Total Zinc (Zn)	mg/kg	83	10	88	10	B604769
RDL = Reportable Detection Limit						

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RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		CYZ989	CYZ991		
Sampling Date		2024/10/29 09:15	2024/10/29 09:50		
COC Number		1/1	1/1		
	UNITS	**WQ-05B**	**WQ-04B**	**RDL**	**QC Batch**
Elements					
Hex. Chromium (Cr 6+)	mg/kg	<0.18 (1)	<0.18 (1)	0.18	B593281

RDL = Reportable Detection Limit
(1) Detection limits raised due to high moisture content, samples contain => 50% moisture.

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PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CYZ989	CYZ990	CYZ991	CYZ992	CYZ993	CYZ994	CYZ995		
Sampling Date		2024/10/29 09:15	2024/10/29 09:40	2024/10/29 09:50	2024/10/29 10:20	2024/10/29 11:15	2024/10/29 11:30	2024/10/29 11:45		
COC Number		1/1	1/1	1/1	1/1	1/1	1/1	1/1		
	UNITS	WQ-05B	WQ-04D	WQ-04B	WQ-04A	WQ-07	WQ-06	WQ-04C	RDL	QC Batch
Physical Properties										
Moisture	%	56	54	55	75	55	54	42	0.30	B591970
RDL = Reportable Detection Limit										

Bureau Veritas ID		CYZ996		CZR562	CZR563		
Sampling Date		2024/10/29 12:20					
COC Number		1/1		1/1	1/1		
	UNITS	WQ-03	QC Batch	WQ-05B RESAMPLE	WQ-04B RESAMPLE	RDL	QC Batch
Physical Properties							
Moisture	%	40	B591970	30	57	0.30	B593521
RDL = Reportable Detection Limit							

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
Package 2	8.6°C
Package 3	4.6°C

Report reissued to include results for AT1 Metals and Salinity in Soil on samples WQ-05B Resample (CZR562) and WQ-04B Resample (CZR563).

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B591970	TLP	Method Blank	Moisture	2024/11/04	<0.30		%	
B591970	TLP	RPD	Moisture	2024/11/04	1.4		%	20
B593281	TOR	Matrix Spike	Hex. Chromium (Cr 6+)	2024/11/04		90	%	75 - 125
B593281	TOR	Spiked Blank	Hex. Chromium (Cr 6+)	2024/11/04		106	%	80 - 120
B593281	TOR	Method Blank	Hex. Chromium (Cr 6+)	2024/11/04	<0.080		mg/kg	
B593281	TOR	RPD	Hex. Chromium (Cr 6+)	2024/11/04	NC		%	35
B593521	A1H	Method Blank	Moisture	2024/11/07	<0.30		%	
B593521	A1H	RPD	Moisture	2024/11/05	1.3		%	20
B593965	DPL	QC Standard	Saturation %	2024/11/05		104	%	75 - 125
B593965	DPL	RPD	Saturation %	2024/11/05	3.9		%	12
B593968	JAY	QC Standard	Soluble (CaCl2) pH	2024/11/05		97	%	97 - 103
B593968	JAY	Spiked Blank	Soluble (CaCl2) pH	2024/11/05		100	%	97 - 103
B593968	JAY	RPD	Soluble (CaCl2) pH	2024/11/05	0.95		%	N/A
B594273	KH2	Matrix Spike	Total Antimony (Sb)	2024/11/05		97	%	75 - 125
			Total Arsenic (As)	2024/11/05		111	%	75 - 125
			Total Barium (Ba)	2024/11/05		NC	%	75 - 125
			Total Beryllium (Be)	2024/11/05		111	%	75 - 125
			Total Cadmium (Cd)	2024/11/05		111	%	75 - 125
			Total Chromium (Cr)	2024/11/05		144 (1)	%	75 - 125
			Total Cobalt (Co)	2024/11/05		108	%	75 - 125
			Total Copper (Cu)	2024/11/05		109	%	75 - 125
			Total Lead (Pb)	2024/11/05		106	%	75 - 125
			Total Mercury (Hg)	2024/11/05		99	%	75 - 125
			Total Molybdenum (Mo)	2024/11/05		112	%	75 - 125
			Total Nickel (Ni)	2024/11/05		115	%	75 - 125
			Total Selenium (Se)	2024/11/05		104	%	75 - 125
			Total Silver (Ag)	2024/11/05		110	%	75 - 125
			Total Thallium (Tl)	2024/11/05		100	%	75 - 125
			Total Tin (Sn)	2024/11/05		110	%	75 - 125
			Total Uranium (U)	2024/11/05		101	%	75 - 125
			Total Vanadium (V)	2024/11/05		NC	%	75 - 125
			Total Zinc (Zn)	2024/11/05		NC	%	75 - 125
B594273	KH2	QC Standard	Total Arsenic (As)	2024/11/05		118	%	68 - 133
			Total Barium (Ba)	2024/11/05		107	%	77 - 123
			Total Beryllium (Be)	2024/11/05		105	%	46 - 154
			Total Cadmium (Cd)	2024/11/05		114	%	56 - 147
			Total Chromium (Cr)	2024/11/05		97	%	65 - 136
			Total Cobalt (Co)	2024/11/05		107	%	79 - 122
			Total Copper (Cu)	2024/11/05		108	%	83 - 117
			Total Lead (Pb)	2024/11/05		110	%	87 - 113
			Total Mercury (Hg)	2024/11/05		102	%	71 - 129
			Total Molybdenum (Mo)	2024/11/05		116	%	69 - 132
			Total Nickel (Ni)	2024/11/05		110	%	85 - 115
			Total Silver (Ag)	2024/11/05		118	%	82 - 118
			Total Uranium (U)	2024/11/05		96	%	78 - 121
			Total Vanadium (V)	2024/11/05		108	%	69 - 131
B594273	KH2	Spiked Blank	Total Antimony (Sb)	2024/11/05		106	%	80 - 120
			Total Arsenic (As)	2024/11/05		106	%	80 - 120
			Total Barium (Ba)	2024/11/05		104	%	80 - 120
			Total Beryllium (Be)	2024/11/05		103	%	80 - 120
			Total Cadmium (Cd)	2024/11/05		105	%	80 - 120
			Total Chromium (Cr)	2024/11/05		105	%	80 - 120
			Total Cobalt (Co)	2024/11/05		104	%	80 - 120
			Total Copper (Cu)	2024/11/05		104	%	80 - 120
			Total Lead (Pb)	2024/11/05		101	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Mercury (Hg)	2024/11/05		107	%	80 - 120
			Total Molybdenum (Mo)	2024/11/05		105	%	80 - 120
			Total Nickel (Ni)	2024/11/05		104	%	80 - 120
			Total Selenium (Se)	2024/11/05		104	%	80 - 120
			Total Silver (Ag)	2024/11/05		104	%	80 - 120
			Total Thallium (Tl)	2024/11/05		100	%	80 - 120
			Total Tin (Sn)	2024/11/05		102	%	80 - 120
			Total Uranium (U)	2024/11/05		105	%	80 - 120
			Total Vanadium (V)	2024/11/05		104	%	80 - 120
			Total Zinc (Zn)	2024/11/05		107	%	80 - 120
B594273	KH2	Method Blank	Total Antimony (Sb)	2024/11/05	<0.50		mg/kg	
			Total Arsenic (As)	2024/11/05	<1.0		mg/kg	
			Total Barium (Ba)	2024/11/05	<1.0		mg/kg	
			Total Beryllium (Be)	2024/11/05	<0.40		mg/kg	
			Total Cadmium (Cd)	2024/11/05	<0.050		mg/kg	
			Total Chromium (Cr)	2024/11/05	<1.0		mg/kg	
			Total Cobalt (Co)	2024/11/05	<0.50		mg/kg	
			Total Copper (Cu)	2024/11/05	<1.0		mg/kg	
			Total Lead (Pb)	2024/11/05	<0.50		mg/kg	
			Total Mercury (Hg)	2024/11/05	<0.050		mg/kg	
			Total Molybdenum (Mo)	2024/11/05	<0.40		mg/kg	
			Total Nickel (Ni)	2024/11/05	<1.0		mg/kg	
			Total Selenium (Se)	2024/11/05	<0.50		mg/kg	
			Total Silver (Ag)	2024/11/05	<0.20		mg/kg	
			Total Thallium (Tl)	2024/11/05	<0.10		mg/kg	
			Total Tin (Sn)	2024/11/05	<1.0		mg/kg	
			Total Uranium (U)	2024/11/05	<0.20		mg/kg	
			Total Vanadium (V)	2024/11/05	<1.0		mg/kg	
			Total Zinc (Zn)	2024/11/05	<10		mg/kg	
B594273	KH2	RPD	Total Antimony (Sb)	2024/11/05	7.8		%	30
			Total Arsenic (As)	2024/11/05	1.6		%	30
			Total Barium (Ba)	2024/11/05	6.9		%	35
			Total Beryllium (Be)	2024/11/05	3.4		%	30
			Total Cadmium (Cd)	2024/11/05	0.93		%	30
			Total Chromium (Cr)	2024/11/05	1.0		%	30
			Total Cobalt (Co)	2024/11/05	3.3		%	30
			Total Copper (Cu)	2024/11/05	1.4		%	30
			Total Lead (Pb)	2024/11/05	3.8		%	35
			Total Mercury (Hg)	2024/11/05	NC		%	35
			Total Molybdenum (Mo)	2024/11/05	0.83		%	35
			Total Nickel (Ni)	2024/11/05	0.10		%	30
			Total Selenium (Se)	2024/11/05	NC		%	30
			Total Silver (Ag)	2024/11/05	NC		%	35
			Total Thallium (Tl)	2024/11/05	4.2		%	30
			Total Tin (Sn)	2024/11/05	NC		%	35
			Total Uranium (U)	2024/11/05	0.27		%	30
			Total Vanadium (V)	2024/11/05	1.0		%	30
			Total Zinc (Zn)	2024/11/05	0.74		%	30
B594803	RDL	QC Standard	Soluble Conductivity	2024/11/05		92	%	75 - 125
B594803	RDL	Spiked Blank	Soluble Conductivity	2024/11/05		99	%	90 - 110
B594803	RDL	Method Blank	Soluble Conductivity	2024/11/05	<0.020		dS/m	
B594803	RDL	RPD	Soluble Conductivity	2024/11/05	0.64		%	20
B594804	RDL	Matrix Spike	Soluble Chloride (Cl)	2024/11/05		100	%	75 - 125
B594804	RDL	QC Standard	Soluble Chloride (Cl)	2024/11/05		75	%	75 - 125
B594804	RDL	Spiked Blank	Soluble Chloride (Cl)	2024/11/05		96	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B594804	RDL	Method Blank	Soluble Chloride (Cl)	2024/11/05	<10		mg/L	
B594804	RDL	RPD	Soluble Chloride (Cl)	2024/11/05	NC		%	30
B594824	PL	Matrix Spike	Soluble Boron (B)	2024/11/05		92	%	75 - 125
			Soluble Calcium (Ca)	2024/11/05		95	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/05		96	%	75 - 125
			Soluble Sodium (Na)	2024/11/05		94	%	75 - 125
			Soluble Potassium (K)	2024/11/05		95	%	75 - 125
B594824	PL	QC Standard	Soluble Calcium (Ca)	2024/11/05		89	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/05		84	%	75 - 125
			Soluble Sodium (Na)	2024/11/05		94	%	75 - 125
			Soluble Potassium (K)	2024/11/05		101	%	75 - 125
			Soluble Sulphate (SO4)	2024/11/05		85	%	75 - 125
B594824	PL	Spiked Blank	Soluble Boron (B)	2024/11/05		92	%	80 - 120
			Soluble Calcium (Ca)	2024/11/05		102	%	80 - 120
			Soluble Magnesium (Mg)	2024/11/05		99	%	80 - 120
			Soluble Sodium (Na)	2024/11/05		97	%	80 - 120
			Soluble Potassium (K)	2024/11/05		96	%	80 - 120
B594824	PL	Method Blank	Soluble Boron (B)	2024/11/05	<0.10		mg/L	
			Soluble Calcium (Ca)	2024/11/05	<1.5		mg/L	
			Soluble Magnesium (Mg)	2024/11/05	<1.0		mg/L	
			Soluble Sodium (Na)	2024/11/05	<2.5		mg/L	
			Soluble Potassium (K)	2024/11/05	<1.3		mg/L	
			Soluble Sulphate (SO4)	2024/11/05	<5.0		mg/L	
B594824	PL	RPD	Soluble Calcium (Ca)	2024/11/05	3.6		%	30
			Soluble Magnesium (Mg)	2024/11/05	4.6		%	30
			Soluble Sodium (Na)	2024/11/05	6.3		%	30
			Soluble Potassium (K)	2024/11/05	3.7		%	30
			Soluble Sulphate (SO4)	2024/11/05	3.7		%	30
B597644	MOP	Matrix Spike	Hex. Chromium (Cr 6+)	2024/11/07		96	%	75 - 125
B597644	MOP	Spiked Blank	Hex. Chromium (Cr 6+)	2024/11/07		99	%	80 - 120
B597644	MOP	Method Blank	Hex. Chromium (Cr 6+)	2024/11/07	<0.080		mg/kg	
B597644	MOP	RPD	Hex. Chromium (Cr 6+)	2024/11/07	NC		%	35
B604197	DPL	QC Standard	Saturation %	2024/11/14		100	%	75 - 125
B604197	DPL	RPD [CZR562-01]	Saturation %	2024/11/14	2.4		%	12
B604197	DPL	RPD	Saturation %	2024/11/14	0.020		%	12
B604203	JAY	QC Standard	Soluble (CaCl2) pH	2024/11/13		99	%	97 - 103
B604203	JAY	Spiked Blank	Soluble (CaCl2) pH	2024/11/13		100	%	97 - 103
B604203	JAY	RPD [CZR562-01]	Soluble (CaCl2) pH	2024/11/13	0.69		%	N/A
B604769	KH2	Matrix Spike	Total Antimony (Sb)	2024/11/14		81	%	75 - 125
			Total Arsenic (As)	2024/11/14		103	%	75 - 125
			Total Barium (Ba)	2024/11/14		NC	%	75 - 125
			Total Beryllium (Be)	2024/11/14		93	%	75 - 125
			Total Cadmium (Cd)	2024/11/14		97	%	75 - 125
			Total Chromium (Cr)	2024/11/14		157 (1)	%	75 - 125
			Total Cobalt (Co)	2024/11/14		100	%	75 - 125
			Total Copper (Cu)	2024/11/14		102	%	75 - 125
			Total Lead (Pb)	2024/11/14		99	%	75 - 125
			Total Mercury (Hg)	2024/11/14		86	%	75 - 125
			Total Molybdenum (Mo)	2024/11/14		99	%	75 - 125
			Total Nickel (Ni)	2024/11/14		114	%	75 - 125
			Total Selenium (Se)	2024/11/14		93	%	75 - 125
			Total Silver (Ag)	2024/11/14		93	%	75 - 125
			Total Thallium (Tl)	2024/11/14		85	%	75 - 125
			Total Tin (Sn)	2024/11/14		98	%	75 - 125
			Total Uranium (U)	2024/11/14		89	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Vanadium (V)	2024/11/14		NC	%	75 - 125
			Total Zinc (Zn)	2024/11/14		NC	%	75 - 125
B604769	KH2	QC Standard	Total Arsenic (As)	2024/11/14		111	%	68 - 133
			Total Barium (Ba)	2024/11/14		94	%	77 - 123
			Total Beryllium (Be)	2024/11/14		90	%	46 - 154
			Total Cadmium (Cd)	2024/11/14		106	%	56 - 147
			Total Chromium (Cr)	2024/11/14		89	%	65 - 136
			Total Cobalt (Co)	2024/11/14		99	%	79 - 122
			Total Copper (Cu)	2024/11/14		101	%	83 - 117
			Total Lead (Pb)	2024/11/14		98	%	87 - 113
			Total Mercury (Hg)	2024/11/14		90	%	71 - 129
			Total Molybdenum (Mo)	2024/11/14		104	%	69 - 132
			Total Nickel (Ni)	2024/11/14		102	%	85 - 115
			Total Silver (Ag)	2024/11/14		100	%	82 - 118
			Total Uranium (U)	2024/11/14		89	%	78 - 121
			Total Vanadium (V)	2024/11/14		102	%	69 - 131
B604769	KH2	Spiked Blank	Total Antimony (Sb)	2024/11/14		99	%	80 - 120
			Total Arsenic (As)	2024/11/14		104	%	80 - 120
			Total Barium (Ba)	2024/11/14		97	%	80 - 120
			Total Beryllium (Be)	2024/11/14		96	%	80 - 120
			Total Cadmium (Cd)	2024/11/14		98	%	80 - 120
			Total Chromium (Cr)	2024/11/14		100	%	80 - 120
			Total Cobalt (Co)	2024/11/14		100	%	80 - 120
			Total Copper (Cu)	2024/11/14		101	%	80 - 120
			Total Lead (Pb)	2024/11/14		99	%	80 - 120
			Total Mercury (Hg)	2024/11/14		100	%	80 - 120
			Total Molybdenum (Mo)	2024/11/14		97	%	80 - 120
			Total Nickel (Ni)	2024/11/14		100	%	80 - 120
			Total Selenium (Se)	2024/11/14		98	%	80 - 120
			Total Silver (Ag)	2024/11/14		95	%	80 - 120
			Total Thallium (Tl)	2024/11/14		97	%	80 - 120
			Total Tin (Sn)	2024/11/14		96	%	80 - 120
			Total Uranium (U)	2024/11/14		100	%	80 - 120
			Total Vanadium (V)	2024/11/14		102	%	80 - 120
			Total Zinc (Zn)	2024/11/14		104	%	80 - 120
B604769	KH2	Method Blank	Total Antimony (Sb)	2024/11/14	<0.50		mg/kg	
			Total Arsenic (As)	2024/11/14	<1.0		mg/kg	
			Total Barium (Ba)	2024/11/14	<1.0		mg/kg	
			Total Beryllium (Be)	2024/11/14	<0.40		mg/kg	
			Total Cadmium (Cd)	2024/11/14	<0.050		mg/kg	
			Total Chromium (Cr)	2024/11/14	<1.0		mg/kg	
			Total Cobalt (Co)	2024/11/14	<0.50		mg/kg	
			Total Copper (Cu)	2024/11/14	<1.0		mg/kg	
			Total Lead (Pb)	2024/11/14	<0.50		mg/kg	
			Total Mercury (Hg)	2024/11/14	<0.050		mg/kg	
			Total Molybdenum (Mo)	2024/11/14	<0.40		mg/kg	
			Total Nickel (Ni)	2024/11/14	<1.0		mg/kg	
			Total Selenium (Se)	2024/11/14	<0.50		mg/kg	
			Total Silver (Ag)	2024/11/14	<0.20		mg/kg	
			Total Thallium (Tl)	2024/11/14	<0.10		mg/kg	
			Total Tin (Sn)	2024/11/14	<1.0		mg/kg	
			Total Uranium (U)	2024/11/14	<0.20		mg/kg	
			Total Vanadium (V)	2024/11/14	<1.0		mg/kg	
			Total Zinc (Zn)	2024/11/14	<10		mg/kg	
B604769	KH2	RPD	Total Antimony (Sb)	2024/11/14	1.0		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Arsenic (As)	2024/11/14	4.8		%	30
			Total Barium (Ba)	2024/11/14	7.4		%	35
			Total Beryllium (Be)	2024/11/14	2.3		%	30
			Total Cadmium (Cd)	2024/11/14	2.8		%	30
			Total Chromium (Cr)	2024/11/14	6.4		%	30
			Total Cobalt (Co)	2024/11/14	3.6		%	30
			Total Copper (Cu)	2024/11/14	4.4		%	30
			Total Lead (Pb)	2024/11/14	4.5		%	35
			Total Mercury (Hg)	2024/11/14	4.7		%	35
			Total Molybdenum (Mo)	2024/11/14	2.1		%	35
			Total Nickel (Ni)	2024/11/14	4.8		%	30
			Total Selenium (Se)	2024/11/14	0.53		%	30
			Total Silver (Ag)	2024/11/14	1.4		%	35
			Total Thallium (Tl)	2024/11/14	3.6		%	30
			Total Tin (Sn)	2024/11/14	NC		%	35
			Total Uranium (U)	2024/11/14	2.2		%	30
			Total Vanadium (V)	2024/11/14	7.4		%	30
			Total Zinc (Zn)	2024/11/14	4.6		%	30
B607019	S1D	Matrix Spike [CZR562-01]	Soluble Boron (B)	2024/11/14		99	%	75 - 125
			Soluble Calcium (Ca)	2024/11/14		96	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/14		97	%	75 - 125
			Soluble Sodium (Na)	2024/11/14		95	%	75 - 125
			Soluble Potassium (K)	2024/11/14		98	%	75 - 125
B607019	S1D	QC Standard	Soluble Calcium (Ca)	2024/11/14		97	%	75 - 125
			Soluble Magnesium (Mg)	2024/11/14		98	%	75 - 125
			Soluble Sodium (Na)	2024/11/14		102	%	75 - 125
			Soluble Potassium (K)	2024/11/14		113	%	75 - 125
			Soluble Sulphate (SO4)	2024/11/14		100	%	75 - 125
B607019	S1D	Spiked Blank	Soluble Boron (B)	2024/11/14		99	%	80 - 120
			Soluble Calcium (Ca)	2024/11/14		98	%	80 - 120
			Soluble Magnesium (Mg)	2024/11/14		100	%	80 - 120
			Soluble Sodium (Na)	2024/11/14		96	%	80 - 120
			Soluble Potassium (K)	2024/11/14		100	%	80 - 120
B607019	S1D	Method Blank	Soluble Boron (B)	2024/11/14	<0.10		mg/L	
			Soluble Calcium (Ca)	2024/11/14	<1.5		mg/L	
			Soluble Magnesium (Mg)	2024/11/14	<1.0		mg/L	
			Soluble Sodium (Na)	2024/11/14	<2.5		mg/L	
			Soluble Potassium (K)	2024/11/14	<1.3		mg/L	
			Soluble Sulphate (SO4)	2024/11/14	<5.0		mg/L	
B607019	S1D	RPD [CZR562-01]	Soluble Boron (B)	2024/11/14	NC		%	30
			Soluble Calcium (Ca)	2024/11/14	15		%	30
			Soluble Magnesium (Mg)	2024/11/14	14		%	30
			Soluble Sodium (Na)	2024/11/14	14		%	30
			Soluble Potassium (K)	2024/11/14	7.7		%	30
			Soluble Sulphate (SO4)	2024/11/14	11		%	30
B607021	PL	Matrix Spike [CZR562-01]	Soluble Chloride (Cl)	2024/11/14		101	%	75 - 125
B607021	PL	QC Standard	Soluble Chloride (Cl)	2024/11/14		97	%	75 - 125
B607021	PL	Spiked Blank	Soluble Chloride (Cl)	2024/11/14		100	%	80 - 120
B607021	PL	Method Blank	Soluble Chloride (Cl)	2024/11/14	<10		mg/L	
B607021	PL	RPD [CZR562-01]	Soluble Chloride (Cl)	2024/11/14	31 (1)		%	30
B607158	NSW	QC Standard	Soluble Conductivity	2024/11/14		95	%	75 - 125
B607158	NSW	Spiked Blank	Soluble Conductivity	2024/11/14		99	%	90 - 110
B607158	NSW	Method Blank	Soluble Conductivity	2024/11/14	<0.020		dS/m	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B607158	NSW	RPD [CZR562-01]	Soluble Conductivity	2024/11/14	13		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas Certified by Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

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See Water COC

Choose Location:
- [x] Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
- [ ] Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
- [ ] Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

www.BVNA.com

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

MCAL-2024-10-2716

Invoice Information	Invoice to (requires report) ☐	Report information (if differs from invoice)		Project Information	
Company:	Ausenco	Company:		Quotation #:	
Contact Name:	Erin Moffatt	Contact Name:		P.O. #/ AFE#:	
Street Address:		Street Address:		Project #:	
City:	Prov: Postal Code:	City:	Prov: Postal Code:	Site #:	
Phone:		Phone:		Site Location:	
Email:	Erin.Moffatt@ausenco.com	Email:	Erin.Moffatt@ausenco.com	Site Location Province:	
Copies:		Copies:		Sampled By:	

Regulatory Criteria

☐ AT1 ☒ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba ☐ Saskatchewan ☐ Drinking Water - Alberta ☐ Other _____

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Regular Turnaround Time (TAT)
☐ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1	5 VOCs	6 BTEX F1-F2	7 BTEX F1-F4	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	WQ05B	24	10	29	9	15	Soil																						Drying and grinding moisture BAL At Metals and Salinity Soil
2	WQ-04D	↓	↓	↓	9	40	↓																						
3	WQ-04B				9	50																							
4	WQ 04A				10	20																							
5	WQ-07				11	15																							
6	WQ-06				11	30																							
7	WQ-04C				11	45																							
8	WQ-03				12	20																							
9																													
10																													
11																													
12																													

LAB USE ONLY	Yes	No		1	2	3
Seal present						
Seal intact	SEE		ACTR			
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	Erin Moffatt	24	10	24			1 Zain Nuruddin	2024	10	29	15	40	
2							2						

C487435
2024/10/29 15:40

Appendix D

Photo Log

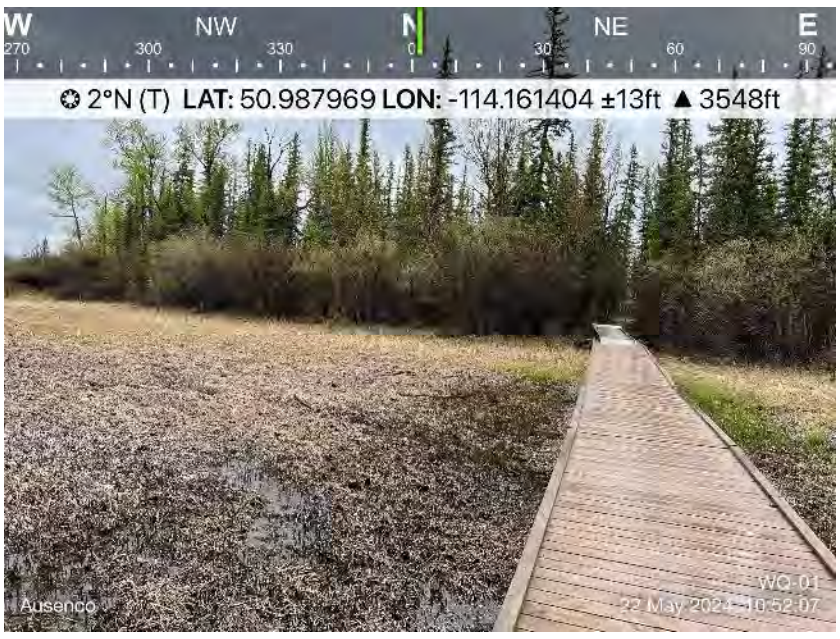

Photo 1 View north from WQ-01 sample site, located within the Reference Wetland. Photo taken during spring sampling on May 22, 2024.

Photo 2 View east from WQ-01 sample site, located within the Reference Wetland. Photo taken during spring sampling on May 22, 2024.

Photo 3 View south from WQ-01 sample site, located within the Reference Wetland. Photo taken during spring sampling on May 22, 2024.

Photo 4 View west from WQ-01 sample site, located within the Reference Wetland. Photo taken during spring sampling on May 22, 2024.

Photo 5 View of ground conditions at WQ-01 sample site, located within the Reference Wetland. Photo taken during spring sampling on May 22, 2024.

Photo 6 View north from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 29, 2024.

Photo 7 View east from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 29, 2024.

Photo 8 View of south from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 29, 2024.

Photo 9 View west from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 29, 2024.

Photo 10 View of ground conditions at WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 29, 2024.

Photo 11 View north from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 12 View east from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 13 View south from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 14 View west from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 15 View of ground conditions at WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 16 View north from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 29, 2024.

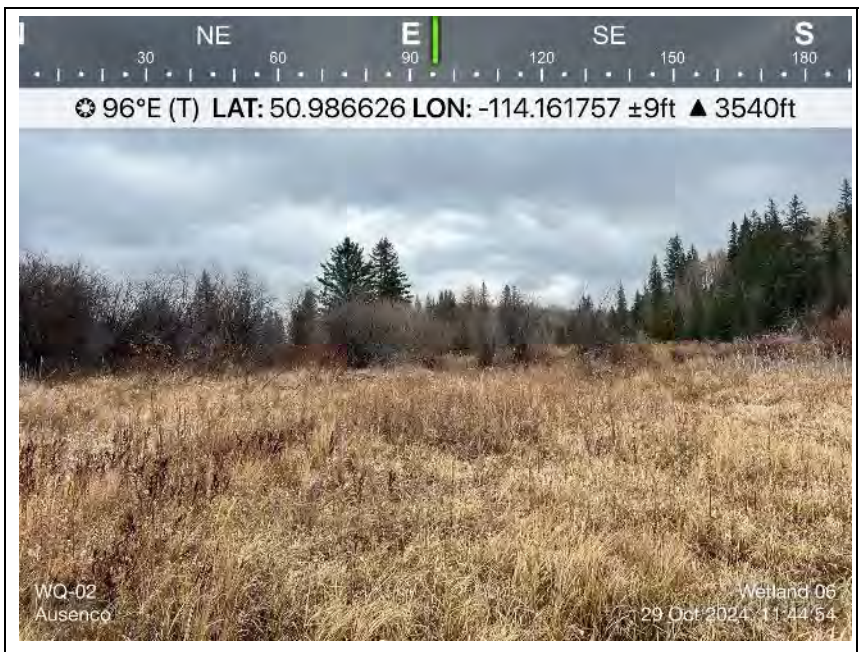

Photo 17 View east from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 29, 2024.

Photo 18 View south from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 29, 2024.

Photo 19 View west from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 29, 2024.

Photo 20 View of ground conditions at WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 29, 2024.

Photo 21 View north from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

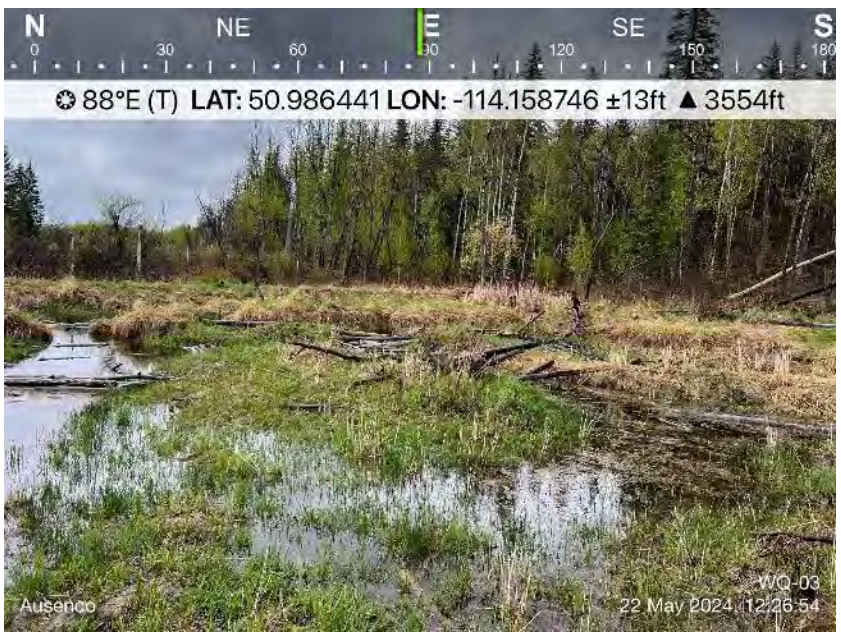

Photo 22 View east from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 23 View south from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 24 View west from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 22, 2024.

Photo 25 View of ground conditions at WQ-03 sample site, located within Wetland 6. Photo taken during spring sampling on May 22, 2024.

Photo 26 View north from WQ-03 sample site, located within Wetland 6. Photo taken during fall sampling on October 29, 2024.

Photo 27 View east from WQ-03 sample site, located within Wetland 6. Photo taken during fall sampling on October 29, 2024.

Photo 28 View south from WQ-03 sample site, located within Wetland 6. Photo taken during fall sampling on October 29, 2024.

Photo 29 View west from WQ-03 sample site, located within Wetland 6. Photo taken during fall sampling on October 29, 2024.

Photo 30 View of ground conditions from WQ-03 sample site, located within Wetland 6. Photo taken during fall sampling on October 29, 2024.

Photo 31 View north from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 32 View east from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 33 View south from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 34 View west from WQ-04A sample site located upslope of the SWCRR Project and within Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 35 View of ground conditions at WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 36 View north from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 37 View east from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 38 View south from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 39 View west from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 40 View of ground conditions from WQ-04A sample site, located upslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 41 View north from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 42 View east from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on May 22, 2024.

Photo 43 View south from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 44 View west from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 45 View of ground conditions at WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

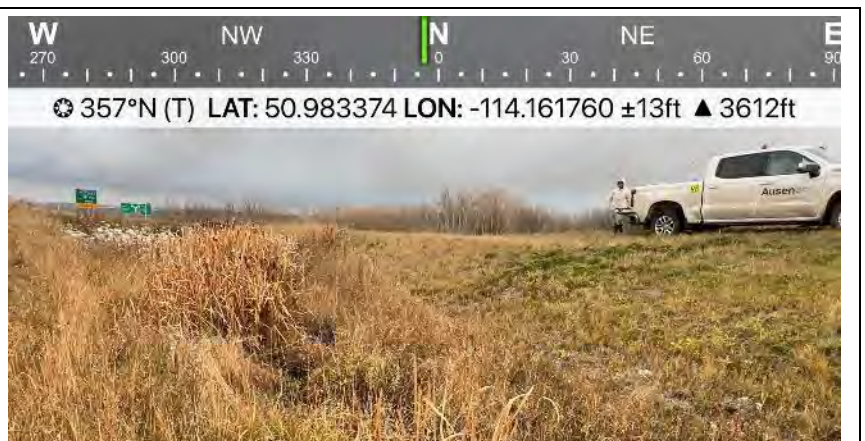

Photo 46 View north from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 47 View east from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 48 View south from WQ-04B sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 49 View west from WQ-04B sample site, located downslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 50 View of ground conditions at WQ-04B sample site, located downslope of the SWCRR Project and within Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 51 View north from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 52 View east from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 53 View south from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 54 View west from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 55 View of ground conditions at WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 56 View north from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 57 View east from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 58 View south from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 59 View west from WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 60 View of ground conditions at WQ-04C sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 61 View north from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 62 View east from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 63 View south from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 64 View west from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 65 View of ground conditions at WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 66 View north from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 67 View east from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 68 View south from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 69 View west from WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 70 View of ground conditions at WQ-04D sample site, located upslope of the SWCRR Project and within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 71 View north from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 72 View east from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 73 View south from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 74 View west from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 75 View of ground conditions at WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 76 View north from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 29, 2024.

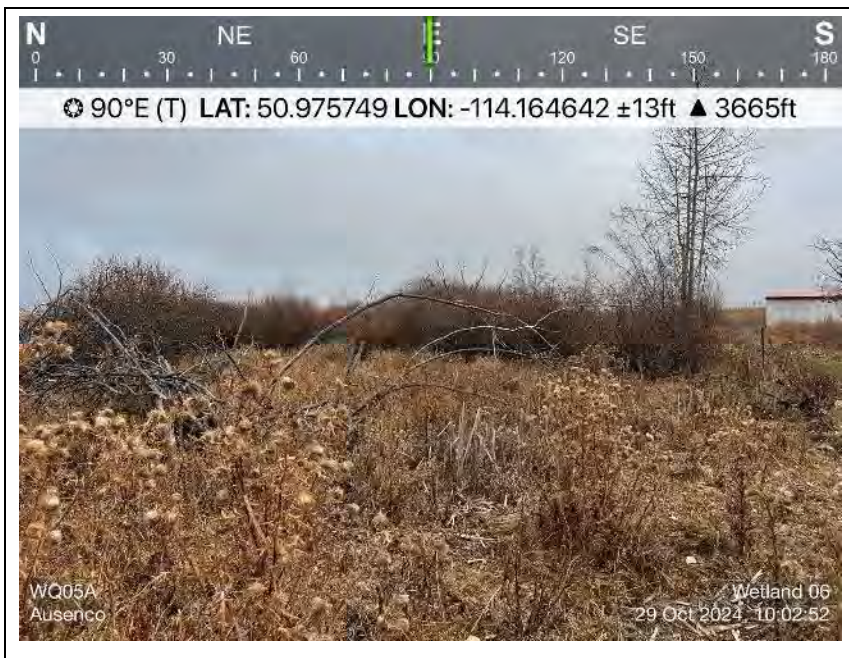

Photo 77 View east from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 29, 2024.

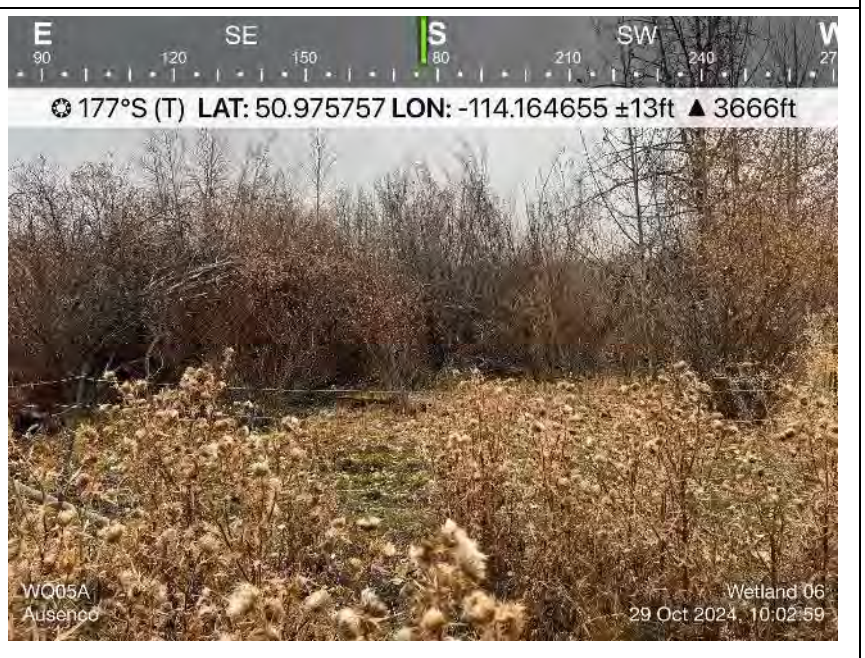

Photo 78 View south from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 79 View west from WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 80 View of ground conditions at WQ-05A sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 81 View north from WQ-05B sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 82 View east from WQ-05B sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 83 View south from WQ-05B sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 22, 2024.

Photo 84 View west from WQ-05B sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 22, 2024.

Note: Photo missing of ground conditions at WQ-05B during spring sampling

Photo 85 View north from WQ-05B sample site located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 86 View east from WQ-05B sample site located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 87 View southwest from WQ-05B sample site located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 88 View west from WQ-05B sample site located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 29, 2024.

Photo 89 View of ground conditions at WQ-05B sample site located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 29, 2024.

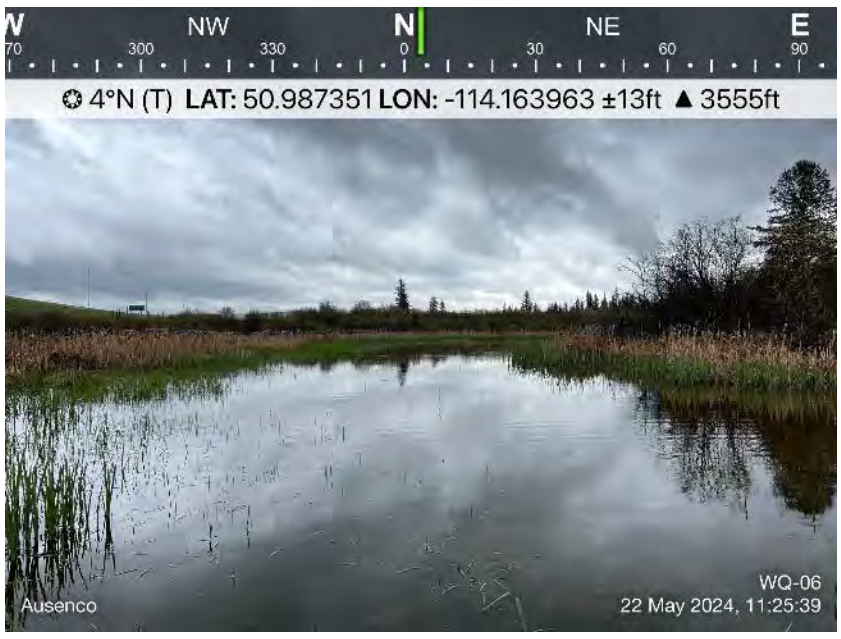

Photo 90 View north from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 91 View east from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 92 View south from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 93 View west from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

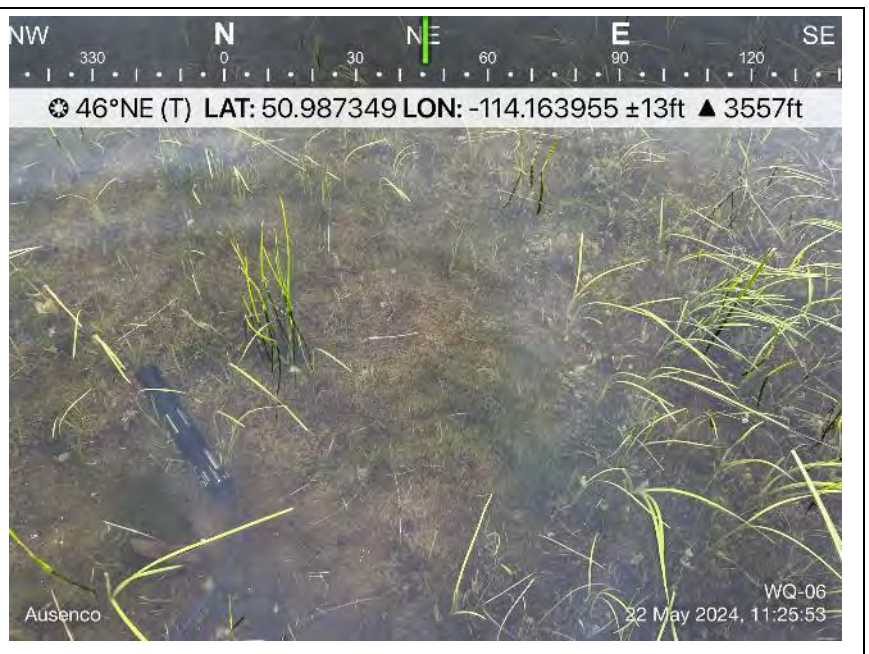

Photo 94 View of ground conditions at WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 95 View north from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 96 View east from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 97 View south from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 98 View west from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 99 View of ground conditions at WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 100 View north from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

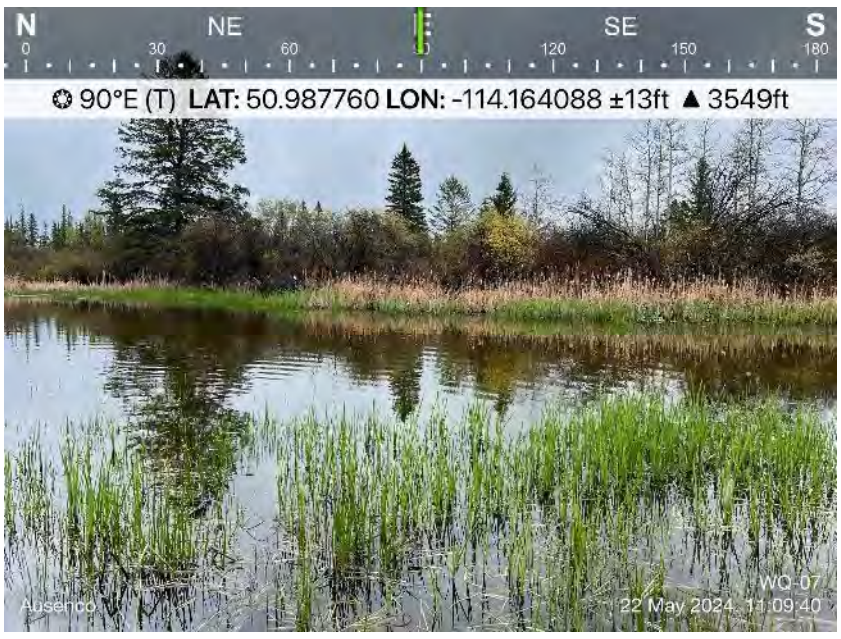

Photo 101 View east from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 102 View south from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Photo 103 View west from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 22, 2024.

Note: Photo missing of ground conditions at WQ-07 during spring sampling

Photo 104 View north from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 105 View east from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 106 View south from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 107 View west from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 108 View of ground conditions at WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 29, 2024.

Photo 109 View north from FL-01 inflow site. Photo taken during spring sampling on May 22, 2024

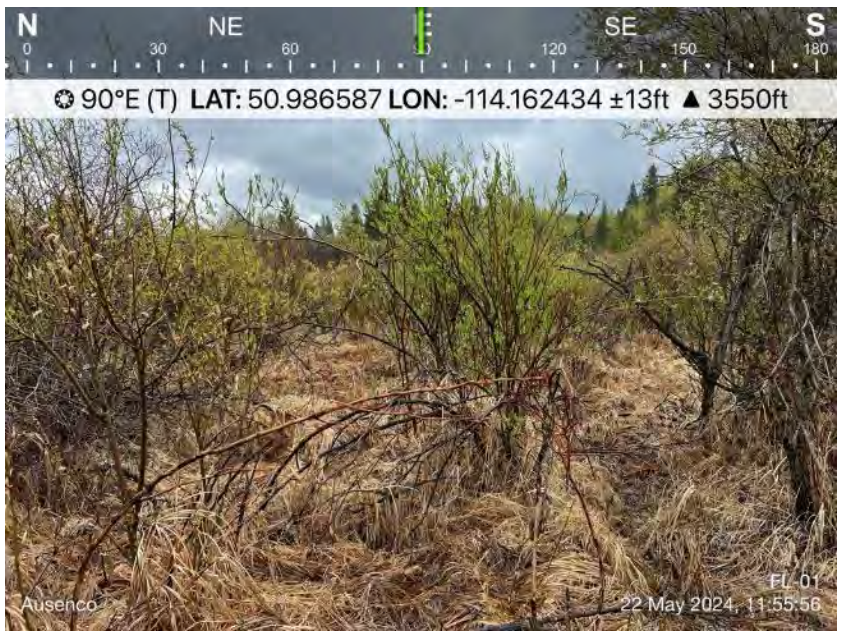

Photo 110 View east from FL-01 inflow site. Photo taken during spring sampling on May 22, 2024.

Photo 111 View south from FL-01 inflow site. Photo taken during spring sampling on May 22, 2024.

Photo 112 View west from FL-01 inflow site. Photo taken during fall sampling on May 22, 2024.

Photo 113 View of ground conditions at FL-01 inflow site. Photo taken during fall sampling on May 22, 2024.

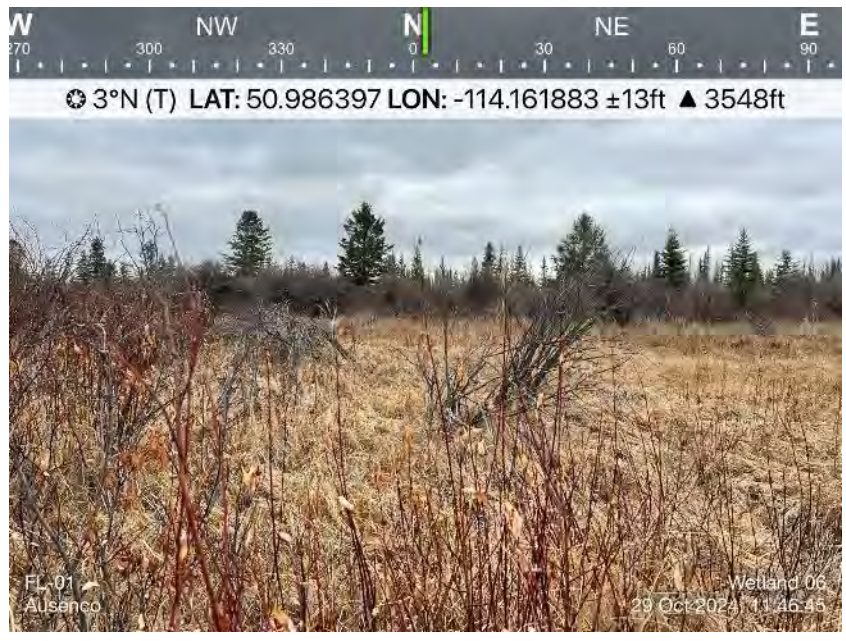

Photo 114 View north from FL-01 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 115 View east from FL-01 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 116 View south from FL-01 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 117 View west from FL-01 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 118 View of ground conditions at FL-01 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 119 View north from FL-02 inflow site. Photo taken during spring sampling on May 22, 2024

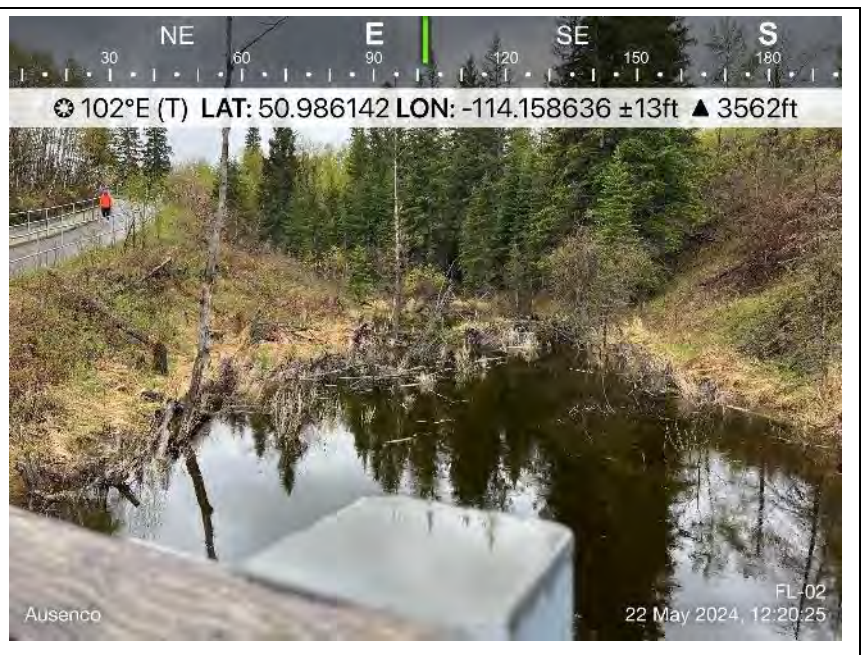

Photo 120 View east from FL-02 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 121 View south from FL-02 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 122 View of ground conditions at FL-02 inflow site. Photo taken during spring sampling on May 22, 2024.

Note: Photo missing of south view at FL-02 during spring sampling

Photo 123 View north from FL-02 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 124 View east from FL-02 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 125 View south from FL-02 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 126 View west from FL-02 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 127 View of ground conditions at FL-02 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 128 View north from FL-03 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 129 View east from FL-03 inflow site. Photo taken during spring sampling on May 22, 2024

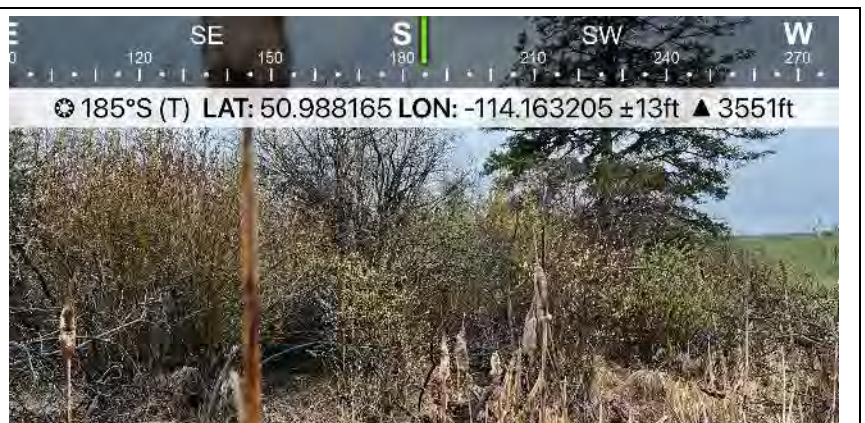

Photo 130 View south from FL-03 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 131 View west from FL-03 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 132 View of ground conditions at FL-03 inflow site. Photo taken during spring sampling on May 22, 2024

Photo 133 View north from FL-03 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 134 View east from FL-03 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 135 View south from FL-03 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 136 View west from FL-03 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 137 View of ground conditions at FL-03 inflow site. Photo taken during fall sampling on October 29, 2024.

Photo 138 View north from FL-04 outflow site. Photo taken during spring sampling on May 22, 2024.

Photo 139 View east from FL-04 outflow site. Photo taken during spring sampling on May 22, 2024.

Photo 140 View south from FL-04 outflow site. Photo taken during spring sampling on May 22, 2024.

Photo 141 View west from FL-04 outflow site. Photo taken during spring sampling on May 22, 2024.

Photo 142 View of ground conditions at FL-04 outflow site. Photo taken during spring sampling on May 22, 2024.

Photo 143 View north from FL-04 outflow site. Photo taken during fall sampling on October 29, 2024.

Photo 144 View east from FL-04 outflow site. Photo taken during fall sampling on October 29, 2024.

Photo 145 View south from FL-04 outflow site. Photo taken during fall sampling on October 29, 2024.

Photo 146 View west from FL-04 outflow site. Photo taken during fall sampling on October 29, 2024.

Photo 147 View of ground conditions at FL-04 outflow site. Photo taken during fall sampling on October 29, 2024.

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