

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

Prepared for:

KGL Constructors
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Project No. 102604-01

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Table of Contents

List of Acronyms and Abbreviations	iii
List of Symbols and Units of Measure	iii
1.0 Background	1
2.0 Introduction	2
3.0 Site Description	3
4.0 Methods	5
4.1 Sample Locations	5
4.1.1 Water Quality Monitoring	5
4.1.2 Sediment Sampling	6
4.1.3 Water Flow Monitoring and Wetted Widths	10
4.2 Water Quality Monitoring	10
4.3 Sediment Sampling	12
4.4 Water Flow Monitoring and Wetted Widths	13
5.0 Results	14
5.1 Water Quality Monitoring and Sediment Sampling	14
5.1.1 2023 Water Quality and Sediment Results	14
5.1.2 Comparison with Results from Previous Years	20
5.1.3 Multi-Year Sampling Comparison of Measurements	20
5.2 Water Flow Monitoring and Wetted Widths	23
6.0 Summary	29
7.0 Recommendations	30
8.0 Closure	31
9.0 References	32

List of Tables (Within text)

Table 4.a	Year 5 (i.e., 2022) Sample Locations	9
Table 4.b	Surface Water Flow Sample Locations	10
Table 4.c	Water Quality Parameters	11
Table 4.d	Sediment Parameters	13
Table 5.a1	Summary of 2018 to 2023 Water Quality Sampling Results – Exceedances Only	16
Table 5.a2	Summary of 2023 Water Quality Sampling Results along Pathways 1 and 2 – Exceedances Only	18
Table 5.b	Summary of Water Quality Sampling Results from 2020 to 2023 at WQ-06 and WQ-07- Exceedances Only	18
Table 5.c	Summary of Sediment Sampling Results from 2020 to 2023– Exceedances Only	19
Table 5.d	Surface Water Quality Parameters Collected from Wetland 06 Sites from 2016 to 2023.....	22
Table 5.e	Summary of Water Flow Monitoring Site Channel Width and Depth.....	23
Table 5.f	Summary of Water Flow Monitoring Site Velocity and Discharge.....	25
Table 5.g	Summary of Wetted Width Measurements from 2018 to 2023	28

List of Figures (Within text)

Figure 1	Wetland Locations.....	4
Figure 2	Water Flow and Quality Sampling Locations	7
Figure 3	Water Flow and Quality Monitoring Location Details	8

List of Appendices

Appendix A	Monitoring Plan
Appendix B	Raw Spring Sampling Data
Appendix C	Raw Fall Sampling Data
Appendix D	Photo Log

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 Background

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) running north to south through the Weaselhead Natural Area. Wetland 06 is an historical oxbow channel to the Elbow River that is over 500 metres (m) in length with wetted widths that are generally less than 30 m. Wetland 06 collects surface water from several other wetlands (Wetland 07, 08, and 09, **Figure 1**) located upslope. 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.

The TUC containing 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 encompasses 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 a Ministerial Order 06/2018 (the Order), on January 29, 2018, that amended the previously received Approval to include additional conditions to address water quality and quantity impacts to Wetland 06. In June 2018, 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) was approved by the Director of Alberta Environment and Parks.

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

- The Monitoring Plan will come 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 implemented in 2018 during construction. The construction phase was completed in October 2020 initiating the operational phase - 2024 represents 4 years after the SWCRR was opened to the public. Monitoring in 2023 represented Year 6 of the Monitoring Plan. The Monitoring Plan is presented in **Appendix A**.

The objective of Year 6 of monitoring was to follow monitoring protocols established during Year 1, collect surface water quality and surface water flow measurements from sample sites located within Wetland 06, and other waterbodies/drainages providing surface flow to Wetland 06. Consistent with previous years monitoring, surface water quality and surface water flow were monitored in a nearby reference wetland, located outside of the potential impact area of construction, to determine naturally occurring variation affecting wetlands in the Weaselhead Natural Area.

Additional sampling locations and events were added to the Wetland 06 scope in 2020. The additions to the sampling protocol were followed during Year 6 (2023) monitoring:

- Following an Enforcement Order and recommendations provided in the Wetland 06 Sediment Release Remediation Memorandum (Hemmera 2019) in response to two sediment releases from the SWCRR Project area into Wetland 06 in August of 2019, sampling of total dissolved sediment levels and turbidity was conducted at two additional locations within the west end of Wetland 06 near the location of the sediment releases¹.
- Supplemental water quality sampling and sediment sampling along Pathway 1 was conducted during spring and fall monitoring following the occurrence of high zinc concentrations exceeding the regulatory guidelines during the fall 2020 and 2021 sampling event.

In July 2021, a sediment release occurred into Wetland 06 following a significant precipitation event (i.e., 24.6 mm on July 2, 2021, and 12.5 mm on July 4, 2021). Following this event, a Wetland Assessment and Impact Report (WAIR) was submitted to AEP which proposed monitoring as per the methodology outlined in the 2020 Enforcement Order be continued in 2021, 2022, and 2023.

Information collected during Year 6 monitoring will facilitate comparative analysis with data collected during previous monitoring years regarding potential influences or lack thereof of the Project on surface water quality and flow in Wetland 06. Additionally, Year 6 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.

¹ Monitoring requirements under the Enforcement Order include water quality monitoring as well as the local amphibian population, vegetation regeneration and weed growth. 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. Water quality results collected under the Enforcement Order will be included in this report to supplement the surface water quality results collected annually in wetland 06.

3.0 Site Description

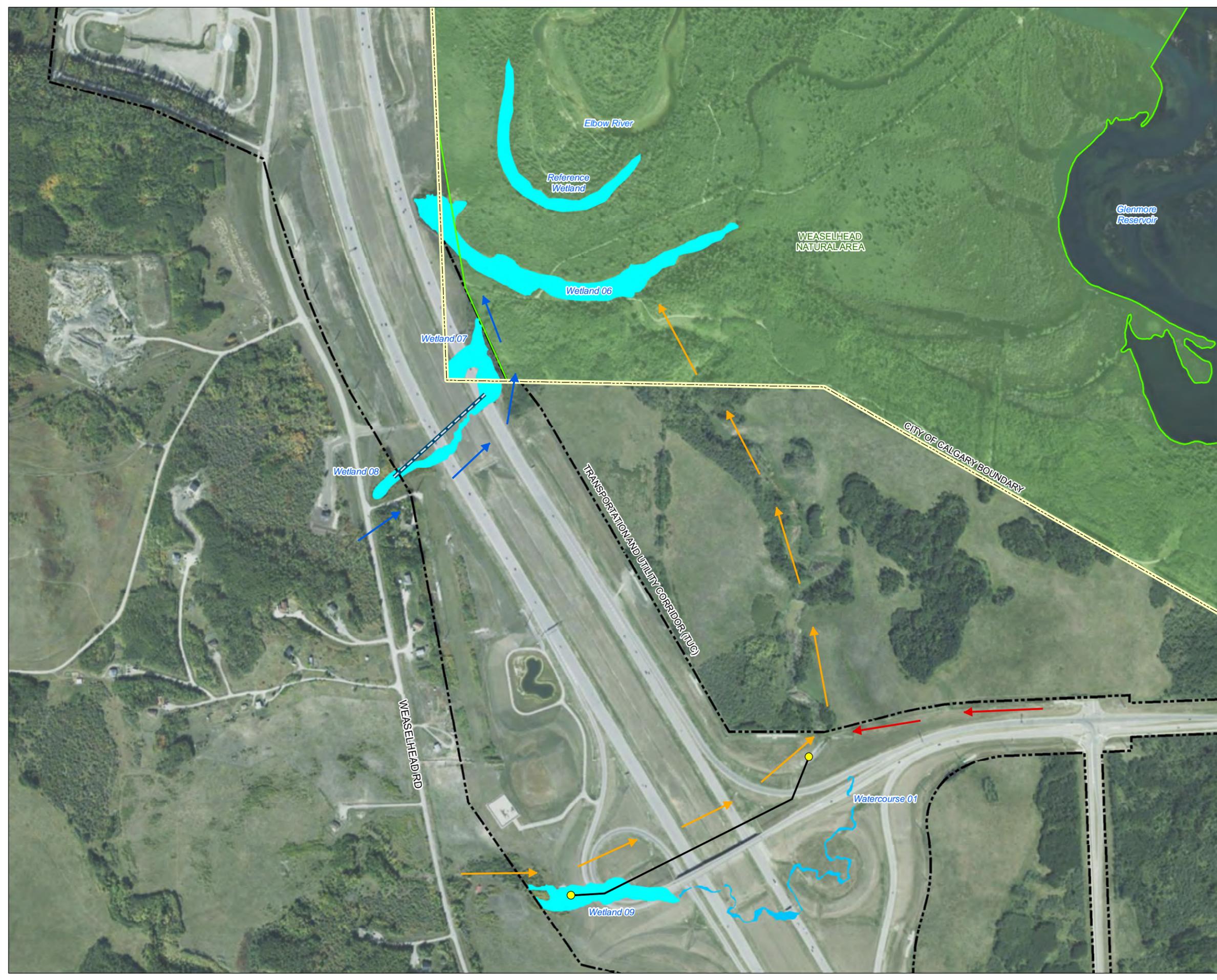
Several adjacent wetlands within the Weaselhead Natural Area contribute surface flow to Wetland 06 (see **Figure 1**). The Monitoring Plan identified two pathways in which Project-influenced water could potentially flow into Wetland 06.

Pathway 1 - conveys flow from Wetland 08 and Wetland 07 which are located to the southwest of Wetland 06. This pathway is an undefined channel that diagonally bisects the Project footprint. From the west side of the TUC boundary, a bypass drainage culvert installed as part of the Project carries water from Wetland 08 and Wetland 07 northeast through the Project area. Water then flows past the east side of the TUC boundary and into a defined channel (approximately 400 m) which ultimately drains into Wetland 06.

Pathway 2 - conveys flow from Wetland 09, located to the south of Wetland 06. This pathway originates as an undefined channel that flows east through Wetland 09 and through 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 constructed riprap lined drainage ditch which flows north towards the eastern TUC boundary. Previously, a constructed drainage ditch channeled water west where it converged with flows from the aforementioned constructed riprap lined drainage ditch. It was noted during 2019 (i.e., Year 2) monitoring visits this constructed drainage ditch had been encompassed by the Project's active construction area and no longer facilitated flow to the west. From the northern edge of the TUC, water meanders north through a defined channel (approximately 1,000 m) eventually draining into Wetland 06.

Throughout the construction phase of the Project, surface run-off from the work area was managed through temporary erosion and sediment control (ESC) measures and 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 northwest into a stormwater pond. The construction phase was completed in October 2020 initiating the operational phase.

Wetland Locations



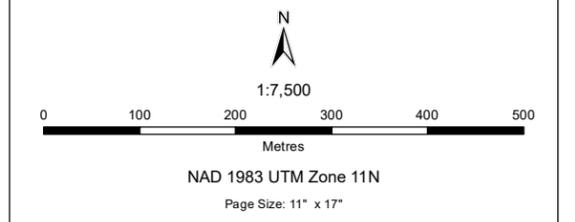
- Legend**
- Bypass Culvert
 - Pathway #1 Approximate Direction of Flow
 - Pathway #2 Approximate Direction of Flow
 - Pathway #2 Approximate Direction of Flow (Decommissioned)
 - Stormwater Drainage Line
 - City of Calgary Boundary
 - Natural Area
 - Transportation and Utility Corridor (TUC)
 - Watercourse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

Site visits of Wetland 06 and surrounding wetlands during Year 6 were conducted by a crew of two, led by a Qualified Environmental Professional (QEP) from Ausenco. Site visits were conducted during the spring and the fall in order 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. In order to reduce temporal variation no sampling was conducted within 72 hours of a substantial precipitation event. Site visits followed the schedule outlined by the Monitoring Plan (**Appendix A**). Site visits were completed on the following dates:

- Spring – May 30, 2023
- Fall – October 18 - 19, 2023.

4.1 Sample Locations

The original locations for surface water quality and flow monitoring are provided in **Figure 2**. Sites were originally selected during Year 1 (i.e., 2018) strategically to provide appropriate reference and comparison site considerations, in order to facilitate comparative analysis. Since year 1, the following adjustments to sampling locations have occurred:

- In 2019, it was noted that a sample site (WQ-05c) located in Pathway 2 had been encompassed by active construction and surface water was no longer accessible for sampling. This sampling point was eliminated from the monitoring plan, and it was determined no additional sampling points were required as sample site WQ-05b located downstream of sample site WQ-05c would reflect water quality and flow changes associated with Pathway 2.
- An additional 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 (i.e., WQ-06 and WQ-07 sampled during spring and fall), with another two sites established along Pathway 1 (i.e., WQ-04c and WQ-04d sampled during spring and fall).

Current locations sampled in 2023 are provided in an enhanced view in **Figure 3**.

4.1.1 Water Quality Monitoring

Eleven surface water quality monitoring sites were sampled during Year 6 monitoring (**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. This location serves as a reference site as there are no identified or known pathways from the Project that could direct Project-affected water into the adjacent wetland.

Three surface water quality reference sites were originally established along the pathway of flow from Wetland 08 and Wetland 07 into Wetland 06 (i.e., Pathway 1). The three sample sites along this pathway are WQ-04a, WQ-04b, and WQ-02. Site WQ-04a is located upstream of any potential influences from the Project and was selected to serve as a background site for this pathway. Two additional supplementary surface water quality sample sites were added along Pathway 1 in late fall of 2020,

following repeated exceedances of zinc concentrations detected along the Pathway 1 sites in Fall 2020. 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 both spring and fall sampling during Year 4, Year 5, and Year 6 monitoring.

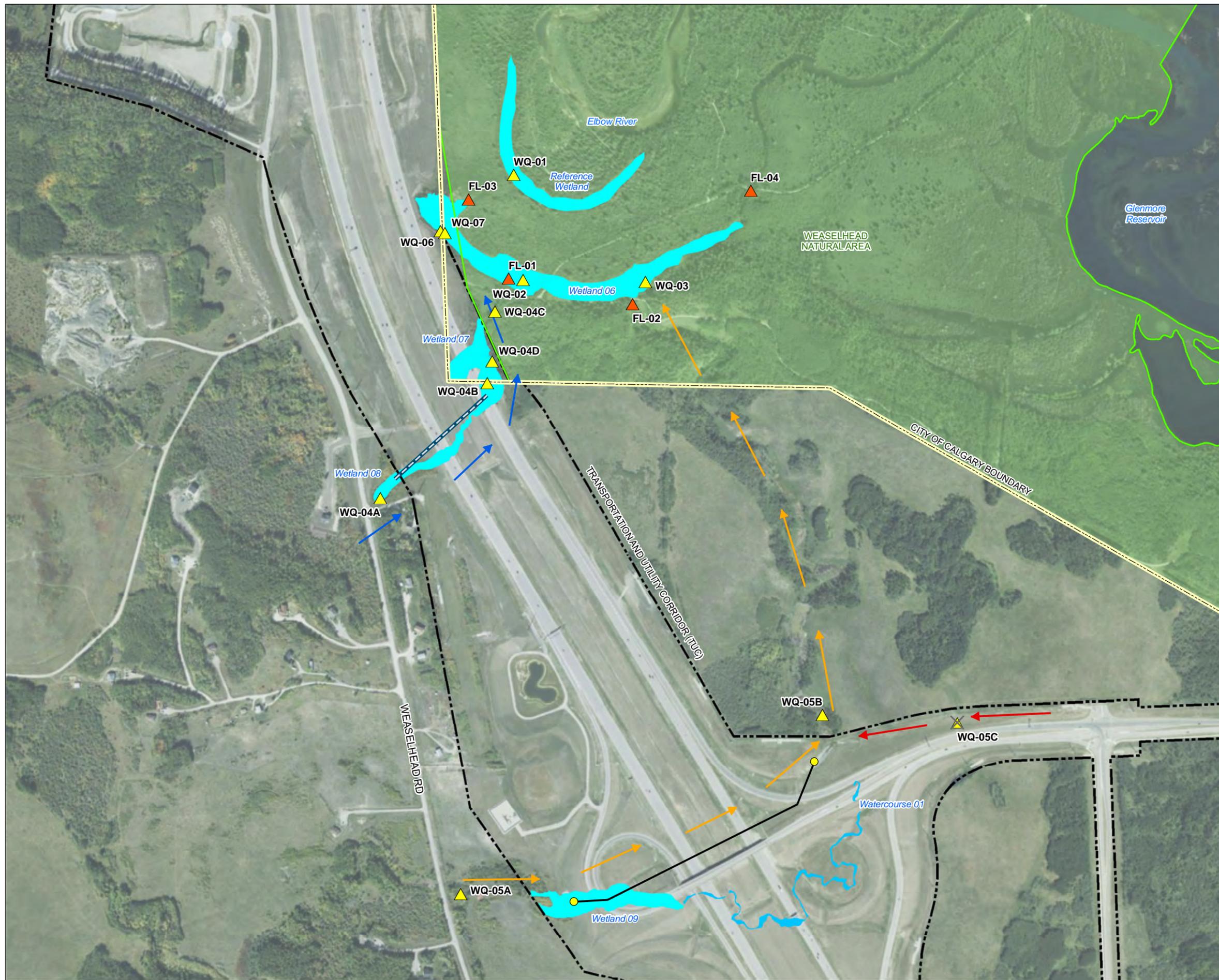
Three surface water quality reference sites are located along the pathway of flow from Wetland 09 to Wetland 06 (i.e., Pathway 2). The sample sites along this pathway during Year 6 monitoring are WQ-05a, WQ-05b, and WQ-03. Site WQ-05a was located upstream of any potential influences from the Project and was selected to serve as a background site for this pathway. In 2019, water quality reference site WQ-05c was no longer accessible for sampling and eliminated from the monitoring plan.

Following the monitoring recommendations of the 2019 Wetland 06 Sediment Release Remediation Memorandum (Hemmera 2020), two new water sample sites (i.e., WQ-06 and WQ-07) were added along a manually vegetated bank (i.e., the green wall) 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 was conducted at seven monitoring sites during Year 6 monitoring during both spring and fall sampling (**Table 4.a**). Sediment sampling was originally conducted during Year 3 monitoring following repeated exceedances of zinc concentrations detected along the Pathway 1 sites (i.e., WQ-02, WQ-04a, WQ-04b) in Fall 2020. Sediment sample sites were co-located with five of the originally established surface water quality monitoring sites (i.e., WQ-02, WQ-03, WQ-04a, WQ-04b, and WQ-06), and two additional sites established along Pathway 1 (i.e., WQ-04c and WQ-04d; **Figure 3**).

Water Flow and Quality Sampling Locations



Legend

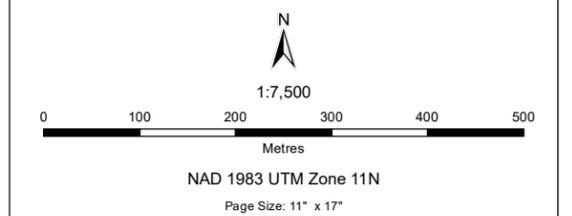
- ▲ Water Flow Sample Location (Hemmera, 2020)
- ▲ Water Quality Sample Location (Hemmera, 2020)
- ▲ Decommissioned Water Quality Location (Hemmera, 2019)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow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

Notes

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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

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- Aerial Image: City of Calgary, 2020



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**Water Flow and Quality
 Sampling Location Details**

Legend

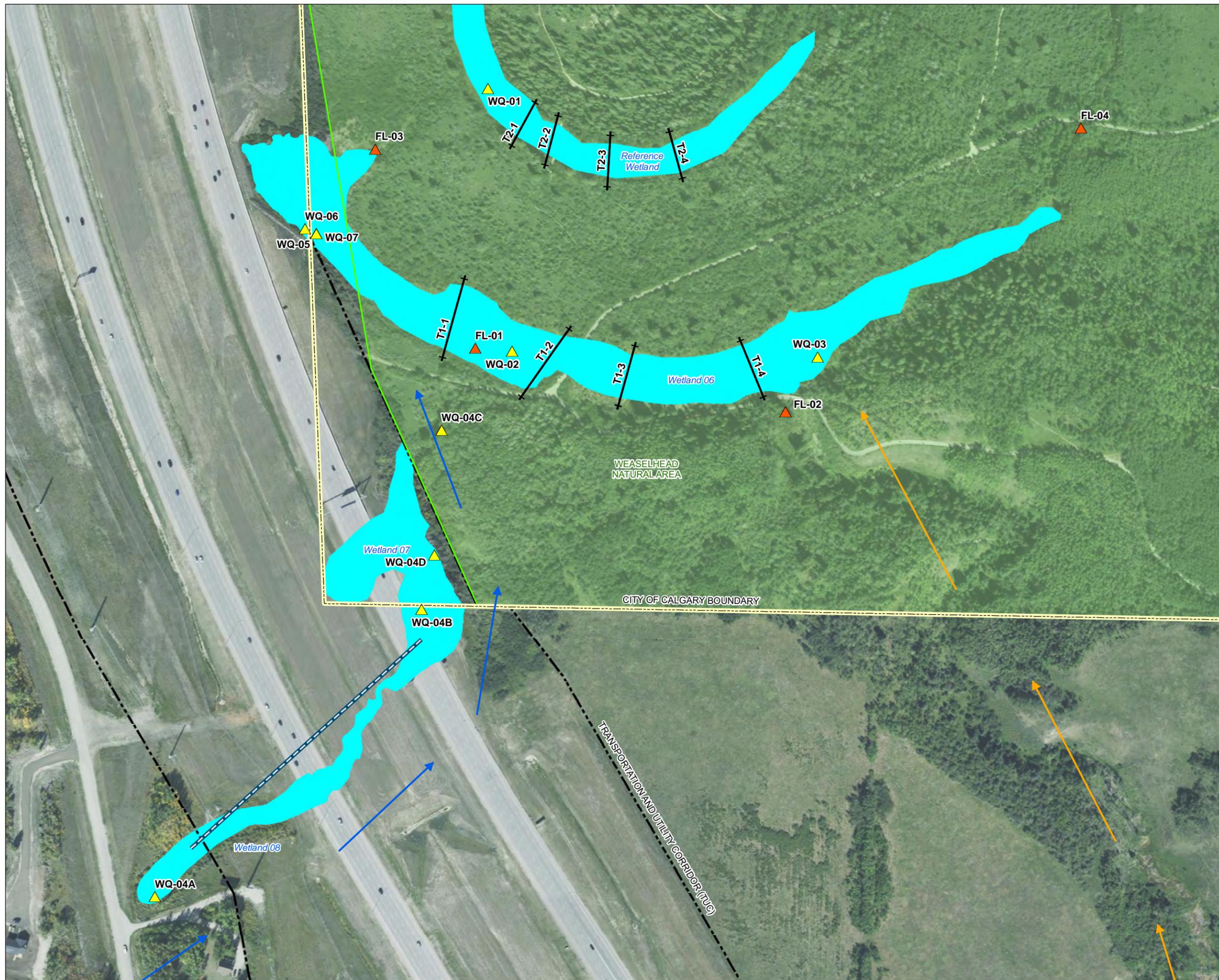
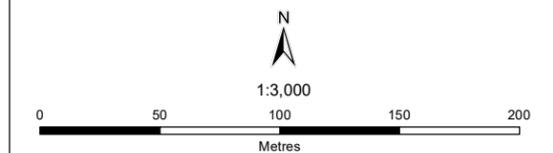
- ▲ Water Flow Sample Location (Hemmera, 2020)
- ▲ Water Quality Sample Location (Hemmera, 2020)
- Transect Location (Hemmera, 2019)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- City of Calgary Boundary
- Natural Area
- Transportation and Utility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

Notes

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- Aerial Image: ESRI World Imagery, 2016



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Table 4.a Year 5 (i.e., 2022) 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 or known pathways that could direct Project-affected water into the wetland. Background sites are located upstream of potential Project-affected. Comparison sites are located downstream of potential Project affected water.
- ² WQ-4c and WQ4d are two supplemental sample sites added in fall 2020 following repeated exceedances of zinc concentrations detected along the Pathway 1.
- ³ WQ-06 and WQ-07 are new sample sites added in spring 2020 following the monitoring recommendations of the 2019 Wetland 06 Sediment Release Remediation Report (Hemmera 2019).

4.1.3 Water Flow Monitoring and Wetted Widths

Surface water flow monitoring sample sites were established at four locations within Wetland 06 (**Table 4.b**) during Year 1 (i.e., 2018). Sampling locations were selected based on the expectation they would provide conveyance of surface flow (inflow or outflow) year-round during normal surface flow conditions. Locations with defined channels were selected for monitoring sites, as monitoring the flow of undefined channels could result in reduced accuracy (**Figure 3**).

Three sampling locations were identified to measure surface water inflows into Wetland 06. Site FL-01 was located at the inflow of surface water from Wetland 07 and 08 along drainage Pathway 1. Site FL-02 was located where the surface water inflow was conveyed from Wetland 09 along drainage Pathway 2. Site FL-03 was located where the surface water inflow from the reference wetland drained into Wetland 06. One site was established to monitor surface water outflow from Wetland 06; site FL-04 was located 75 m downstream of Wetland 06 at the Glenmore Pathway bridge crossing. 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 from the banks of the sample sites provided in **Table 4.a** and described in **Section 4.1.1**. Site conditions (e.g., weather) were recorded, and photos documenting current conditions were taken at each location.

Sampling was conducted following the shore sampling protocol provided by Canadian Council of Ministers of Environment (CCME 2011). The crew wore unpowdered nitrile disposable gloves during sample collection. At each sample site, the crew collected water samples using an extension pole to avoid site disturbance. The extension pole and clamp were rinsed upon arrival at each site, before samples were collected, in order to reduce contamination between sites. Laboratory protocols for sample bottle rinsing were followed by the crew; 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), which resulted in samples being collected from the entire water depth. Algae, sediment, organic matter, scum, and film were avoided in order to avoid contamination and ensure the sample was representative. All water samples were collected one at a time, capped immediately to

prevent contamination and labelled with a water-proof marker to facilitate accurate identification. After collection, samples were kept at approximately 4°C within a cooler using ice packs. 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 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 in Wetland 06 samples were detected in water quality parameters under the Environmental Quality Guidelines for Alberta Surface Water (GOA; Government of Alberta 2018). This testing protocol facilitated the potential determination of source pathway of water quality exceedances in Wetland 06.

Table 4.c Water Quality Parameters

Sediment and Physical			
• Total Suspended Solids (TSS)		• Specific conductivity (EC)	
• Total Dissolved Solids (TDS)		• pH	
• Turbidity		• Dissolved Oxygen (DO)	
Nutrients and Others (mg/L)			
• Biochemical Oxygen Demand (BOD)		• Total Kjeldahl Nitrogen (TKN)	
• Chemical Oxygen Demand (COD)		• Ammonia-Nitrogen (NH ₃ -N)	
• Nitrate (NO ₃)		• Total Phosphorus (TP)	
• Nitrite (NO ₂)		• Dissolved Reactive Phosphorus (DRP)	
		• Ortho-Phosphate	
Metals (mg/L)			
• Silver (Ag)	• Cobalt (Co)	• Molybdenum (Mo)	• Tin (Sn)
• Aluminum (Al)	• Chromium (Cr)	• Nickel (Ni)	• Strontium (Sr)
• Arsenic (As)	• Copper (Cu)	• Lead (Pb)	• Sodium (Na)
• Boron (B)	• Iron (Fe)	• Sulfur (S)	• Titanium (Ti)
• Barium (Ba)	• Potassium (K)	• Antimony (Sb)	• Thallium (Tl)
• Beryllium (Be)	• Lithium (Li)	• Selenium (Se)	• Uranium (U)
• Calcium (Ca)	• Magnesium (Mg)	• Silicon (Si)	• Vanadium (V)
• Cadmium (Cd)	• Manganese (Mn)		• Zinc (Zn)
Major Ions and Salts			
• Sodium (Na ²⁺)		• Calcium (Ca ²⁺)	
• Potassium (K ⁺)		• Chloride (Cl ⁻)	
• Potassium (K ⁺)		• Sulfate (SO ⁴⁻)	

In-situ measurements were also collected at all water quality sample sites; sediment and physical parameters were recorded (i.e., turbidity, specific conductivity, dissolved oxygen, pH, and water temperature). Measurements were taken at approximately 60% water depth using an Aquatroll 600 as per the manufacturer's instructions, following calibration.

Year 6 water quality parameters were compared to previous monitoring years (i.e., Year 1, Year 2, Year 3, Year 4, and Year 5) surface water data. Additionally, select water quality parameters were compared to surface water quality parameters 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).

4.3 Sediment Sampling

During spring and fall sampling, sediment samples were collected from seven sites along Pathway 1 and within Wetland 06. Samples were collected from the water-sediment interface at all sites 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 in alignment with contaminated sediment sampling guidance provided by CCME (1993). Sediment samples were collected from downstream to upstream sites where flow was present to reduce alteration of site conditions prior to sample collection. The crew wore unpowdered nitrile disposable gloves during sample collection. At each sample site, the crew collected sediment samples at the interface of the water and sediments, using a stainless steel trowel and bowl. The trowel and bowl were cleaned withalconox and rinsed with metal free deionized water between each site in order to prevent contamination between sites; all rinsing of collection equipment was conducted downslope and away from the shoreline of the sample site to prevent cross contamination.

The collected sediment was mixed until homogenous; algae, woody debris, organic matter, and rocks were removed from the sample to ensure the sample was representative. All sediment samples were collected one at a time, capped immediately to prevent contamination, and were labelled with a water-proof marker to facilitate accurate future identification. After collection, samples were kept at approximately 4°C within a cooler using ice packs. 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			
<ul style="list-style-type: none"> Percent saturation 			
Inorganics			
<ul style="list-style-type: none"> Boron Sat Paste (mg/L) 	<ul style="list-style-type: none"> Moisture (%) 		
Metals (mg/kg)			
<ul style="list-style-type: none"> Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Cadmium (Cd) Cobalt (Co) 	<ul style="list-style-type: none"> Chromium (Cr) Chromium, hexavalent Copper (Cu) Molybdenum (Mo) Mercury (Mg) Nickel (Ni) 	<ul style="list-style-type: none"> Lead (Pb) Antimony (Sb) Selenium (Se) Silver (Ag) Tin (Sn) Thallium (Tl) 	<ul style="list-style-type: none"> 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. The inflow sites had water, but flow was below a measurable rate. During the fall survey all inflow sites and the outflow site were dry, preventing the collection of flow measurements. 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. These water level staff gauges have now been removed thus data was not collected.

In 2023, wetted width was measured at three transects in Wetland 06 during the spring monitoring visit. During the fall sampling, all sites were dry thus no wetted widths were recorded. There was no surface water present in the reference wetland during spring or fall sampling, as a result the wetted width was not 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 2023 Water Quality and Sediment Results

Water quality parameters outlined in **Table 4.c** were collected from sample sites located within Wetland 06, the inflow pathways from Wetlands 07 and 08, and Wetland 09, as well as the reference wetland. Water quality samples could not be collected from the following locations as these sites were dry, or water was too low to collect during monitoring visits:

- WQ-01, WQ-02, WQ-04C and WQ-05a during spring monitoring
- WQ-01, WQ-03, WQ-06, WQ-07 and WQ-05a during fall monitoring.

Water quality sampling results between 2018 and 2023 from WQ-01, WQ-02, and WQ-03 are summarized in **Table 5.a1** and demonstrate the natural variability within Wetland 06 and the reference wetland during both spring and fall. Additionally, the 2023 results for water quality sampling within 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 provided in **Table 5.b**.

The certificate 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 Year 3 (2020) Year 4 (2021), and Year 5 (2022), sediment sampling was repeated during Year 6 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 results from Year 6 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. Sediment analytical results were compared to the Canadian sediment quality guidelines. The following exceedances were observed:

Uranium: Marginally elevated uranium concentrations (above the EQG of 0.015 mg/L) within surface water samples were recorded at the Wetland 06 sample site WQ-03 in the spring (0.018 mg/L) in Year 6 (2023). This elevation in uranium was also observed at WQ-03 in Year 5 (2022) in both the spring and the fall. No uranium exceedances were recorded from the other samples collected or in any of the 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: In previous years (i.e., 2018 - 2020) elevated zinc concentrations (above EQG of 0.003 mg/L) were recorded in water samples at the Wetland 06 sample site WQ-02 and along Pathway 1 (WQ-04b, WQ-04d, and WQ-04c). In 2022 and 2023, no zinc exceedances in surface water or sediment have been observed within Wetland 06 sample sites (i.e., WQ-02, WQ-06, and WQ-07) suggesting that zinc is no longer being transported into the wetland.

Other metals: Elevated concentrations of nickel, selenium, and arsenic were recorded in sediment samples during both spring and fall 2023 sampling (**Table 5.c**). These elevated concentrations are most likely naturally occurring and are representative of background conditions. Concentrations were similar across the Project. Increased diligence should be taken in regard to these metals in subsequent monitoring years.

Dissolved Oxygen: DO measured during 2023 fall water quality sampling at WQ-04a was recorded as 4.6 mg/L in the lab sample (the in-situ measurement of DO was 0.01 mg/L which is likely due to sampling error). The minimum acceptable DO concentration for freshwater biota under the Environmental Quality Guidelines (GOA 2018) is 5.0 mg/L.

DO concentration in shallow groundwater & surface water is affected by temperature and has both a seasonal and a daily cycle. Low DO in the fall is consistent with seasonal fluctuations. The low DO concentration recorded at WQ-04A during fall sampling is likely related to the decomposition of algae and low water levels. As WQ-04a is a background site on the upslope from the WQ-04b, WQ-04c and WQ-04d, which all had DO measurement within the acceptable range, no ongoing DO issues are foreseen in wetland 06.

pH: At both WQ-06 and WQ-07 in the spring, the analytical results for pH, 9.7 and 9.65 respectively, were in exceedance of EQG of 6.5-9. These sites are located at the west end of Wetland 06 along a manually vegetated bank. pH measured at the Wetland 06 samples sites at the east end WQ-02 and WQ-03 (i.e., the end sites of Pathways 1 and 2, respectively) was within the EQG.

Increased nutrient activity resulting in high levels of photosynthesis can result in higher pH conditions (EPA 2024). Elevated nitrogen (TKN) and ortho-phosphate levels measured at WQ-06 and WQ-07 suggest that elevated nutrient conditions are present at these locations which may be contributing to high pH exceedances.

Table 5.a1 Summary of 2018 to 2023 Water Quality Sampling Results – Exceedances Only

	CCME Guidelines (1999)		WQ-01 (reference)											
			Spring					Fall						
	AB SW Freshwater Aquatic Life (Long-term)	AB SW Freshwater Aquatic Life (Short-term)	2018 ^a	2019	2020	2021	2022	2023	2018	2019	2020	2021	2022	2023
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 and 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	N/A	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-
Uranium (U)	0.015mg/L	0.033 mg/L	0.0004	0.0018	0.0011	0.0015	-	-	-	0.0022	-	-	-	-
Zinc (Zn)	0.007 mg/L	0.037mg/L	<0.0030	<0.0030	0.0062	0.0045	-	-	-	0.0051	-	-	-	-

	CCME Guidelines (1999)		WQ-02											
			Spring					Fall						
	AB SW Freshwater Aquatic Life (Long-term)	AB SW Freshwater Aquatic Life (Short-term)	2018 ^a	2019	2020	2021	2022	2023	2018	2019	2020	2021	2022	2023
Sediment and Physical														
pH	6.50 – 9.00	N/A	8.25	8.26	8.34	8.32	7.64	-	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	-	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	-	0.600	0.079	0.710	0.190	0.110	<0.044
Dissolved Metals and Metals (mg/L)														
Iron (Fe)	0.30 mg/L	N/A	<0.060	0.083	0.090	<0.060	<0.060	-	0.100	<0.060	0.083	<0.060	<0.060	<0.060
Selenium (Se)	0.001 mg/L	N/A	0.0011	0.0006	0.0009	0.0008	0.0003	-	0.0014	0.0011	0.0013	0.0014	0.0004	0.0006
Uranium (U)	0.015mg/L	0.033 mg/L	0.0031	0.0059	0.0035	0.0054	0.0130	-	0.0048	0.0043	0.0032	0.0065	0.0110	0.0042
Zinc (Zn)	0.007 mg/L	0.037mg/L	<0.0030	<0.0030	<0.0030	0.0160	<0.0030	-	0.0130	0.0180	0.0071	<0.0030	<0.0030	<0.0030

	CCME Guidelines (1999)		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	2018	2019	2020	2021	2022	2023
Sediment and Physical														
pH	6.50 – 9.00	N/A	9.10	8.33	8.29	8.22	8.15	8.15	8.09	8.29	7.96	7.72	8.17	-
Dissolved Oxygen (mg/L)	Narr.	5	14.00	7.90	9.40	8.00	11.35	11.00	4.30	8.00	8.20	1.80	10.62	-
Nutrients and Others (mg/L)														
Nitrate (NO3)	3	124	0.072	<0.044	8	<0.220	<0.044	<0.220	<0.044	<0.044	<0.220	0.027	0.500	-
Dissolved Metals and Metals (mg/L)														
Iron (Fe)	0.30 mg/L	N/A	<0.060	0.076	<0.060	0.068	<0.060	0.065	0.064	<0.060	0.100	0.250	<0.060	-
Selenium (Se)	0.001 mg/L	N/A	0.0006	0.0003	0.0007	0.0006	0.0007	0.0009	0.0004	0.0004	0.0005	0.0004	0.0006	-
Uranium (U)	0.015mg/L	0.033 mg/L	0.0023	0.0052	0.0030	0.0085	0.0160	0.0180	0.0083	0.0056	0.0071	0.0075	0.0160	-
Zinc (Zn)	0.007 mg/L	0.037mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0043	<0.0030	-

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
 (-) = null result/site was dry
 Narr = Narrative guidelines
 N/A = CCME data regarding water quality limits for specified parameter is unavailable.
^aSpring sampling in 2018 occurred during the summer (June 5, 2018)

Table 5.a2 Summary of 2023 Water Quality Sampling Results along Pathways 1 and 2 – Exceedances Only

	CCME Guidelines (1999)		WQ04A		WQ04B		WQ04C		WQ04D		WQ05B	
			Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	AB SW Freshwater Aquatic Life (Long-term)	AB SW Freshwater Aquatic Life (Short-term)	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023
Sediment and Physical												
pH	6.50 – 9.00	N/A	8.20	6.54	8.35	8.21	-	8.34	8.50	8.47	8.54	8.26
Dissolved Oxygen (mg/L)	Narr.	5	6	5	12	16	-	10	10	13	7	
Nutrients and Others (mg/L)												
Nitrate (NO3)	3	124	3	2	3	2	-	<0.044	0	<0.044	<0.044	<0.044
Dissolved Metals and Metals (mg/L)												
Iron (Fe)	0.30 mg/L	N/A	<0.060	<0.060	<0.060	<0.060	-	<0.300	<0.060	<0.060	<0.060	<0.300
Selenium (Se)	0.001 mg/L	N/A	0.003	0.002	0.002	0.002	-	0.001	0.001	0.001	0.003	0.000
Uranium (U)	0.015mg/L	0.033 mg/L	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.010	0.010
Zinc (Zn)	0.007 mg/L	0.037mg/L	<0.0030	<0.0030	<0.0030	0.00	-	0.00	0.03	0.04	<0.0030	<0.0030

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
 (-) = null result/site was dry
 Narr = Narrative guidelines.
 N/A = CCME data regarding water quality limits for specified parameter is unavailable.
 Location 5a was dry during both the spring and fall sampling.

Table 5.b Summary of Water Quality Sampling Results from 2020 to 2023 at WQ-06 and WQ-07- Exceedances Only

	CCME Guidelines (1999)		WQ-06								WQ-07							
			Spring				Fall				Spring				Fall			
	AB SW Freshwater Aquatic Life (Long-term)	AB SW Freshwater Aquatic Life (Short-term)	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023
Sediment and Physical																		
pH (Lab)	6.50 – 9.00	N/A	8.29	8.72	-	9.7	8.26	8.31	8.23	-	8.18	8.56	-	9.65	-	-	8.27	-
Dissolved Metals and Metals (mg/L)																		
Selenium (Se)	0.001 mg/L	N/A	0.0007	<0.00020	0.00057	0.0012	0.00032	0.00046	0.00089	-	0.00057	<0.00020	0.00058	0.00084	-	-	0.00086	-

Note: **Bold** = Indicates exceedance of **long-term** CCME water quality guidelines
 (-) = null result/site was dry
 Narr = Narrative guidelines.

Table 5.c Summary of Sediment Sampling Results from 2020 to 2023– Exceedances Only

	AB Sediment Interim Guidelines	AB Sediment Probable Effects Level	AB Sediment Lowest Effects Level	Units	WQ-04A								WQ-04B								WQ-04C							
					Spring			Fall					Spring			Fall					Spring			Fall				
					2021	2022	2023	2020	2021	2022	2023	2021	2022	2023	2020	2021	2022	2023	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022
Regulated Metals - Soils																												
Metals	Arsenic	5.9	17	N/A	mg/kg	3.1	-	1.7	-	4.5	<2	1.9	4.5	4.8	4.9	5.9	5.4	4.4	5.1	3.4	3.3	4.0	4.6	5.3	-	4.0		
	Chromium	37.3	90	N/A	mg/kg	11.0	-	10.0	-	14.0	9.7	10.0	12.0	13.0	22.0	16.0	16.0	19.0	15.0	9.1	19.0	13.0	19.0	16.0	-	11.0		
	Lead	35	91.3	N/A	mg/kg	7.7	-	7.1	-	8.8	7.2	8.3	9.0	9.0	8.9	9.6	9.4	9.0	9.8	7.0	9.9	8.2	7.9	7.1	-	6.9		
	Nickel	N/A	N/A	16	mg/kg	15	-	9.9	-	17.0	11.0	12.0	18.0	17.0	21.0	21.0	19.0	18.0	18.0	14.0	21.0	15.0	19.0	17.0	-	14.0		
	Selenium	2	N/A	N/A	mg/kg	4.0	-	4.0	-	5.9	4.5	5.9	1.0	2.7	<0.50	1.4	1.6	0.94	0.66	1.6	1.8	2.8	2.6	2.1	-	1.8		
	Zinc	123	315	N/A	mg/kg	54	-	36	-	86	37	47	480	420	63	340	360	71	85	240	140	81	330	78	-	91		

	AB Sediment Interim Guidelines	AB Sediment Probable Effects Level	AB Sediment Lowest Effects Level	Units	WQ-04D								WQ-02								WQ-03							
					Spring			Fall					Spring			Fall					Spring			Fall				
					2021	2022	2023	2020	2021	2022	2023	2021	2022	2023	2020	2021	2022	2023	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022
Regulated Metals - Soils																												
Metals	Arsenic	5.9	17	N/A	mg/kg	3	3.5	4.2	2.9	6.7	3.6	4.4	3.3	5.4	-	-	3	2.9	4.4	3.5	2.9	3.1	4.2	17	5.6	4.4		
	Chromium	37.3	90	N/A	mg/kg	8.6	40	13	11	17	14	12	13	15	-	-	12	15	14	13	10	14	15	28	15	14		
	Lead	35	91.3	N/A	mg/kg	7.3	9.4	7.7	6.7	9.6	7.3	7.1	9.5	10	-	-	7.8	8.4	10	8.5	7	10	12	51	9.5	10		
	Nickel	N/A	N/A	16	mg/kg	15	30	15	14	24	16	14	17	20	-	-	15	17	20	15	12	19	20	36	18	20		
	Selenium	2	N/A	N/A	mg/kg	2.8	2	2.7	2.5	1.1	3	2.7	2.8	2.3	-	-	4.4	1.3	2	0.61	1.2	1.6	2.1	1.4	1.7	1.4		
	Zinc	123	315	N/A	mg/kg	290	180	990	230	85	270	1500	78	80	-	-	64	64	87	55	50	73	88	130	77	74		

	AB Sediment Interim Guidelines	AB Sediment Probable Effects Level	AB Sediment Lowest Effects Level	Units	WQ-06								WQ-07	
					Spring			Fall					Spring	Fall
					2021	2022	2023	2020	2021	2022	2023	2023	2023	
Regulated Metals - Soils														
Metals	Arsenic	5.9	17	N/A	mg/kg	5.6	7.5	5.4	6.2	7.1	7.2	6.1	5.4	6.5
	Chromium	37.3	90	N/A	mg/kg	14	14	14	17	18	19	14	16	15
	Lead	35	91.3	N/A	mg/kg	9.1	11	10	11	12	12	11	10	11
	Nickel	N/A	N/A	16	mg/kg	19	21	19	23	24	25	21	21	22
	Selenium	2	N/A	N/A	mg/kg	0.73	1.7	1	0.62	1.4	1.3	1.4	1.1	1.1
	Zinc	123	315	N/A	mg/kg	71	82	68	78	94	93	78	75	81

Note: **Bold** = Indicates exceedance of Alberta Sediment Quality Guidelines (GOA 2018)
 (-) = null result/site was dry
 N/A = Guidelines for sediment quality limits for specified parameter is unavailable

5.1.2 Comparison with Results from Previous Years

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

- In 2023 (Year 6) exceedances in both analytical and *in situ* pH was recorded at the two locations on the west side of Wetland 06 (i.e., WQ-06 and WQ-07) during spring monitoring. Both sites were dry during the fall monitoring period. The higher pH levels may be due to elevated nutrient conditions that may be present at the west end of Wetland 06.
- 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. The detection of elevated zinc concentration in surface water at only one location in combination with the elevated total zinc concentrations in the sediment at this location suggest that zinc may be attenuating into the sediment from the surface water at WQ-04d and no longer being transported into Wetland 06.
- Slight exceedances of nickel, selenium, 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 6 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 2023 monitoring, WQ-02 was dry in the spring, and WQ-03 was dry in the fall. 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 2023, turbidity ranged from 18.69 NTU in the spring to 0.47 in the fall which is below the pre-construction range of 0.80 to 36.00 NTU (Porto 2018) across both sites and seasons. Lab-analysed water samples collected concurrently with in-situ measurements also were within the pre-construction range (6.90 to 19.00 NTU; **Appendix B and C**).

Chloride: Similar to previous monitoring years (i.e. 2018 to 2022), in 2023, the Wetland 06 samples were higher in chloride concentrations than the samples collected by the Weaselhead / Glenmore Preservation Society in 2016 and 2017 (i.e., prior to construction); in which documented chloride concentrations ranged

from 2.88 mg/L to 7.70mg/L. In 2023, chloride concentrations from the spring at WQ-03 was 26 mg/L and in the fall from WQ-02 was 14 mg/L.

Elevated chloride concentrations may result from a variety of 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 both Wetland 06 sample sites has decreased compared to 2018. As chloride has limited reactivity with the environment and is highly soluble in water, its residence time within a water body is greatly influenced by the rate of water flow; limited flow will result in a longer persistence time. The CCME guidelines for water quality recommend a maximum chloride concentration of 120 mg/L for the long-term protection of aquatic life (CCME 1999); the concentration of chloride identified at Wetland 06 sample sites remained below this limit.

Conductivity: In-situ water quality sampling of Wetland 06 in 2023 measured elevated specific conductivity when compared to previous water quality data collected by the Weaselhead / Glenmore Preservation Society in 2016 and 2017 (i.e., prior to construction). In-situ samples collected during 2023 measured a conductivity of 1355 $\mu\text{S}/\text{cm}$ at WQ-03 in the spring and 2299 $\mu\text{S}/\text{cm}$ at WQ-02 in the fall. The lab results for conductivity at WQ-03 in the spring were 1300 $\mu\text{S}/\text{cm}$ and at WQ-02 in the fall were 970 $\mu\text{S}/\text{cm}$ (suggesting a sampling error in the fall in situ measurement). A comparison between post-construction sampling years shows that specific conductivity remains elevated from pre-construction levels, with a more prominent spike in 2023. The specific conductivity measured at WQ-03 has gradually increased each monitoring year.

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 $\mu\text{S}/\text{cm}$ and 1,500 $\mu\text{S}/\text{cm}$ (BC Ministry of Environment 2013). The lab results for conductivity at both locations fall within this range.

Table 5.d Surface Water Quality Parameters Collected from Wetland 06 Sites from 2016 to 2023

Surface Water Quality Parameters of Wetland 06																		
		2016 ^a		2017 ^a		2018 ^b		2019 ^b		2020 ^b		2021 ^b		2022 ^b		2023 ^b		
		Summer	Fall	Summer	Fall	Summer	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	
	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	
	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	
	Conductivity (uS/cm)	470	444	589	500	882	833	712	698	662	760	756	783	867	665	-	970 ^c	
	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	
	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
	Chloride (mg/L)	2.88	5.26	3.68	5.25	41.00	12.00	13.00	7.30	12.00	15.00	15.00	11.00	22.00	63.00	-	14.00	
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	-	
	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	-	
	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	-	
	Conductivity (uS/cm)	469	449	523	491	509	688	575	766	591	737	706	455	712	893	1355	-	
	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	-	
	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	-	
	Chloride (mg/L)	4.18	5.85	7.70	4.68	51.00	29.00	12.00	12.00	18.00	7.90	23.00	24.00	5.00	25.00	26.00	-	

Note: ^a Porto 2018
^b Data collected at WQ-02 and WQ-03 from 2018 to 2023 as part of the Monitoring Plan.
^c This value is the conductivity measures in the lab sample. The in situ measurement 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**, **Table 5.f** and **Table 5.g**.

Following procedures specified in the Monitoring Plan, and recommendations made following Year 1 surface water flow monitoring, the initial 2023 site visit was conducted earlier in the year (i.e., late May) to capture higher periods of flow within the Project area; enabling calculations of velocity and discharge at all inflow and outflow locations. However, during the spring monitoring visit water levels remained low. Depth and velocity measurements were able to be recorded at FL-02 and FL-03 during the spring. The inflow channel at FL-01 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 the inflow channel at FL-01 had minimal water but was not sufficient to collect depth and flow. FL-02, FL-03 and FL-04 were all dry at the time of the fall sampling 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 Year 1 (i.e., 2018), Year 2 (i.e., 2019) Year 3 (i.e., 2020), Year 4 (i.e., 2021), and Year 5 (i.e., 2022) monitoring.

All inflow sites showed a reduction in channel depth and wetted widths during the fall monitoring visit when compared to spring measurements. Site FL-02 showed the greatest seasonal change, with a spring wetted width of 3.6 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 and Depth

Site	Inflow or Outflow	Channel Width (m)	Depth*(m)		
			RMID	MID	LMID
Summer 2018					
FL-01	Inflow	0.42	0.30	0.27	0.28
FL-02	Inflow	2.50	0.68	0.58	0.39
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Fall 2018					
FL-01	Inflow	0.49	0.07	0.07	0.07
FL-02	Inflow	1.15	0.14	0.23	0.28
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2019					
FL-01	Inflow	0.55	-	0.04	-
FL-02	Inflow	1.58	0.26	0.55	0.66
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-

Site	Inflow or Outflow	Channel Width (m)	Depth*(m)		
			RMID	MID	LMID
Fall 2019					
FL-01	Inflow	0.25	-	0.12	-
FL-02	Inflow	1.30	0.26	0.42	0.66
FL-03	Inflow	5	-	0.40	-
FL-04	Outflow	-	-	-	-
Spring 2020					
FL-01	Inflow	0.55	0.03	0.08	0.05
FL-02	Inflow	1.62	0.62	0.65	0.64
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Fall 2020					
FL-01	Inflow	0.82	0.01	0.08	0.02
FL-02	Inflow	1.32	0.22	0.32	0.44
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2021					
FL-01	Inflow	0.60	0.02	0.03	0.02
FL-02	Inflow	1.40	0.36	0.50	0.41
FL-03	Inflow	1.20	0.13	0.16	0.10
FL-04	Outflow	-	-	-	-
Fall 2021					
FL-01	Inflow	0.40	0.10	0.10	0.10
FL-02	Inflow	1.20	0.28	0.30	0.26
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2022					
FL-01	Inflow	0.60	0.05	0.05	0.05
FL-02	Inflow	17	1.25	2	2
FL-03	Inflow	0	-	-	-
FL-04	Outflow	0	-	-	-
Fall 2022					
FL-01	Inflow	0.75	0.03	0.01	0.01
FL-02	Inflow	1.50	-	-	-
FL-03	Inflow	0	-	-	-
FL-04	Outflow	0	-	-	-
Spring 2023					
FL-01	Inflow	0.75	-	-	-
FL-02	Inflow	2	0.10	0.75	0.10
FL-03	Inflow	3.6	0.10	0.25	0.10
FL-04	Outflow	0	-	-	-

Site	Inflow or Outflow	Channel Width (m)	Depth*(m)		
			RMID	MID	LMID
Fall 2023					
FL-01	Inflow	-	-	-	-
FL-02	Inflow	-	-	-	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-

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

Table 5.f Summary of Water Flow Monitoring Site Velocity and Discharge

Site	Inflow or Outflow	Velocity* (m/sec)			Discharge (m3/sec)
		RMID	MID	LMID	
Summer 2018					
FL-01	Inflow	-	-	-	-
FL-02	Inflow	-	-	-	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Fall 2018					
FL-01	Inflow	0	0.15	0	-
FL-02	Inflow	-	-	-	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2019					
FL-01	Inflow	-	0.20	-	-
FL-02	Inflow	0	0	0	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Fall 2019					
FL-01	Inflow	-	0.10	-	-
FL-02	Inflow	0	0	0	-
FL-03	Inflow	0	0	0	-
FL-04	Outflow	-	-	-	-
Spring 2020					
FL-01	Inflow	0	0.10	0	-
FL-02	Inflow	0	0	0	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-

Site	Inflow or Outflow	Velocity* (m/sec)			Discharge (m3/sec)
		RMID	MID	LMID	
Fall 2020					
FL-01	Inflow	0	0.11	0	0
FL-02	Inflow	0	0	0	0
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2021					
FL-01	Inflow	0	0	0	0
FL-02	Inflow	0	0	0	0
FL-03	Inflow	0	0	0	0
FL-04	Outflow	-	-	-	-
Fall 2021					
FL-01	Inflow	0	0	0	0
FL-02	Inflow	0	0	0	0
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2022					
FL-01	Inflow	0.02	0.05	0.05	-
FL-02	Inflow	0	0	0	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Fall 2022					
FL-01	Inflow	0.01	0.01	0.01	-
FL-02	Inflow	-	-	-	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-
Spring 2023					
FL-01	Inflow	-	-	-	-
FL-02	Inflow	0	0	0	-
FL-03	Inflow	0	0	0	-
FL-04	Outflow	-	-	-	-
Fall 2023					
FL-01	Inflow	-	-	-	-
FL-02	Inflow	-	-	-	-
FL-03	Inflow	-	-	-	-
FL-04	Outflow	-	-	-	-

Note: * 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.g**. 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 percent 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 Year 1 (i.e., 2018), Year 2 (i.e., 2019), Year 3 (i.e., 2020), Year 4 (i.e., 2021), Year 5 (i.e., 2022), 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.g Summary of Wetted Width Measurements from 2018 to 2023

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

Note: (-) = wetland was dry during monitoring visit, (*) = data not available

6.0 Summary

Monitoring effort conducted in 2023 represents Year 6 of the Wetland 06 monitoring program. This report presents the 2023 results which will add to the sampling record within the Project area and facilitate additional comparison in subsequent monitoring years. Year 6 of the monitoring program was completed according to the criteria specified in the Monitoring Plan, with the addition of supplemental monitoring sites.

During Year 6 of monitoring, the following key observations were noted:

- Water quality results show variation in water quality parameters among sampling locations within Wetland 06, as well 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.
- 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. The detection of elevated zinc concentration in surface water at only one location in combination with the elevated total zinc concentrations in the sediment at this location suggest that zinc may be attenuating into the sediment from the surface water at WQ-04d and no longer being transported into Wetland 06.
- Chloride, and specific conductivity concentrations measured in Wetland 06 in 2023 were higher than historical measurements taken in 2016 and 2017.
- 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, however inflow and outflow channel measurements found limited to no surface water flow into or out of Wetland 06 during the two monitoring visits.
- 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 results indicate the lowest observed water levels since the start of the monitoring program. During the fall and spring site visits the reference wetland was dry.

7.0 Recommendations

Based on the results of the Year 6 (i.e., 2023) monitoring program, the following recommendations are suggested for monitoring in 2024:

- Monitoring of water quality and quantity should be continued in 2024 using similar methods and effort as employed in 2023 and outlined in the Monitoring Plan. 2024 represents 4 years after the SWCRR was opened to the public (i.e., October 2020).
- Water quality monitoring efforts will continue in Year 7 to better facilitate detection of any changes to surface water quality as a result of SWCRR Project impacts.
 - Zinc exceedances observed in 2019-2022 were not observed in 2023 suggesting that the zinc in the water may be attenuating into the environment as expected. The additional sampling measures (i.e., two supplementary surface water sampling sites [WQ-04c and WQ-04d] and co-located sediment sampling at all sites along Pathway 1) undertaken since 2020 to understand the zinc exceedances should continue in Year 7. If 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 7 to determine if surface water quantity within Wetland 06 has been influenced by activities related to the SWCRR Project. 2023 had the lowest observed water levels since the start of the monitoring program. 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 to capture higher periods of flow and wetted areas. 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 5 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.

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Appendix A

Monitoring Plan

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

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TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Monitoring Objectives.....	1
2.0	DESCRIPTION OF WETLAND 06	2
3.0	MONITORING SCHEDULE	3
4.0	METHODOLOGY.....	4
4.1	Sample locations.....	4
4.1.1	Surface Water Quality	4
4.1.2	Surface Water Flow	5
4.2	Frequency of sampling.....	6
4.3	Water Quality Monitoring	6
4.4	Water Flow Monitoring	8
4.5	Reporting.....	9
5.0	CLOSURE.....	9
6.0	REFERENCES.....	10

LIST OF TABLES (WITHIN TEXT)

Table 1	Monitoring Schedule	3
Table 2	Surface Water Quality Sample Locations	5
Table 3	Surface Water Flow Sample Locations.....	5
Table 4	Water Quality Parameters Monitored During the Plan.....	7

LIST OF FIGURES (WITHIN TEXT)

LIST OF APPENDICES

FIGURES (APPENDED)

Figure 1	Wetland Locations
Figure 2	Water Flow and Quality Sampling Locations
Figure 3	Water Flow and Quality Sampling Location Details

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.

^dThe 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	Outflow

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 to 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 by 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	
<ul style="list-style-type: none"> • Total Suspended Solids (TSS) • Total Dissolved Solids (TDS) • Turbidity 	<ul style="list-style-type: none"> • Conductivity (EC) • pH • Dissolved Oxygen (DO)
Nutrients and Others (mg/L)	
<ul style="list-style-type: none"> • Biochemical Oxygen Demand (BOD) • Chemical Oxygen Demand (COD) • Nitrate (NO₃) • Nitrite (NO₂) 	<ul style="list-style-type: none"> • Total Kjelaht Nitrogen (TKN) • Ammonia-Nitrogen (NH₃-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) device 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 be 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.



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Aquatic Biologist



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6.0 REFERENCES

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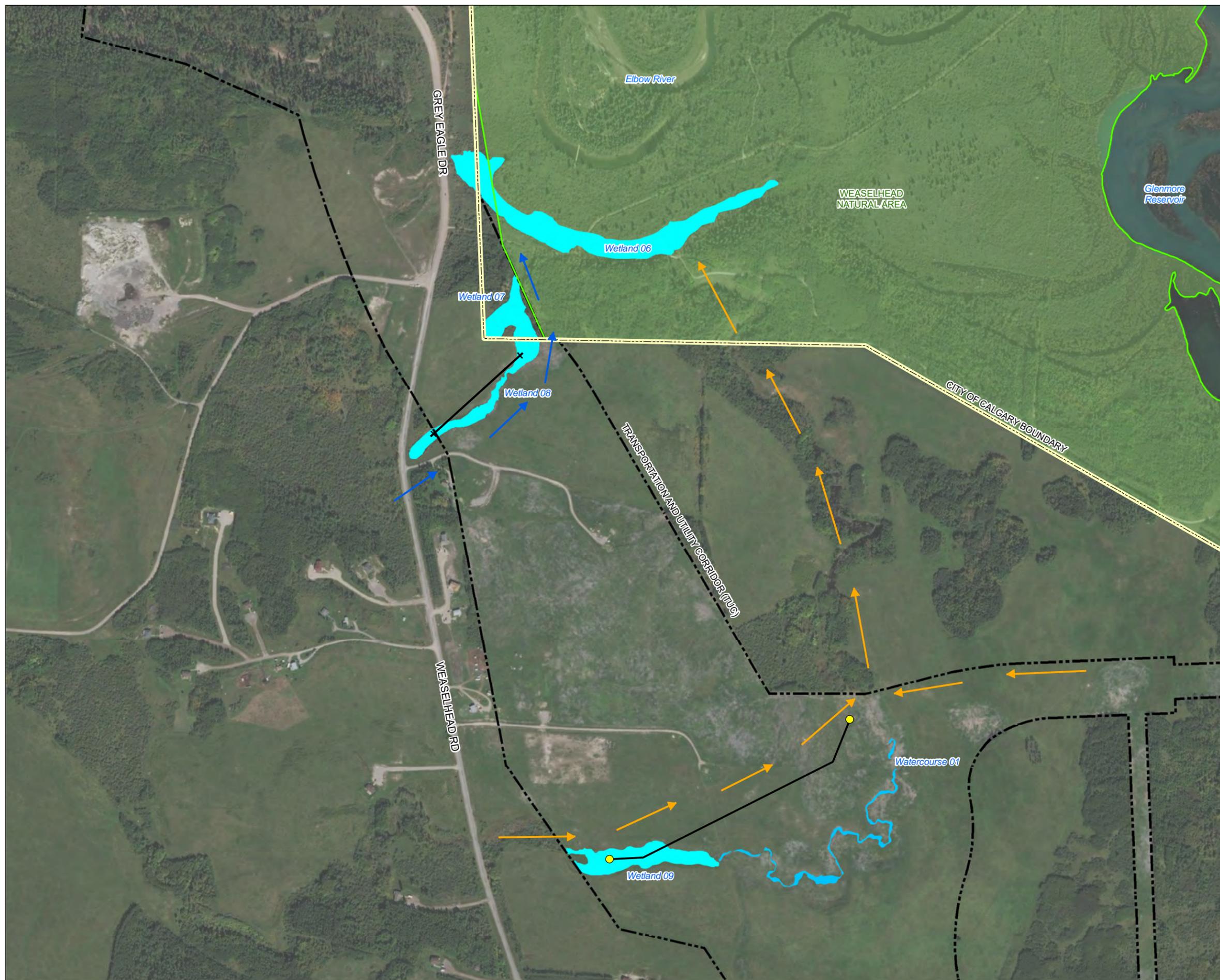
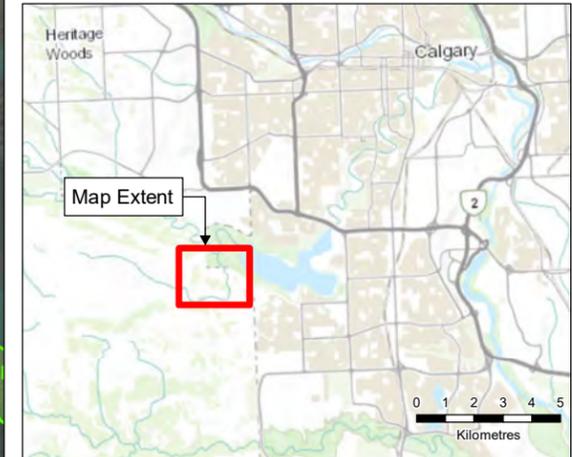
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FIGURES

- Figure 1 Wetland Locations
- Figure 2 Water Flow and Quality Sampling Locations
- Figure 3 Water Flow and Quality Sampling Location Details

Wetland Locations



Legend

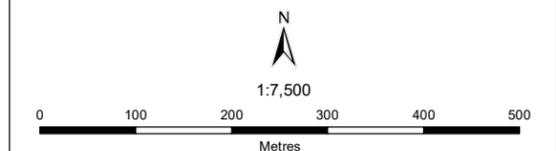
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor (TUC)
- Watercourse
- Wetland

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.

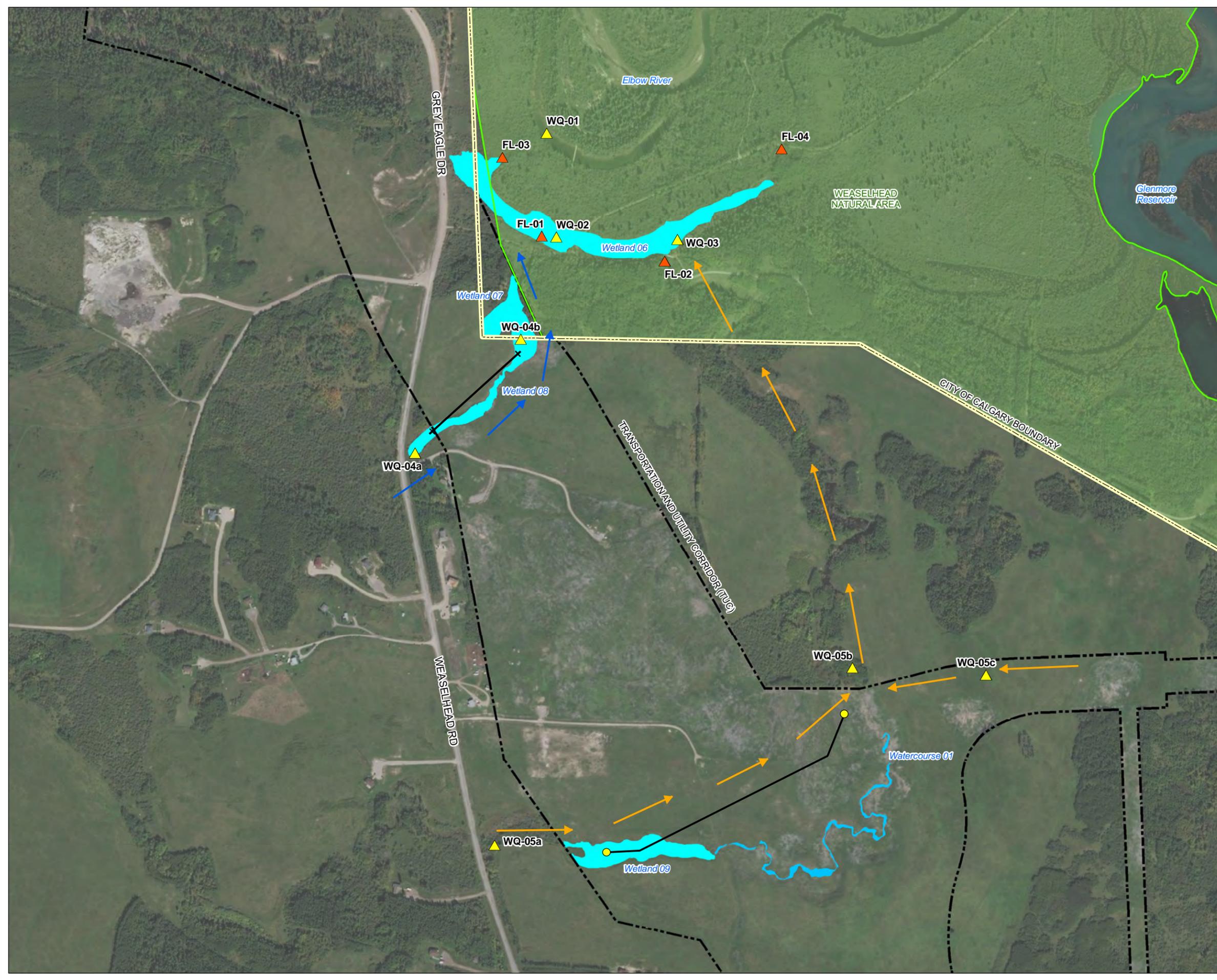
Sources

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



NAD 1983 UTM Zone 11N
Page Size: 11" x 17"

**Water Flow and Quality
Sampling Locations**



Legend

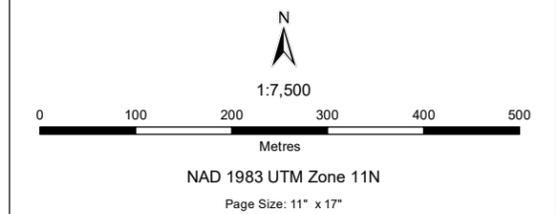
- ▲ Water Flow Sample Location (Hemmera, 2018)
- ▲ Water Quality Sample Location (Hemmera, 2018)
- Bypass Culvert
- Pathway #1 Approximate Direction of Flow
- Pathway #2 Approximate Direction of Flow
- Stormwater Drainage Line
- City of Calgary Boundary
- Natural Area
- Transportation and Utility Corridor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

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Sources

- Aerial Image: ESRI World Imagery, 2016



**Water Flow and Quality
Sampling Location Details**

Legend

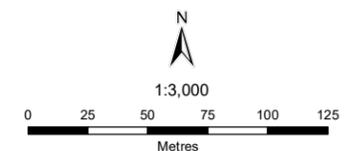
-  Water Flow Sample Location (Hemmera, 2018)
-  Water Quality Sample Location (Hemmera, 2018)
-  Bypass Culvert
-  Pathway #1 Approximate Direction of Flow
-  Pathway #2 Approximate Direction of Flow
-  City of Calgary Boundary
-  Natural Area
-  Transportation and Utility Corridor (TUC)
-  Wetland

Notes

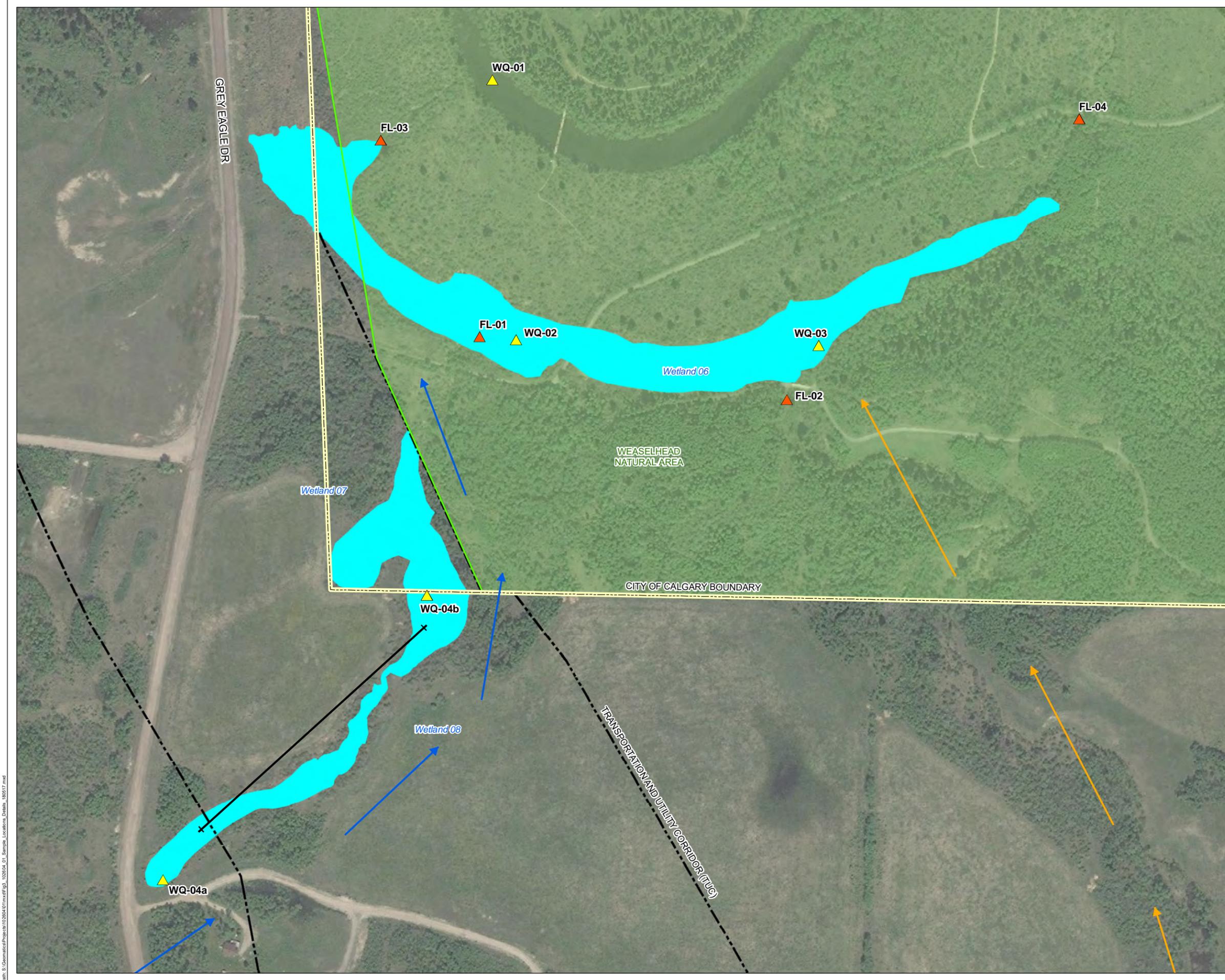
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Path: S:\Geomatics\Projects\102604-01\mxd\figs_102604_01_Sample_Locations_Details_180517.mxd

Appendix B

Raw Spring Sampling Data



Your Project #: 102604-01
 Your C.O.C. #: 695881-01-01

Attention: CGY SAR LAB REPORTS

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

Report Date: 2023/06/07
 Report #: R3345602
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338552

Received: 2023/05/30, 16:33

Sample Matrix: Soil
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	7	N/A	2023/06/07		Auto Calc
Chloride (Soluble)	7	2023/06/05	2023/06/06	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1)	7	2023/06/01	2023/06/01	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble)	7	2023/06/06	2023/06/06	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Elements by ICPMS - Soils	7	2023/06/03	2023/06/05	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions	7	N/A	2023/06/07		Auto Calc
Moisture	7	N/A	2023/06/01	AB SOP-00002	CCME PHC-CWS m
pH @25C (1:2 Calcium Chloride Extract)	7	2023/06/04	2023/06/04	AB SOP-00033 / AB SOP-00006	SM 23 4500 H+B m
Sodium Adsorption Ratio	7	N/A	2023/06/07		Auto Calc
Soluble Ions	7	2023/06/05	2023/06/06	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	7	2023/06/05	2023/06/06	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation	7	N/A	2023/06/07		Auto Calc
Soluble Ions Calculation	7	N/A	2023/06/01		Auto Calc
Theoretical Gypsum Requirement (2)	7	N/A	2023/06/07		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, MELCC, EPA, APHA.

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. #: 695881-01-01

Attention: CGY SAR LAB REPORTS

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

Report Date: 2023/06/07
Report #: R3345602
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338552

Received: 2023/05/30, 16:33

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.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

07 Jun 2023 13:31:13

Please direct all questions regarding this Certificate of Analysis to:

Geraldyn Gouthro, Key Account Specialist
Email: geraldyn.gouthro@bureauveritas.com
Phone# (780)577-7173

=====
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.



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		BRJ041		BRJ042		BRJ043		BRJ044		
Sampling Date		2023/05/30 09:25		2023/05/30 09:45		2023/05/30 11:30		2023/05/30 11:15		
COC Number		695881-01-01		695881-01-01		695881-01-01		695881-01-01		
	UNITS	WQ-04D	RDL	WQ-04B	RDL	WQ-06	RDL	WQ-07	RDL	QC Batch

Calculated Parameters										
Anion Sum	meq/L	8.4	N/A	7.8	N/A	27	N/A	24	N/A	A978030
Cation Sum	meq/L	21	N/A	17	N/A	31	N/A	29	N/A	A978030
Cation/EC Ratio	N/A	12	0.10	12	0.10	13	0.10	12	0.10	A978028
Calculated Calcium (Ca)	mg/kg	200	1.6	83	0.81	220	1.2	190	1.3	A978034
Calculated Magnesium (Mg)	mg/kg	110	1.1	36	0.54	130	0.81	120	0.84	A978034
Calculated Sodium (Na)	mg/kg	85	2.7	48	1.4	79	2.0	97	2.1	A978034
Calculated Potassium (K)	mg/kg	16	1.4	9.4	0.71	17	1.1	17	1.1	A978034
Calculated Boron (B)	mg/kg	0.20	0.11	0.061	0.054	0.16	0.081	0.092	0.084	A978488
Calculated Chloride (Cl)	mg/kg	96	11	64	5.4	53	8.1	91	8.4	A978034
Calculated Sulphate (SO4)	mg/kg	310	5.5	120	2.7	960	4.0	860	4.2	A978034

Elements										
Hex. Chromium (Cr 6+)	mg/kg	<0.42 (1)	0.42	<0.080	0.080	<0.17 (2)	0.17	<0.38 (3)	0.38	A980758

Soluble Parameters										
Soluble Boron (B)	mg/L	0.19	0.10	0.11	0.10	0.20	0.10	0.11	0.10	A985835
Soluble Chloride (Cl)	mg/L	88	10	120	10	65	10	110	10	A985845
Soluble Conductivity	dS/m	1.7	0.020	1.4	0.020	2.5	0.020	2.4	0.020	A985893
Soluble (CaCl2) pH	pH	7.62	N/A	7.73	N/A	7.75	N/A	7.75	N/A	A982291
Sodium Adsorption Ratio	N/A	1.2	0.10	1.5	0.10	1.2	0.10	1.5	0.10	A978033
Soluble Calcium (Ca)	mg/L	180	1.5	150	1.5	270	1.5	230	1.5	A985835
Soluble Magnesium (Mg)	mg/L	99	1.0	67	1.0	160	1.0	140	1.0	A985835
Soluble Sodium (Na)	mg/L	78	2.5	88	2.5	98	2.5	110	2.5	A985835
Soluble Potassium (K)	mg/L	15	1.3	17	1.3	21	1.3	20	1.3	A985835
Saturation %	%	110	N/A	54	N/A	81	N/A	84	N/A	A982286
Soluble Sulphate (SO4)	mg/L	290	5.0	210	5.0	1200	5.0	1000	5.0	A985835
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	A978040

Elements										
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	0.50	0.50	0.51	0.50	A982848

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



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		BRJ041		BRJ042		BRJ043		BRJ044		
Sampling Date		2023/05/30 09:25		2023/05/30 09:45		2023/05/30 11:30		2023/05/30 11:15		
COC Number		695881-01-01		695881-01-01		695881-01-01		695881-01-01		
	UNITS	WQ-04D	RDL	WQ-04B	RDL	WQ-06	RDL	WQ-07	RDL	QC Batch
Total Arsenic (As)	mg/kg	4.2	1.0	4.9	1.0	5.4	1.0	5.4	1.0	A982848
Total Barium (Ba)	mg/kg	210	1.0	170	1.0	220	1.0	240	1.0	A982848
Total Beryllium (Be)	mg/kg	0.45	0.40	0.55	0.40	0.53	0.40	0.62	0.40	A982848
Total Cadmium (Cd)	mg/kg	0.36	0.050	0.30	0.050	0.42	0.050	0.44	0.050	A982848
Total Chromium (Cr)	mg/kg	13	1.0	22	1.0	14	1.0	16	1.0	A982848
Total Cobalt (Co)	mg/kg	5.6	0.50	7.3	0.50	6.0	0.50	6.5	0.50	A982848
Total Copper (Cu)	mg/kg	13	1.0	14	1.0	16	1.0	18	1.0	A982848
Total Lead (Pb)	mg/kg	7.7	0.50	8.9	0.50	10	0.50	10	0.50	A982848
Total Mercury (Hg)	mg/kg	0.053	0.050	0.057	0.050	<0.050	0.050	<0.050	0.050	A982848
Total Molybdenum (Mo)	mg/kg	0.56	0.40	0.74	0.40	0.91	0.40	1.1	0.40	A982848
Total Nickel (Ni)	mg/kg	15	1.0	21	1.0	19	1.0	21	1.0	A982848
Total Selenium (Se)	mg/kg	2.7	0.50	<0.50	0.50	1.0	0.50	1.1	0.50	A982848
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	A982848
Total Thallium (Tl)	mg/kg	0.15	0.10	0.14	0.10	0.17	0.10	0.21	0.10	A982848
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	A982848
Total Uranium (U)	mg/kg	0.76	0.20	0.62	0.20	1.5	0.20	2.1	0.20	A982848
Total Vanadium (V)	mg/kg	18	1.0	24	1.0	24	1.0	27	1.0	A982848
Total Zinc (Zn)	mg/kg	990	10	63	10	68	10	75	10	A982848
RDL = Reportable Detection Limit										



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		BRJ045		BRJ046		BRJ047		
Sampling Date		2023/05/30 12:30		2023/05/30 12:10		2023/05/30 14:30		
COC Number		695881-01-01		695881-01-01		695881-01-01		
	UNITS	WQ-03	RDL	WQ-04C	RDL	WQ-04A	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	18	N/A	2.5	N/A	13	N/A	A978030
Cation Sum	meq/L	22	N/A	12	N/A	19	N/A	A978030
Cation/EC Ratio	N/A	12	0.10	12	0.10	12	0.10	A978028
Calculated Calcium (Ca)	mg/kg	190	1.5	58	1.0	150	1.2	A978034
Calculated Magnesium (Mg)	mg/kg	98	0.98	36	0.69	63	0.83	A978034
Calculated Sodium (Na)	mg/kg	64	2.4	48	1.7	62	2.1	A978034
Calculated Potassium (K)	mg/kg	21	1.3	5.5	0.90	15	1.1	A978034
Calculated Boron (B)	mg/kg	0.12	0.098	0.11	0.069	0.13	0.083	A978488
Calculated Chloride (Cl)	mg/kg	88	9.8	9.8	6.9	87	8.3	A978034
Calculated Sulphate (SO4)	mg/kg	730	4.9	69	3.4	380	4.2	A978034
Elements								
Hex. Chromium (Cr 6+)	mg/kg	<0.40 (1)	0.40	<0.080	0.080	<0.17 (2)	0.17	A980758
Soluble Parameters								
Soluble Boron (B)	mg/L	0.13	0.10	0.16	0.10	0.16	0.10	A985835
Soluble Chloride (Cl)	mg/L	90	10	14	10	100	10	A985845
Soluble Conductivity	dS/m	1.8	0.020	0.95	0.020	1.6	0.020	A985893
Soluble (CaCl2) pH	pH	7.73	N/A	7.91	N/A	7.59	N/A	A982291
Sodium Adsorption Ratio	N/A	0.94	0.10	1.5	0.10	1.2	0.10	A978033
Soluble Calcium (Ca)	mg/L	200	1.5	84	1.5	180	1.5	A985835
Soluble Magnesium (Mg)	mg/L	100	1.0	52	1.0	76	1.0	A985835
Soluble Sodium (Na)	mg/L	65	2.5	69	2.5	75	2.5	A985835
Soluble Potassium (K)	mg/L	22	1.3	7.9	1.3	18	1.3	A985835
Saturation %	%	98	N/A	69	N/A	83	N/A	A982286
Soluble Sulphate (SO4)	mg/L	740	5.0	100	5.0	460	5.0	A985835
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	A978040
Elements								
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	A982848
Total Arsenic (As)	mg/kg	3.1	1.0	4.0	1.0	1.7	1.0	A982848
Total Barium (Ba)	mg/kg	230	1.0	220	1.0	87	1.0	A982848
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to high moisture content, samples contain => 50% moisture. Detection limits raised due to matrix interference. (2) Detection limits raised due to high moisture content, samples contain => 50% moisture.								



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		BRJ045		BRJ046		BRJ047		
Sampling Date		2023/05/30 12:30		2023/05/30 12:10		2023/05/30 14:30		
COC Number		695881-01-01		695881-01-01		695881-01-01		
	UNITS	WQ-03	RDL	WQ-04C	RDL	WQ-04A	RDL	QC Batch
Total Beryllium (Be)	mg/kg	0.53	0.40	0.45	0.40	<0.40	0.40	A982848
Total Cadmium (Cd)	mg/kg	0.49	0.050	0.37	0.050	0.46	0.050	A982848
Total Chromium (Cr)	mg/kg	14	1.0	13	1.0	10	1.0	A982848
Total Cobalt (Co)	mg/kg	5.7	0.50	5.3	0.50	2.9	0.50	A982848
Total Copper (Cu)	mg/kg	17	1.0	13	1.0	11	1.0	A982848
Total Lead (Pb)	mg/kg	10	0.50	8.2	0.50	7.1	0.50	A982848
Total Mercury (Hg)	mg/kg	0.051	0.050	<0.050	0.050	<0.050	0.050	A982848
Total Molybdenum (Mo)	mg/kg	0.75	0.40	0.62	0.40	1.1	0.40	A982848
Total Nickel (Ni)	mg/kg	19	1.0	15	1.0	9.9	1.0	A982848
Total Selenium (Se)	mg/kg	1.6	0.50	2.8	0.50	4.0	0.50	A982848
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	A982848
Total Thallium (Tl)	mg/kg	0.17	0.10	0.15	0.10	0.16	0.10	A982848
Total Tin (Sn)	mg/kg	<1.0	1.0	<1.0	1.0	<1.0	1.0	A982848
Total Uranium (U)	mg/kg	2.3	0.20	0.95	0.20	1.2	0.20	A982848
Total Vanadium (V)	mg/kg	24	1.0	19	1.0	14	1.0	A982848
Total Zinc (Zn)	mg/kg	73	10	81	10	36	10	A982848
RDL = Reportable Detection Limit								



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		BRJ041	BRJ042	BRJ043	BRJ044	BRJ045	BRJ046		
Sampling Date		2023/05/30 09:25	2023/05/30 09:45	2023/05/30 11:30	2023/05/30 11:15	2023/05/30 12:30	2023/05/30 12:10		
COC Number		695881-01-01	695881-01-01	695881-01-01	695881-01-01	695881-01-01	695881-01-01		
	UNITS	WQ-04D	WQ-04B	WQ-06	WQ-07	WQ-03	WQ-04C	RDL	QC Batch

Physical Properties									
Moisture	%	61	35	53	57	59	22	0.30	A979380
RDL = Reportable Detection Limit									

Bureau Veritas ID		BRJ047		
Sampling Date		2023/05/30 14:30		
COC Number		695881-01-01		
	UNITS	WQ-04A	RDL	QC Batch
Physical Properties				
Moisture	%	52	0.30	A979380
RDL = Reportable Detection Limit				



GENERAL COMMENTS

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

Package 1	14.0°C
Package 2	13.7°C
Package 3	8.7°C

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	A979380	ZMA	Method Blank	Moisture	2023/06/01	<0.30		%	
	A979380	ZMA	RPD	Moisture	2023/06/01	2.9		%	20
	A980758	TOR	Matrix Spike	Hex. Chromium (Cr 6+)	2023/06/01		95	%	75 - 125
	A980758	TOR	Spiked Blank	Hex. Chromium (Cr 6+)	2023/06/01		101	%	80 - 120
	A980758	TOR	Method Blank	Hex. Chromium (Cr 6+)	2023/06/01	<0.080		mg/kg	
	A980758	TOR	RPD	Hex. Chromium (Cr 6+)	2023/06/01	NC		%	35
	A982286	LZO	QC Standard	Saturation %	2023/06/06		103	%	75 - 125
	A982286	LZO	RPD	Saturation %	2023/06/06	3.5		%	12
	A982291	HAP	QC Standard	Soluble (CaCl2) pH	2023/06/04		99	%	97 - 103
	A982291	HAP	Spiked Blank	Soluble (CaCl2) pH	2023/06/04		100	%	97 - 103
	A982291	HAP	RPD	Soluble (CaCl2) pH	2023/06/04	1.1		%	N/A
	A982848	JAB	Matrix Spike	Total Antimony (Sb)	2023/06/05		96	%	75 - 125
				Total Arsenic (As)	2023/06/05		79	%	75 - 125
				Total Barium (Ba)	2023/06/05		NC	%	75 - 125
				Total Beryllium (Be)	2023/06/05		91	%	75 - 125
				Total Cadmium (Cd)	2023/06/05		89	%	75 - 125
				Total Chromium (Cr)	2023/06/05		90	%	75 - 125
				Total Cobalt (Co)	2023/06/05		87	%	75 - 125
				Total Copper (Cu)	2023/06/05		86	%	75 - 125
				Total Lead (Pb)	2023/06/05		89	%	75 - 125
				Total Mercury (Hg)	2023/06/05		90	%	75 - 125
				Total Molybdenum (Mo)	2023/06/05		93	%	75 - 125
				Total Nickel (Ni)	2023/06/05		83	%	75 - 125
				Total Selenium (Se)	2023/06/05		84	%	75 - 125
				Total Silver (Ag)	2023/06/05		92	%	75 - 125
				Total Thallium (Tl)	2023/06/05		93	%	75 - 125
				Total Tin (Sn)	2023/06/05		92	%	75 - 125
				Total Uranium (U)	2023/06/05		91	%	75 - 125
				Total Vanadium (V)	2023/06/05		88	%	75 - 125
				Total Zinc (Zn)	2023/06/05		71 (1)	%	75 - 125
	A982848	JAB	QC Standard	Total Antimony (Sb)	2023/06/05		124	%	15 - 182
				Total Arsenic (As)	2023/06/05		104	%	53 - 147
				Total Barium (Ba)	2023/06/05		102	%	80 - 119
				Total Cadmium (Cd)	2023/06/05		93	%	72 - 128
				Total Chromium (Cr)	2023/06/05		102	%	59 - 141
				Total Cobalt (Co)	2023/06/05		96	%	58 - 142
				Total Copper (Cu)	2023/06/05		100	%	83 - 117
				Total Lead (Pb)	2023/06/05		107	%	79 - 121
				Total Molybdenum (Mo)	2023/06/05		109	%	67 - 133
				Total Nickel (Ni)	2023/06/05		100	%	79 - 121
				Total Silver (Ag)	2023/06/05		94	%	47 - 153
				Total Tin (Sn)	2023/06/05		104	%	67 - 133
				Total Uranium (U)	2023/06/05		98	%	77 - 123
				Total Vanadium (V)	2023/06/05		103	%	79 - 121
				Total Zinc (Zn)	2023/06/05		93	%	79 - 121
	A982848	JAB	Spiked Blank	Total Antimony (Sb)	2023/06/05		104	%	80 - 120
				Total Arsenic (As)	2023/06/05		88	%	80 - 120
				Total Barium (Ba)	2023/06/05		97	%	80 - 120
				Total Beryllium (Be)	2023/06/05		95	%	80 - 120
				Total Cadmium (Cd)	2023/06/05		93	%	80 - 120
				Total Chromium (Cr)	2023/06/05		93	%	80 - 120
				Total Cobalt (Co)	2023/06/05		95	%	80 - 120
				Total Copper (Cu)	2023/06/05		95	%	80 - 120
				Total Lead (Pb)	2023/06/05		98	%	80 - 120



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Total Mercury (Hg)	2023/06/05		99	%	80 - 120
				Total Molybdenum (Mo)	2023/06/05		98	%	80 - 120
				Total Nickel (Ni)	2023/06/05		93	%	80 - 120
				Total Selenium (Se)	2023/06/05		88	%	80 - 120
				Total Silver (Ag)	2023/06/05		97	%	80 - 120
				Total Thallium (Tl)	2023/06/05		99	%	80 - 120
				Total Tin (Sn)	2023/06/05		97	%	80 - 120
				Total Uranium (U)	2023/06/05		97	%	80 - 120
				Total Vanadium (V)	2023/06/05		93	%	80 - 120
				Total Zinc (Zn)	2023/06/05		87	%	80 - 120
A982848	JAB		Method Blank	Total Antimony (Sb)	2023/06/05	<0.50		mg/kg	
				Total Arsenic (As)	2023/06/05	<1.0		mg/kg	
				Total Barium (Ba)	2023/06/05	<1.0		mg/kg	
				Total Beryllium (Be)	2023/06/05	<0.40		mg/kg	
				Total Cadmium (Cd)	2023/06/05	<0.050		mg/kg	
				Total Chromium (Cr)	2023/06/05	<1.0		mg/kg	
				Total Cobalt (Co)	2023/06/05	<0.50		mg/kg	
				Total Copper (Cu)	2023/06/05	<1.0		mg/kg	
				Total Lead (Pb)	2023/06/05	<0.50		mg/kg	
				Total Mercury (Hg)	2023/06/05	<0.050		mg/kg	
				Total Molybdenum (Mo)	2023/06/05	<0.40		mg/kg	
				Total Nickel (Ni)	2023/06/05	<1.0		mg/kg	
				Total Selenium (Se)	2023/06/05	<0.50		mg/kg	
				Total Silver (Ag)	2023/06/05	<0.20		mg/kg	
				Total Thallium (Tl)	2023/06/05	<0.10		mg/kg	
				Total Tin (Sn)	2023/06/05	<1.0		mg/kg	
				Total Uranium (U)	2023/06/05	<0.20		mg/kg	
				Total Vanadium (V)	2023/06/05	<1.0		mg/kg	
				Total Zinc (Zn)	2023/06/05	<10		mg/kg	
A982848	JAB		RPD	Total Antimony (Sb)	2023/06/05	NC		%	30
				Total Arsenic (As)	2023/06/05	4.5		%	30
				Total Barium (Ba)	2023/06/05	34		%	35
				Total Beryllium (Be)	2023/06/05	NC		%	30
				Total Cadmium (Cd)	2023/06/05	27		%	30
				Total Chromium (Cr)	2023/06/05	NC		%	30
				Total Cobalt (Co)	2023/06/05	30		%	30
				Total Copper (Cu)	2023/06/05	NC		%	30
				Total Lead (Pb)	2023/06/05	0.17		%	35
				Total Mercury (Hg)	2023/06/05	NC		%	35
				Total Molybdenum (Mo)	2023/06/05	19		%	35
				Total Nickel (Ni)	2023/06/05	29		%	30
				Total Selenium (Se)	2023/06/05	NC		%	30
				Total Silver (Ag)	2023/06/05	NC		%	35
				Total Thallium (Tl)	2023/06/05	15		%	30
				Total Tin (Sn)	2023/06/05	NC		%	35
				Total Uranium (U)	2023/06/05	97 (1)		%	30
				Total Vanadium (V)	2023/06/05	26		%	30
				Total Zinc (Zn)	2023/06/05	28		%	30
A985835	PL		Matrix Spike	Soluble Boron (B)	2023/06/06		97	%	75 - 125
				Soluble Calcium (Ca)	2023/06/06		97	%	75 - 125
				Soluble Magnesium (Mg)	2023/06/06		100	%	75 - 125
				Soluble Sodium (Na)	2023/06/06		96	%	75 - 125
				Soluble Potassium (K)	2023/06/06		97	%	75 - 125
A985835	PL		QC Standard	Soluble Calcium (Ca)	2023/06/06		87	%	75 - 125



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A985835	PL	Spiked Blank	Soluble Magnesium (Mg)	2023/06/06		93	%	75 - 125
			Soluble Sodium (Na)	2023/06/06		97	%	75 - 125
			Soluble Potassium (K)	2023/06/06		93	%	75 - 125
			Soluble Sulphate (SO4)	2023/06/06		88	%	75 - 125
			Soluble Boron (B)	2023/06/06		96	%	80 - 120
			Soluble Calcium (Ca)	2023/06/06		98	%	80 - 120
			Soluble Magnesium (Mg)	2023/06/06		100	%	80 - 120
A985835	PL	Method Blank	Soluble Sodium (Na)	2023/06/06		98	%	80 - 120
			Soluble Potassium (K)	2023/06/06		97	%	80 - 120
			Soluble Boron (B)	2023/06/06	<0.10		mg/L	
			Soluble Calcium (Ca)	2023/06/06	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/06/06	<1.0		mg/L	
			Soluble Sodium (Na)	2023/06/06	<2.5		mg/L	
			Soluble Potassium (K)	2023/06/06	<1.3		mg/L	
A985835	PL	RPD	Soluble Sulphate (SO4)	2023/06/06	<5.0		mg/L	
			Soluble Calcium (Ca)	2023/06/06	7.6		%	30
			Soluble Magnesium (Mg)	2023/06/06	9.2		%	30
			Soluble Sodium (Na)	2023/06/06	6.4		%	30
			Soluble Potassium (K)	2023/06/06	2.3		%	30
			Soluble Sulphate (SO4)	2023/06/06	28		%	30
A985845	ZI	Matrix Spike	Soluble Chloride (Cl)	2023/06/06		NC	%	75 - 125
A985845	ZI	QC Standard	Soluble Chloride (Cl)	2023/06/06		95	%	75 - 125
A985845	ZI	Spiked Blank	Soluble Chloride (Cl)	2023/06/06		104	%	80 - 120
A985845	ZI	Method Blank	Soluble Chloride (Cl)	2023/06/06	<10		mg/L	
A985845	ZI	RPD	Soluble Chloride (Cl)	2023/06/06	5.4		%	30
A985893	EH2	QC Standard	Soluble Conductivity	2023/06/06		103	%	75 - 125
A985893	EH2	Spiked Blank	Soluble Conductivity	2023/06/06		99	%	90 - 110
A985893	EH2	Method Blank	Soluble Conductivity	2023/06/06	<0.020		dS/m	
A985893	EH2	RPD	Soluble Conductivity	2023/06/06	24 (1)		%	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.



BUREAU
VERITAS

Bureau Veritas Job #: C338552
Report Date: 2023/06/07

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EM

VALIDATION SIGNATURE PAGE

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

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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



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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 {0}, {1} responsible for {2} {3} laboratory operations.



Bureau Veritas
4000 19th N.E. Calgary, Alberta Canada T2E 6P8 Tel: (403) 291-3077 Toll-free: 800-563-6266 Fax: (403) 291-9488 www.bvna.com

1137

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #10658 Ausenco Sustainability Inc.	Company Name: <u>AUSENCO</u>	Quotation #: C21878	Bureau Veritas Job #: <u>C338552</u>	Bottle Order #:	COC #: <u>695861</u>		
Attention: Accounts Payable	Attention: <u>Erin Moffatt</u>	P.O. #: <u>102604-01</u>	Project Name: <u>Erin Moffatt E. Moffatt</u>		Project Manager: <u>Geraldyn Gauthier</u>		
Address: Suite 1430, 401-9 Avenue CALGARY AB T2P 3C5	Address: <u>SAME AS INVOICE</u>	Site #: <u>Erin Moffatt E. Moffatt</u>	Sampled By: <u>Erin Moffatt E. Moffatt</u>		C#695861-01-01		
Tel: (403) 264-0671 Fax: (403) 264-0670	Tel: _____ Fax: _____	Email: <u>erin.moffatt@ausenco.com</u>		Email: _____			

Regulatory Criteria: <input type="checkbox"/> ATI <input checked="" type="checkbox"/> CCME <input type="checkbox"/> Other	Special Instructions	ANALYSIS REQUESTED (PLEASE BE SPECIFIC):										Turnaround Time (TAT) Required: Please provide advance notice for rush projects.		
		Metals Field Filled? (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	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.	<input checked="" type="checkbox"/>
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS													Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Rush Confirmation Number: _____	<input type="checkbox"/>

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filled? (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 Batches	Comments
1	WA-05B	2023/05/30	8:30	Soil												1	For analysis: Hexavalent chromium, elements by IAMS, moisture, soluble ions, soluble paste, and soluble boron calculator
2	WA-04D		0925													1	- Same analysis for all sites.
3	WA-04B		0945												1		
4	WA-06		1130												1		
5	WA-07		1115												1		
6	WA-03		1230												1		
7	WA-04C		1210												1		
8	WA-04E																
9	WA-04A	2023/03/30	1430	Soil												1	
10																	

RELINQUISHED BY: (Signature/Print) <u>Erin Moffatt</u>	Date: (YY/MM/DD) <u>23/05/30</u>	Time	RECEIVED BY: (Signature/Print) <u>Marjorie Lecker</u>	Date: (YY/MM/DD) <u>2023/05/30</u>	Time <u>16:33</u>	# jars used and not submitted	Time Sensitive <input type="checkbox"/>	Temperature (°C) on Receipt <u>13, 14, 15</u>	Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
---	-------------------------------------	------	--	---------------------------------------	----------------------	-------------------------------	--	--	---

* 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

10, 13, 18
3, 10, 13
Ile - yez



Your Project #: 102604-01
 Your C.O.C. #: 695881-02-01

Attention: Erin Moffatt

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

Report Date: 2023/06/08
 Report #: R3346283
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338553

Received: 2023/05/30, 16:33

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH	2	N/A	2023/06/02	BBY6SOP-00026	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	3	N/A	2023/06/03	BBY6SOP-00026	SM 24 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH	2	N/A	2023/06/08	AB SOP-00005	SM 23 2320 B m
Biochemical Oxygen Demand	7	2023/05/31	2023/06/05	AB SOP-00017	SM 23 5210B m
Cadmium - low level CCME - Dissolved	7	N/A	2023/06/05		Auto Calc
Chloride/Sulphate by Auto Colourimetry	5	N/A	2023/06/05	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Chloride/Sulphate by Auto Colourimetry	2	N/A	2023/06/06	AB SOP-00020	SM24-4500-Cl/SO4-E m
COD by Colorimeter	7	N/A	2023/06/02	AB SOP-00016	SM 23 5220D m
Oxygen (Dissolved) (2)	7	N/A	2023/05/31	AB SOP-00058	SM 23 4500-O C m
Conductivity @25C	2	N/A	2023/06/02	AB SOP-00005	SM 23 2510 B m
Conductivity @25C	3	N/A	2023/06/03	AB SOP-00005	SM 23 2510 B m
Conductivity @25C	2	N/A	2023/06/08	AB SOP-00005	SM 23 2510 B m
Hardness	7	N/A	2023/06/02		Auto Calc
Elements by ICP - Dissolved (3)	7	N/A	2023/06/01	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (3)	7	N/A	2023/06/03	AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	5	N/A	2023/06/05	BBY WI-00033	Auto Calc
Ion Balance (1)	2	N/A	2023/06/08	BBY WI-00033	Auto Calc
Sum of cations, anions (1)	7	N/A	2023/06/02	BBY WI-00033	Auto Calc
Ammonia-N (Total)	5	N/A	2023/06/05	AB SOP-00007	SM 24 4500 NH3 A G m
Ammonia-N (Total)	2	N/A	2023/06/06	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite	7	N/A	2023/06/05		Auto Calc
NO2 (N); NO2 (N) + NO3 (N) in Water	7	N/A	2023/06/04	AB SOP-00091	SM 24 4500 NO3m
Nitrate (as N)	7	2023/05/31	2023/06/05		Auto Calc
pH @25°C (4)	2	N/A	2023/06/02	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (4)	3	N/A	2023/06/03	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (4)	2	N/A	2023/06/08	AB SOP-00005	SM 23 4500-H+B m
Orthophosphate by Konelab (5)	7	N/A	2023/06/03	AB SOP-00025	SM 24 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	4	2023/06/02	2023/06/02	AB SOP-00065	SM 23 2540 C m
Total Dissolved Solids (Filt. Residue)	3	2023/06/03	2023/06/03	AB SOP-00065	SM 23 2540 C m
Total Dissolved Solids (Calculated) (1)	5	N/A	2023/06/05	BBY WI-00033	Calculated Parameter
Total Dissolved Solids (Calculated) (1)	2	N/A	2023/06/08	BBY WI-00033	Calculated Parameter



Your Project #: 102604-01
 Your C.O.C. #: 695881-02-01

Attention: Erin Moffatt

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

Report Date: 2023/06/08
 Report #: R3346283
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338553

Received: 2023/05/30, 16:33

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Kjeldahl Nitrogen (Total)	7	N/A	2023/06/05	BBY WI-00033	Auto Calc
Nitrogen (Total)	7	2023/06/02	2023/06/02	AB SOP-00093	SM 24 4500-N C m
Phosphorus -P (Total, Dissolved) (6)	7	2023/06/02	2023/06/02	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	7	2023/06/02	2023/06/03	AB SOP-00024	SM 24 4500-P A,B,F m
Total Suspended Solids (NFR)	7	2023/06/05	2023/06/05	AB SOP-00061	SM 24 2540 D m
Turbidity	7	N/A	2023/06/01	CAL SOP-00081	SM 23 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, MELCC, EPA, APHA.

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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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) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5
- (2) 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.
- (3) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (4) 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.
- (5) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets



Your Project #: 102604-01
Your C.O.C. #: 695881-02-01

Attention: Erin Moffatt

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

Report Date: 2023/06/08
Report #: R3346283
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338553

Received: 2023/05/30, 16:33

acceptable levels unless otherwise noted.

(6) 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
08 Jun 2023 15:06:42

Please direct all questions regarding this Certificate of Analysis to:
Geraldlyn Gouthro, Key Account Specialist
Email: geraldlyn.gouthro@bureauveritas.com
Phone# (780)577-7173

=====
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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

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ048			BRJ049		BRJ050		
Sampling Date		2023/05/30 08:30			2023/05/30 09:25		2023/05/30 09:45		
COC Number		695881-02-01			695881-02-01		695881-02-01		
	UNITS	WQ05B	RDL	QC Batch	WQ04D	QC Batch	WQ04B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.0	N/A	A978723	8.6	A978723	9.0	N/A	A978723
Cation Sum	meq/L	9.8	N/A	A978723	9.3	A978723	9.6	N/A	A978723
Hardness (CaCO3)	mg/L	390	0.50	A978657	370	A978657	380	0.50	A978657
Ion Balance (% Difference)	%	3.8	N/A	A978722	4.0	A978722	3.0	N/A	A978722
Nitrate (N)	mg/L	<0.010	0.010	A978734	0.038	A978734	0.69	0.010	A978734
Nitrate (NO3)	mg/L	<0.044	0.044	A978658	0.17	A978658	3.1	0.044	A978658
Nitrite (NO2)	mg/L	<0.033	0.033	A978658	<0.033	A978658	<0.033	0.033	A978658
Calculated Total Dissolved Solids	mg/L	480	5.0	A978724	440	A978724	470	1.0	A978724

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	A978620	<0.000020	A978620	<0.000020	0.000020	A978620
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Misc. Inorganics

Conductivity	uS/cm	820	2.0	A982202	780	A982202	850	2.0	A982412
pH	pH	8.54	N/A	A982197	8.50	A982197	8.35	N/A	A982410

Anions

Alkalinity (PP as CaCO3)	mg/L	12	1.0	A981920	21	A981920	6.9	1.0	A982404
Alkalinity (Total as CaCO3)	mg/L	280	1.0	A981920	380	A981920	310	1.0	A982404
Bicarbonate (HCO3)	mg/L	320	1.0	A981920	410	A981920	370	1.0	A982404
Carbonate (CO3)	mg/L	15	1.0	A981920	25	A981920	8.3	1.0	A982404
Hydroxide (OH)	mg/L	<1.0	1.0	A981920	<1.0	A981920	<1.0	1.0	A982404
Chloride (Cl)	mg/L	20	1.0	A983808	6.8	A983808	53	1.0	A983808
Sulphate (SO4)	mg/L	130	5.0	A983808	42	A983808	58	1.0	A983808

Nutrients

Nitrite (N)	mg/L	<0.010	0.010	A982918	<0.010	A982917	<0.010	0.010	A982918
Nitrate plus Nitrite (N)	mg/L	<0.010	0.010	A982918	0.038	A982917	0.69	0.010	A982918

Elements

Dissolved Aluminum (Al)	mg/L	0.0049	0.0030	A980399	0.0032	A980399	<0.0030	0.0030	A980399
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	A980399	<0.00060	A980399	<0.00060	0.00060	A980399
Dissolved Arsenic (As)	mg/L	0.0015	0.00020	A980399	0.00041	A980399	0.00022	0.00020	A980399
Dissolved Barium (Ba)	mg/L	0.061	0.010	A980728	0.080	A980728	0.074	0.010	A980728
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	A980399	<0.0010	A980399	<0.0010	0.0010	A980399
Dissolved Boron (B)	mg/L	0.036	0.020	A980728	0.048	A980728	0.049	0.020	A980728

RDL = Reportable Detection Limit

N/A = Not Applicable



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ048			BRJ049		BRJ050		
Sampling Date		2023/05/30 08:30			2023/05/30 09:25		2023/05/30 09:45		
COC Number		695881-02-01			695881-02-01		695881-02-01		
	UNITS	WQ05B	RDL	QC Batch	WQ04D	QC Batch	WQ04B	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	29	0.30	A980728	70	A980728	74	0.30	A980728
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	A980399	<0.0010	A980399	<0.0010	0.0010	A980399
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	A980399	<0.00030	A980399	<0.00030	0.00030	A980399
Dissolved Copper (Cu)	mg/L	0.0013	0.0010	A980399	<0.0010	A980399	0.0020	0.0010	A980399
Dissolved Iron (Fe)	mg/L	<0.060	0.060	A980728	<0.060	A980728	<0.060	0.060	A980728
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	A980399	<0.00020	A980399	<0.00020	0.00020	A980399
Dissolved Lithium (Li)	mg/L	0.022	0.020	A980728	0.021	A980728	0.020	0.020	A980728
Dissolved Magnesium (Mg)	mg/L	77	0.20	A980728	47	A980728	47	0.20	A980728
Dissolved Manganese (Mn)	mg/L	0.0047	0.0040	A980728	0.029	A980728	<0.0040	0.0040	A980728
Dissolved Molybdenum (Mo)	mg/L	0.0024	0.00020	A980399	0.0013	A980399	0.0014	0.00020	A980399
Dissolved Nickel (Ni)	mg/L	0.0012	0.00050	A980399	<0.00050	A980399	<0.00050	0.00050	A980399
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	A980728	<0.10	A980728	<0.10	0.10	A980728
Dissolved Potassium (K)	mg/L	1.2	0.30	A980728	2.6	A980728	4.3	0.30	A980728
Dissolved Selenium (Se)	mg/L	0.0033	0.00020	A980399	0.00090	A980399	0.0024	0.00020	A980399
Dissolved Silicon (Si)	mg/L	1.4	0.50	A980728	4.7	A980728	2.5	0.50	A980728
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	A980399	<0.00010	A980399	<0.00010	0.00010	A980399
Dissolved Sodium (Na)	mg/L	44	0.50	A980728	44	A980728	44	0.50	A980728
Dissolved Strontium (Sr)	mg/L	0.25	0.020	A980728	0.75	A980728	0.84	0.020	A980728
Dissolved Sulphur (S)	mg/L	40	0.20	A980728	13	A980728	18	0.20	A980728
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	A980399	<0.00020	A980399	<0.00020	0.00020	A980399
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	A980399	<0.0010	A980399	<0.0010	0.0010	A980399
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	A980399	<0.0010	A980399	<0.0010	0.0010	A980399
Dissolved Uranium (U)	mg/L	0.0070	0.00010	A980399	0.0026	A980399	0.0038	0.00010	A980399
Dissolved Vanadium (V)	mg/L	0.0015	0.0010	A980399	<0.0010	A980399	0.0010	0.0010	A980399
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	A980399	0.031	A980399	<0.0030	0.0030	A980399

RDL = Reportable Detection Limit



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ051		BRJ052		BRJ053		
Sampling Date		2023/05/30 11:15		2023/05/30 11:30		2023/05/30 12:30		
COC Number		695881-02-01		695881-02-01		695881-02-01		
	UNITS	WQ07	QC Batch	WQ06	RDL	WQ03	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	10	A978723	11	N/A	16	N/A	A978723
Cation Sum	meq/L	10	A978723	9.8	N/A	16	N/A	A978723
Hardness (CaCO3)	mg/L	350	A978657	340	0.50	700	0.50	A978728
Ion Balance (% Difference)	%	0.33	A978722	3.7	N/A	0.82	N/A	A978722
Nitrate (N)	mg/L	<0.010	A978734	0.032	0.010	<0.050	0.050	A978734
Nitrate (NO3)	mg/L	<0.044	A978658	0.14	0.044	<0.22	0.22	A978730
Nitrite (NO2)	mg/L	<0.033	A978658	<0.033	0.033	<0.033	0.033	A978730
Calculated Total Dissolved Solids	mg/L	580	A978724	590	5.0	940	5.0	A978724
Elements								
Dissolved Cadmium (Cd)	mg/L	<0.000020	A978620	<0.000020	0.000020	<0.000020	0.000020	A978620
Misc. Inorganics								
Conductivity	uS/cm	900	A982412	850	2.0	1300	2.0	A987841
pH	pH	9.65	A982410	9.70	N/A	8.15	N/A	A987838
Anions								
Alkalinity (PP as CaCO3)	mg/L	55	A982404	72	1.0	<1.0	1.0	A987826
Alkalinity (Total as CaCO3)	mg/L	180	A982404	190	1.0	270	1.0	A987826
Bicarbonate (HCO3)	mg/L	80	A982404	54	1.0	330	1.0	A987826
Carbonate (CO3)	mg/L	66	A982404	86	1.0	<1.0	1.0	A987826
Hydroxide (OH)	mg/L	<1.0	A982404	<1.0	1.0	<1.0	1.0	A987826
Chloride (Cl)	mg/L	19	A983808	21	1.0	26	1.0	A985596
Sulphate (SO4)	mg/L	290	A983808	300	5.0	470	5.0	A985596
Nutrients								
Nitrite (N)	mg/L	<0.010	A982918	<0.010	0.010	<0.010	0.010	A982917
Nitrate plus Nitrite (N)	mg/L	<0.010	A982918	0.032	0.010	<0.050 (1)	0.050	A982917
Elements								
Dissolved Aluminum (Al)	mg/L	0.0050	A980399	0.0032	0.0030	0.0048	0.0030	A980399
Dissolved Antimony (Sb)	mg/L	0.00076	A980399	<0.00060	0.00060	<0.00060	0.00060	A980399
Dissolved Arsenic (As)	mg/L	0.0035	A980399	0.0030	0.00020	0.0013	0.00020	A980399
Dissolved Barium (Ba)	mg/L	0.041	A980728	0.043	0.010	0.11	0.010	A980728
Dissolved Beryllium (Be)	mg/L	<0.0010	A980399	<0.0010	0.0010	<0.0010	0.0010	A980399
Dissolved Boron (B)	mg/L	0.068	A980728	0.074	0.020	0.070	0.020	A980728
RDL = Reportable Detection Limit N/A = Not Applicable (1) Detection limits raised due to matrix interference.								



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ051		BRJ052		BRJ053		
Sampling Date		2023/05/30 11:15		2023/05/30 11:30		2023/05/30 12:30		
COC Number		695881-02-01		695881-02-01		695881-02-01		
	UNITS	WQ07	QC Batch	WQ06	RDL	WQ03	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	28	A980728	27	0.30	140	0.30	A980728
Dissolved Chromium (Cr)	mg/L	<0.0010	A980399	<0.0010	0.0010	<0.0010	0.0010	A980399
Dissolved Cobalt (Co)	mg/L	0.00046	A980399	0.00042	0.00030	<0.00030	0.00030	A980399
Dissolved Copper (Cu)	mg/L	0.0014	A980399	0.0033	0.0010	<0.0010	0.0010	A980399
Dissolved Iron (Fe)	mg/L	<0.060	A980728	<0.060	0.060	0.065	0.060	A980728
Dissolved Lead (Pb)	mg/L	<0.00020	A980399	<0.00020	0.00020	<0.00020	0.00020	A980399
Dissolved Lithium (Li)	mg/L	0.027	A980728	0.029	0.020	0.026	0.020	A980728
Dissolved Magnesium (Mg)	mg/L	69	A980728	66	0.20	89	0.20	A980728
Dissolved Manganese (Mn)	mg/L	0.0076	A980728	<0.0040	0.0040	0.038	0.0040	A980728
Dissolved Molybdenum (Mo)	mg/L	0.0065	A980399	0.0073	0.00020	0.0094	0.00020	A980399
Dissolved Nickel (Ni)	mg/L	0.0021	A980399	0.0024	0.00050	0.0018	0.00050	A980399
Dissolved Phosphorus (P)	mg/L	<0.10	A980728	<0.10	0.10	<0.10	0.10	A980728
Dissolved Potassium (K)	mg/L	0.57	A980728	0.56	0.30	11	0.30	A980728
Dissolved Selenium (Se)	mg/L	0.00084	A980399	0.0012	0.00020	0.00094	0.00020	A980399
Dissolved Silicon (Si)	mg/L	1.7	A980728	1.1	0.50	0.71	0.50	A980728
Dissolved Silver (Ag)	mg/L	<0.00010	A980399	<0.00010	0.00010	<0.00010	0.00010	A980399
Dissolved Sodium (Na)	mg/L	71	A980728	69	0.50	45	0.50	A980728
Dissolved Strontium (Sr)	mg/L	0.34	A980728	0.36	0.020	1.0	0.020	A980728
Dissolved Sulphur (S)	mg/L	88	A980728	87	0.20	160	0.20	A980728
Dissolved Thallium (Tl)	mg/L	<0.00020	A980399	<0.00020	0.00020	<0.00020	0.00020	A980399
Dissolved Tin (Sn)	mg/L	<0.0010	A980399	<0.0010	0.0010	<0.0010	0.0010	A980399
Dissolved Titanium (Ti)	mg/L	<0.0010	A980399	<0.0010	0.0010	<0.0010	0.0010	A980399
Dissolved Uranium (U)	mg/L	0.0064	A980399	0.0074	0.00010	0.018	0.00010	A980399
Dissolved Vanadium (V)	mg/L	0.0021	A980399	0.0032	0.0010	0.0010	0.0010	A980399
Dissolved Zinc (Zn)	mg/L	<0.0030	A980399	<0.0030	0.0030	<0.0030	0.0030	A980399
RDL = Reportable Detection Limit								



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ054		
Sampling Date		2023/05/30 14:30		
COC Number		695881-02-01		
	UNITS	WQ04A	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.4	N/A	A978723
Cation Sum	meq/L	9.0	N/A	A978723
Hardness (CaCO3)	mg/L	360	0.50	A978728
Ion Balance (% Difference)	%	4.3	N/A	A978722
Nitrate (N)	mg/L	0.73	0.010	A978734
Nitrate (NO3)	mg/L	3.2	0.044	A978730
Nitrite (NO2)	mg/L	<0.033	0.033	A978730
Calculated Total Dissolved Solids	mg/L	430	1.0	A978724
Elements				
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	A978620
Misc. Inorganics				
Conductivity	uS/cm	770	2.0	A982412
pH	pH	8.20	N/A	A982410
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	A982404
Alkalinity (Total as CaCO3)	mg/L	350	1.0	A982404
Bicarbonate (HCO3)	mg/L	430	1.0	A982404
Carbonate (CO3)	mg/L	<1.0	1.0	A982404
Hydroxide (OH)	mg/L	<1.0	1.0	A982404
Chloride (Cl)	mg/L	7.3	1.0	A983808
Sulphate (SO4)	mg/L	52	1.0	A983808
Nutrients				
Nitrite (N)	mg/L	<0.010	0.010	A982917
Nitrate plus Nitrite (N)	mg/L	0.73	0.010	A982917
Elements				
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	A980399
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	A980399
Dissolved Arsenic (As)	mg/L	0.00029	0.00020	A980399
Dissolved Barium (Ba)	mg/L	0.069	0.010	A980728
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	A980399
Dissolved Boron (B)	mg/L	0.043	0.020	A980728
RDL = Reportable Detection Limit N/A = Not Applicable				



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		BRJ054		
Sampling Date		2023/05/30 14:30		
COC Number		695881-02-01		
	UNITS	WQ04A	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	73	0.30	A980728
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	A980399
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	A980399
Dissolved Copper (Cu)	mg/L	0.0017	0.0010	A980399
Dissolved Iron (Fe)	mg/L	<0.060	0.060	A980728
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	A980399
Dissolved Lithium (Li)	mg/L	<0.020	0.020	A980728
Dissolved Magnesium (Mg)	mg/L	42	0.20	A980728
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	A980728
Dissolved Molybdenum (Mo)	mg/L	0.0026	0.00020	A980399
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	A980399
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	A980728
Dissolved Potassium (K)	mg/L	3.8	0.30	A980728
Dissolved Selenium (Se)	mg/L	0.0025	0.00020	A980399
Dissolved Silicon (Si)	mg/L	4.1	0.50	A980728
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	A980399
Dissolved Sodium (Na)	mg/L	42	0.50	A980728
Dissolved Strontium (Sr)	mg/L	0.72	0.020	A980728
Dissolved Sulphur (S)	mg/L	16	0.20	A980728
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	A980399
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	A980399
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	A980399
Dissolved Uranium (U)	mg/L	0.0041	0.00010	A980399
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	A980399
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	A980399
RDL = Reportable Detection Limit				



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		BRJ048	BRJ049		BRJ050	BRJ051		
Sampling Date		2023/05/30 08:30	2023/05/30 09:25		2023/05/30 09:45	2023/05/30 11:15		
COC Number		695881-02-01	695881-02-01		695881-02-01	695881-02-01		
	UNITS	WQ05B	WQ04D	QC Batch	WQ04B	WQ07	RDL	QC Batch
Calculated Parameters								
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.758	0.191	A978659	<0.020	1.44	0.020	A978659
Nutrients								
Total Nitrogen (N)	mg/L	0.76	0.23	A981265	0.66 (1)	1.4	0.020	A981258
RDL = Reportable Detection Limit								
(1) Nitrogen < Nitrate: Both values fall within the method uncertainty for duplicates and are likely equivalent.								

Bureau Veritas ID		BRJ052			BRJ053			BRJ054		
Sampling Date		2023/05/30 11:30			2023/05/30 12:30			2023/05/30 14:30		
COC Number		695881-02-01			695881-02-01			695881-02-01		
	UNITS	WQ06	RDL	QC Batch	WQ03	RDL	QC Batch	WQ04A	RDL	QC Batch
Calculated Parameters										
Total Total Kjeldahl Nitrogen (Calc)	mg/L	1.19	0.020	A978659	0.831	0.050	A978659	<0.020	0.020	A978659
Nutrients										
Total Nitrogen (N)	mg/L	1.2	0.020	A981265	0.83	0.020	A981258	0.68 (1)	0.020	A981265
RDL = Reportable Detection Limit										
(1) Nitrogen < Nitrate: Both values fall within the method uncertainty for duplicates and are likely equivalent.										



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		BRJ048		BRJ049		BRJ050		
Sampling Date		2023/05/30 08:30		2023/05/30 09:25		2023/05/30 09:45		
COC Number		695881-02-01		695881-02-01		695881-02-01		
	UNITS	WQ05B	QC Batch	WQ04D	QC Batch	WQ04B	RDL	QC Batch
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.3	A978523	<2.0	A978523	<2.0	2.0	A978523
Chemical Oxygen Demand	mg/L	31	A981342	12	A981342	12	10	A981342
Misc. Inorganics								
Dissolved Oxygen (O2)	mg/L	7.4	A978367	9.8	A978367	12	0.10	A978367
Total Dissolved Solids	mg/L	460	A981676	460	A981676	480	10	A981676
Total Suspended Solids	mg/L	4.8	A983225	6.3	A983225	2.1	1.0	A983225
Nutrients								
Total Ammonia (N)	mg/L	<0.015	A980138	<0.015	A980129	<0.015	0.015	A980129
Orthophosphate (P)	mg/L	0.0048	A982546	0.0056	A982546	<0.0030	0.0030	A982546
Dissolved Phosphorus (P)	mg/L	0.010	A981224	0.0076	A981224	<0.0030	0.0030	A981224
Total Phosphorus (P)	mg/L	0.034	A981943	0.0089	A981951	<0.0030	0.0030	A981943
Physical Properties								
Turbidity	NTU	4.0	A979607	0.47	A979607	0.40	0.10	A979607
RDL = Reportable Detection Limit								

Bureau Veritas ID		BRJ051			BRJ052		BRJ053	BRJ054		
Sampling Date		2023/05/30 11:15			2023/05/30 11:30		2023/05/30 12:30	2023/05/30 14:30		
COC Number		695881-02-01			695881-02-01		695881-02-01	695881-02-01		
	UNITS	WQ07	RDL	QC Batch	WQ06	QC Batch	WQ03	WQ04A	RDL	QC Batch
Demand Parameters										
Biochemical Oxygen Demand	mg/L	<2.0	2.0	A978523	<2.0	A978523	2.1	<2.0	2.0	A978523
Chemical Oxygen Demand	mg/L	49	10	A981342	45	A981342	36	<10	10	A981342
Misc. Inorganics										
Dissolved Oxygen (O2)	mg/L	>15 (1)	0.10	A978367	13	A978367	11	5.8	0.10	A978367
Total Dissolved Solids	mg/L	620	10	A981676	580	A982486	950	460	10	A982486
Total Suspended Solids	mg/L	5.3	0.99	A983225	6.9	A983225	6.5	8.3	1.0	A983225
Nutrients										
Total Ammonia (N)	mg/L	0.029	0.015	A980138	0.022	A980129	<0.015	<0.015	0.015	A980129
Orthophosphate (P)	mg/L	0.0040	0.0030	A982547	0.0041	A982546	<0.0030	<0.0030	0.0030	A982546
Dissolved Phosphorus (P)	mg/L	0.023	0.0030	A981224	0.020	A981224	0.013	<0.0030	0.0030	A981224
Total Phosphorus (P)	mg/L	0.044	0.0030	A981943	0.040	A981951	0.029	<0.0030	0.0030	A981943
Physical Properties										
Turbidity	NTU	4.8	0.10	A979607	6.7	A979607	6.9	0.64	0.10	A979607
RDL = Reportable Detection Limit										
(1) Result is greater than DO saturation limit due to possible matrix interference.										



GENERAL COMMENTS

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

Package 1	14.0°C
Package 2	13.7°C
Package 3	8.7°C

Sample BRJ048 [WQ05B] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ049 [WQ04D] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ050 [WQ04B] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ051 [WQ07] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ052 [WQ06] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ053 [WQ03] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample BRJ054 [WQ04A] : 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. Orthophosphate by Konelab completed within five days of sampling. Data is satisfactory for compliance purposes. NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Results relate only to the items tested.



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Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	A978367	NHE	Spiked Blank	Dissolved Oxygen (O2)	2023/05/31		95	%	80 - 120
	A978367	NHE	RPD	Dissolved Oxygen (O2)	2023/05/31	5.7		%	20
	A978523	BYM	Spiked Blank	Biochemical Oxygen Demand	2023/06/05		92	%	85 - 115
	A978523	BYM	Method Blank	Biochemical Oxygen Demand	2023/06/05	<2.0		mg/L	
	A978523	BYM	RPD	Biochemical Oxygen Demand	2023/06/05	0.70		%	20
	A979607	AP1	Spiked Blank	Turbidity	2023/06/01		102	%	80 - 120
	A979607	AP1	Method Blank	Turbidity	2023/06/01	<0.10		NTU	
	A979607	AP1	RPD	Turbidity	2023/06/01	NC		%	20
	A980129	AFI	Matrix Spike	Total Ammonia (N)	2023/06/05		113	%	80 - 120
	A980129	AFI	Spiked Blank	Total Ammonia (N)	2023/06/05		108	%	80 - 120
	A980129	AFI	Method Blank	Total Ammonia (N)	2023/06/05	<0.015		mg/L	
	A980129	AFI	RPD	Total Ammonia (N)	2023/06/05	NC		%	20
	A980138	ISW	Matrix Spike	Total Ammonia (N)	2023/06/05		98	%	80 - 120
	A980138	ISW	Spiked Blank	Total Ammonia (N)	2023/06/05		108	%	80 - 120
	A980138	ISW	Method Blank	Total Ammonia (N)	2023/06/05	<0.015		mg/L	
	A980138	ISW	RPD	Total Ammonia (N)	2023/06/05	1.1		%	20
	A980399	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/06/03		80	%	80 - 120
				Dissolved Antimony (Sb)	2023/06/03		121 (1)	%	80 - 120
				Dissolved Arsenic (As)	2023/06/03		96	%	80 - 120
				Dissolved Beryllium (Be)	2023/06/03		84	%	80 - 120
				Dissolved Chromium (Cr)	2023/06/03		93	%	80 - 120
				Dissolved Cobalt (Co)	2023/06/03		94	%	80 - 120
				Dissolved Copper (Cu)	2023/06/03		89	%	80 - 120
				Dissolved Lead (Pb)	2023/06/03		93	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/06/03		107	%	80 - 120
				Dissolved Nickel (Ni)	2023/06/03		89	%	80 - 120
				Dissolved Selenium (Se)	2023/06/03		111	%	80 - 120
				Dissolved Silver (Ag)	2023/06/03		97	%	80 - 120
				Dissolved Thallium (Tl)	2023/06/03		97	%	80 - 120
				Dissolved Tin (Sn)	2023/06/03		103	%	80 - 120
				Dissolved Titanium (Ti)	2023/06/03		96	%	80 - 120
				Dissolved Uranium (U)	2023/06/03		NC	%	80 - 120
				Dissolved Vanadium (V)	2023/06/03		97	%	80 - 120
				Dissolved Zinc (Zn)	2023/06/03		91	%	80 - 120
	A980399	JAB	Spiked Blank	Dissolved Aluminum (Al)	2023/06/03		94	%	80 - 120
				Dissolved Antimony (Sb)	2023/06/03		125 (1)	%	80 - 120
				Dissolved Arsenic (As)	2023/06/03		96	%	80 - 120
				Dissolved Beryllium (Be)	2023/06/03		85	%	80 - 120
				Dissolved Chromium (Cr)	2023/06/03		95	%	80 - 120
				Dissolved Cobalt (Co)	2023/06/03		96	%	80 - 120
				Dissolved Copper (Cu)	2023/06/03		94	%	80 - 120
				Dissolved Lead (Pb)	2023/06/03		99	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/06/03		101	%	80 - 120
				Dissolved Nickel (Ni)	2023/06/03		94	%	80 - 120
				Dissolved Selenium (Se)	2023/06/03		114	%	80 - 120
				Dissolved Silver (Ag)	2023/06/03		98	%	80 - 120
				Dissolved Thallium (Tl)	2023/06/03		101	%	80 - 120
				Dissolved Tin (Sn)	2023/06/03		103	%	80 - 120
				Dissolved Titanium (Ti)	2023/06/03		87	%	80 - 120
				Dissolved Uranium (U)	2023/06/03		97	%	80 - 120
				Dissolved Vanadium (V)	2023/06/03		101	%	80 - 120
				Dissolved Zinc (Zn)	2023/06/03		95	%	80 - 120
	A980399	JAB	Method Blank	Dissolved Aluminum (Al)	2023/06/03	<0.0030		mg/L	
				Dissolved Antimony (Sb)	2023/06/03	<0.00060		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

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Sampler Initials: EN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Dissolved Arsenic (As)	2023/06/03	<0.00020		mg/L	
				Dissolved Beryllium (Be)	2023/06/03	<0.0010		mg/L	
				Dissolved Chromium (Cr)	2023/06/03	<0.0010		mg/L	
				Dissolved Cobalt (Co)	2023/06/03	<0.00030		mg/L	
				Dissolved Copper (Cu)	2023/06/03	<0.0010		mg/L	
				Dissolved Lead (Pb)	2023/06/03	<0.00020		mg/L	
				Dissolved Molybdenum (Mo)	2023/06/03	<0.00020		mg/L	
				Dissolved Nickel (Ni)	2023/06/03	<0.00050		mg/L	
				Dissolved Selenium (Se)	2023/06/03	<0.00020		mg/L	
				Dissolved Silver (Ag)	2023/06/03	<0.00010		mg/L	
				Dissolved Thallium (Tl)	2023/06/03	<0.00020		mg/L	
				Dissolved Tin (Sn)	2023/06/03	<0.0010		mg/L	
				Dissolved Titanium (Ti)	2023/06/03	<0.0010		mg/L	
				Dissolved Uranium (U)	2023/06/03	<0.00010		mg/L	
				Dissolved Vanadium (V)	2023/06/03	<0.0010		mg/L	
				Dissolved Zinc (Zn)	2023/06/03	<0.0030		mg/L	
A980399	JAB	RPD		Dissolved Aluminum (Al)	2023/06/03	NC		%	20
				Dissolved Antimony (Sb)	2023/06/03	NC		%	20
				Dissolved Arsenic (As)	2023/06/03	3.7		%	20
				Dissolved Beryllium (Be)	2023/06/03	NC		%	20
				Dissolved Chromium (Cr)	2023/06/03	NC		%	20
				Dissolved Cobalt (Co)	2023/06/03	NC		%	20
				Dissolved Copper (Cu)	2023/06/03	11		%	20
				Dissolved Lead (Pb)	2023/06/03	NC		%	20
				Dissolved Molybdenum (Mo)	2023/06/03	8.6		%	20
				Dissolved Nickel (Ni)	2023/06/03	6.3		%	20
				Dissolved Selenium (Se)	2023/06/03	NC		%	20
				Dissolved Silver (Ag)	2023/06/03	NC		%	20
				Dissolved Thallium (Tl)	2023/06/03	NC		%	20
				Dissolved Tin (Sn)	2023/06/03	NC		%	20
				Dissolved Titanium (Ti)	2023/06/03	NC		%	20
				Dissolved Uranium (U)	2023/06/03	0.032		%	20
				Dissolved Vanadium (V)	2023/06/03	NC		%	20
				Dissolved Zinc (Zn)	2023/06/03	5.9		%	20
A980728	MPU	Matrix Spike		Dissolved Barium (Ba)	2023/06/01		113	%	80 - 120
				Dissolved Boron (B)	2023/06/01		113	%	80 - 120
				Dissolved Calcium (Ca)	2023/06/01		NC	%	80 - 120
				Dissolved Iron (Fe)	2023/06/01		NC	%	80 - 120
				Dissolved Lithium (Li)	2023/06/01		113	%	80 - 120
				Dissolved Magnesium (Mg)	2023/06/01		NC	%	80 - 120
				Dissolved Manganese (Mn)	2023/06/01		122 (1)	%	80 - 120
				Dissolved Phosphorus (P)	2023/06/01		122 (1)	%	80 - 120
				Dissolved Potassium (K)	2023/06/01		119	%	80 - 120
				Dissolved Silicon (Si)	2023/06/01		108	%	80 - 120
				Dissolved Sodium (Na)	2023/06/01		NC	%	80 - 120
				Dissolved Strontium (Sr)	2023/06/01		104	%	80 - 120
				Dissolved Sulphur (S)	2023/06/01		118	%	80 - 120
A980728	MPU	Spiked Blank		Dissolved Barium (Ba)	2023/06/01		102	%	80 - 120
				Dissolved Boron (B)	2023/06/01		99	%	80 - 120
				Dissolved Calcium (Ca)	2023/06/01		98	%	80 - 120
				Dissolved Iron (Fe)	2023/06/01		108	%	80 - 120
				Dissolved Lithium (Li)	2023/06/01		96	%	80 - 120
				Dissolved Magnesium (Mg)	2023/06/01		101	%	80 - 120
				Dissolved Manganese (Mn)	2023/06/01		107	%	80 - 120



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Phosphorus (P)	2023/06/01		102	%	80 - 120
			Dissolved Potassium (K)	2023/06/01		100	%	80 - 120
			Dissolved Silicon (Si)	2023/06/01		99	%	80 - 120
			Dissolved Sodium (Na)	2023/06/01		99	%	80 - 120
			Dissolved Strontium (Sr)	2023/06/01		99	%	80 - 120
			Dissolved Sulphur (S)	2023/06/01		98	%	80 - 120
A980728	MPU	Method Blank	Dissolved Barium (Ba)	2023/06/01	<0.010		mg/L	
			Dissolved Boron (B)	2023/06/01	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/06/01	<0.30		mg/L	
			Dissolved Iron (Fe)	2023/06/01	<0.060		mg/L	
			Dissolved Lithium (Li)	2023/06/01	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2023/06/01	<0.20		mg/L	
			Dissolved Manganese (Mn)	2023/06/01	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2023/06/01	<0.10		mg/L	
			Dissolved Potassium (K)	2023/06/01	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/06/01	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/06/01	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/06/01	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/06/01	<0.20		mg/L	
A980728	MPU	RPD	Dissolved Barium (Ba)	2023/06/01	0.85		%	20
			Dissolved Boron (B)	2023/06/01	7.7		%	20
			Dissolved Calcium (Ca)	2023/06/01	0.32		%	20
			Dissolved Iron (Fe)	2023/06/01	2.5		%	20
			Dissolved Lithium (Li)	2023/06/01	0.45		%	20
			Dissolved Magnesium (Mg)	2023/06/01	0.15		%	20
			Dissolved Manganese (Mn)	2023/06/01	3.5		%	20
			Dissolved Phosphorus (P)	2023/06/01	NC		%	20
			Dissolved Potassium (K)	2023/06/01	0.37		%	20
			Dissolved Silicon (Si)	2023/06/01	2.9		%	20
			Dissolved Sodium (Na)	2023/06/01	0.31		%	20
			Dissolved Strontium (Sr)	2023/06/01	0.42		%	20
			Dissolved Sulphur (S)	2023/06/01	2.8		%	20
A981224	MAP	Matrix Spike [BRJ054-05]	Dissolved Phosphorus (P)	2023/06/02		118	%	80 - 120
A981224	MAP	QC Standard	Dissolved Phosphorus (P)	2023/06/02		100	%	80 - 120
A981224	MAP	Spiked Blank	Dissolved Phosphorus (P)	2023/06/02		112	%	80 - 120
A981224	MAP	Method Blank	Dissolved Phosphorus (P)	2023/06/02	<0.0030		mg/L	
A981224	MAP	RPD [BRJ054-05]	Dissolved Phosphorus (P)	2023/06/02	NC		%	20
A981258	CTU	Matrix Spike [BRJ050-06]	Total Nitrogen (N)	2023/06/02		97	%	80 - 120
A981258	CTU	QC Standard	Total Nitrogen (N)	2023/06/02		100	%	80 - 120
A981258	CTU	Spiked Blank	Total Nitrogen (N)	2023/06/02		100	%	80 - 120
A981258	CTU	Method Blank	Total Nitrogen (N)	2023/06/02	<0.020		mg/L	
A981258	CTU	RPD [BRJ050-06]	Total Nitrogen (N)	2023/06/02	4.4		%	20
A981265	CTU	Matrix Spike [BRJ049-06]	Total Nitrogen (N)	2023/06/02		99	%	80 - 120
A981265	CTU	QC Standard	Total Nitrogen (N)	2023/06/02		103	%	80 - 120
A981265	CTU	Spiked Blank	Total Nitrogen (N)	2023/06/02		95	%	80 - 120
A981265	CTU	Method Blank	Total Nitrogen (N)	2023/06/02	<0.020		mg/L	
A981265	CTU	RPD [BRJ049-06]	Total Nitrogen (N)	2023/06/02	4.8		%	20
A981342	NHE	Matrix Spike	Chemical Oxygen Demand	2023/06/02		99	%	80 - 120
A981342	NHE	Spiked Blank	Chemical Oxygen Demand	2023/06/02		101	%	80 - 120
A981342	NHE	Method Blank	Chemical Oxygen Demand	2023/06/02	<10		mg/L	
A981342	NHE	RPD	Chemical Oxygen Demand	2023/06/02	0		%	20
A981676	SKP	Matrix Spike	Total Dissolved Solids	2023/06/02		103	%	80 - 120
A981676	SKP	Spiked Blank	Total Dissolved Solids	2023/06/02		101	%	80 - 120
A981676	SKP	Method Blank	Total Dissolved Solids	2023/06/02	<10		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	A981676	SKP	RPD	Total Dissolved Solids	2023/06/02	4.2		%	20
	A981920	BTM	Spiked Blank	Alkalinity (Total as CaCO3)	2023/06/02		93	%	80 - 120
	A981920	BTM	Method Blank	Alkalinity (PP as CaCO3)	2023/06/02	<1.0		mg/L	
				Alkalinity (Total as CaCO3)	2023/06/02	<1.0		mg/L	
				Bicarbonate (HCO3)	2023/06/02	<1.0		mg/L	
				Carbonate (CO3)	2023/06/02	<1.0		mg/L	
				Hydroxide (OH)	2023/06/02	<1.0		mg/L	
	A981920	BTM	RPD	Alkalinity (PP as CaCO3)	2023/06/02	NC		%	20
				Alkalinity (Total as CaCO3)	2023/06/02	NC		%	20
				Bicarbonate (HCO3)	2023/06/02	NC		%	20
				Carbonate (CO3)	2023/06/02	NC		%	20
				Hydroxide (OH)	2023/06/02	NC		%	20
	A981943	CTU	Matrix Spike	Total Phosphorus (P)	2023/06/03		111	%	80 - 120
	A981943	CTU	QC Standard	Total Phosphorus (P)	2023/06/03		92	%	80 - 120
	A981943	CTU	Spiked Blank	Total Phosphorus (P)	2023/06/03		105	%	80 - 120
	A981943	CTU	Method Blank	Total Phosphorus (P)	2023/06/03	<0.0030		mg/L	
	A981943	CTU	RPD	Total Phosphorus (P)	2023/06/03	15		%	20
	A981951	CTU	Matrix Spike	Total Phosphorus (P)	2023/06/03		101	%	80 - 120
	A981951	CTU	QC Standard	Total Phosphorus (P)	2023/06/03		89	%	80 - 120
	A981951	CTU	Spiked Blank	Total Phosphorus (P)	2023/06/03		102	%	80 - 120
	A981951	CTU	Method Blank	Total Phosphorus (P)	2023/06/03	<0.0030		mg/L	
	A981951	CTU	RPD	Total Phosphorus (P)	2023/06/03	3.1		%	20
	A982197	BTM	Spiked Blank	pH	2023/06/02		100	%	97 - 103
	A982197	BTM	RPD	pH	2023/06/02	0.41		%	N/A
	A982202	BTM	Spiked Blank	Conductivity	2023/06/02		99	%	90 - 110
	A982202	BTM	Method Blank	Conductivity	2023/06/02	<2.0		uS/cm	
	A982202	BTM	RPD	Conductivity	2023/06/02	0.41		%	10
	A982404	BTM	Spiked Blank	Alkalinity (Total as CaCO3)	2023/06/03		93	%	80 - 120
	A982404	BTM	Method Blank	Alkalinity (PP as CaCO3)	2023/06/03	<1.0		mg/L	
				Alkalinity (Total as CaCO3)	2023/06/03	<1.0		mg/L	
				Bicarbonate (HCO3)	2023/06/03	<1.0		mg/L	
				Carbonate (CO3)	2023/06/03	<1.0		mg/L	
				Hydroxide (OH)	2023/06/03	<1.0		mg/L	
	A982410	BTM	Spiked Blank	pH	2023/06/03		100	%	97 - 103
	A982412	BTM	Spiked Blank	Conductivity	2023/06/03		99	%	90 - 110
	A982412	BTM	Method Blank	Conductivity	2023/06/03	<2.0		uS/cm	
	A982486	AZI	Matrix Spike	Total Dissolved Solids	2023/06/03		90	%	80 - 120
	A982486	AZI	Spiked Blank	Total Dissolved Solids	2023/06/03		98	%	80 - 120
	A982486	AZI	Method Blank	Total Dissolved Solids	2023/06/03	<10		mg/L	
	A982486	AZI	RPD	Total Dissolved Solids	2023/06/03	1.9		%	20
	A982546	CTU	Matrix Spike	Orthophosphate (P)	2023/06/03		105	%	80 - 120
	A982546	CTU	Spiked Blank	Orthophosphate (P)	2023/06/03		98	%	80 - 120
	A982546	CTU	Method Blank	Orthophosphate (P)	2023/06/03	<0.0030		mg/L	
	A982546	CTU	RPD	Orthophosphate (P)	2023/06/03	0.35		%	20
	A982547	CTU	Matrix Spike	Orthophosphate (P)	2023/06/03		102	%	80 - 120
	A982547	CTU	Spiked Blank	Orthophosphate (P)	2023/06/03		98	%	80 - 120
	A982547	CTU	Method Blank	Orthophosphate (P)	2023/06/03	<0.0030		mg/L	
	A982547	CTU	RPD	Orthophosphate (P)	2023/06/03	0.040		%	20
	A982917	ISW	Matrix Spike	Nitrite (N)	2023/06/04		101	%	80 - 120
				Nitrate plus Nitrite (N)	2023/06/04		NC	%	80 - 120
	A982917	ISW	Spiked Blank	Nitrite (N)	2023/06/04		103	%	80 - 120
				Nitrate plus Nitrite (N)	2023/06/04		105	%	80 - 120
	A982917	ISW	Method Blank	Nitrite (N)	2023/06/04	<0.010		mg/L	
				Nitrate plus Nitrite (N)	2023/06/04	<0.010		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A982917	ISW	RPD		Nitrite (N)	2023/06/04	2.8		%	20
				Nitrate plus Nitrite (N)	2023/06/04	1.9		%	20
A982918	ISW	Matrix Spike		Nitrite (N)	2023/06/05		97	%	80 - 120
				Nitrate plus Nitrite (N)	2023/06/05		NC	%	80 - 120
A982918	ISW	Spiked Blank		Nitrite (N)	2023/06/04		94	%	80 - 120
				Nitrate plus Nitrite (N)	2023/06/04		108	%	80 - 120
A982918	ISW	Method Blank		Nitrite (N)	2023/06/04	<0.010		mg/L	
				Nitrate plus Nitrite (N)	2023/06/04	<0.010		mg/L	
A982918	ISW	RPD		Nitrite (N)	2023/06/04	1.6		%	20
				Nitrate plus Nitrite (N)	2023/06/04	1.1		%	20
A983225	HE1	Matrix Spike [BRJ050-01]		Total Suspended Solids	2023/06/05		104	%	80 - 120
A983225	HE1	Spiked Blank		Total Suspended Solids	2023/06/05		94	%	80 - 120
A983225	HE1	Method Blank		Total Suspended Solids	2023/06/05	<1.0		mg/L	
A983225	HE1	RPD [BRJ049-01]		Total Suspended Solids	2023/06/05	2.1		%	20
A983808	JAV	Matrix Spike		Chloride (Cl)	2023/06/05		106	%	80 - 120
				Sulphate (SO4)	2023/06/05		NC	%	80 - 120
A983808	JAV	Spiked Blank		Chloride (Cl)	2023/06/05		104	%	80 - 120
				Sulphate (SO4)	2023/06/05		101	%	80 - 120
A983808	JAV	Method Blank		Chloride (Cl)	2023/06/05	<1.0		mg/L	
				Sulphate (SO4)	2023/06/05	<1.0		mg/L	
A983808	JAV	RPD		Chloride (Cl)	2023/06/05	5.5		%	20
				Sulphate (SO4)	2023/06/05	1.2		%	20
A985596	TOR	Matrix Spike [BRJ052-03]		Chloride (Cl)	2023/06/06		96	%	80 - 120
				Sulphate (SO4)	2023/06/06		NC	%	80 - 120
A985596	TOR	Spiked Blank		Chloride (Cl)	2023/06/06		99	%	80 - 120
				Sulphate (SO4)	2023/06/06		108	%	80 - 120
A985596	TOR	Method Blank		Chloride (Cl)	2023/06/06	<1.0		mg/L	
				Sulphate (SO4)	2023/06/06	<1.0		mg/L	
A985596	TOR	RPD [BRJ052-03]		Chloride (Cl)	2023/06/06	0.51		%	20
				Sulphate (SO4)	2023/06/06	0.23		%	20
A987826	JLD	Spiked Blank		Alkalinity (Total as CaCO3)	2023/06/08		99	%	80 - 120
A987826	JLD	Method Blank		Alkalinity (PP as CaCO3)	2023/06/08	<1.0		mg/L	
				Alkalinity (Total as CaCO3)	2023/06/08	<1.0		mg/L	
				Bicarbonate (HCO3)	2023/06/08	<1.0		mg/L	
				Carbonate (CO3)	2023/06/08	<1.0		mg/L	
				Hydroxide (OH)	2023/06/08	<1.0		mg/L	
A987826	JLD	RPD		Alkalinity (PP as CaCO3)	2023/06/08	NC		%	20
				Alkalinity (Total as CaCO3)	2023/06/08	1.7		%	20
				Bicarbonate (HCO3)	2023/06/08	1.7		%	20
				Carbonate (CO3)	2023/06/08	NC		%	20
				Hydroxide (OH)	2023/06/08	NC		%	20
A987838	JLD	Spiked Blank		pH	2023/06/08		100	%	97 - 103
A987838	JLD	RPD		pH	2023/06/08	0.36		%	N/A
A987841	JLD	Spiked Blank		Conductivity	2023/06/08		99	%	90 - 110
A987841	JLD	Method Blank		Conductivity	2023/06/08	<2.0		uS/cm	



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	A987841	JLD	RPD	Conductivity	2023/06/08	0.10		%	10
<p>N/A = Not Applicable</p> <p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>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.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>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)</p> <p>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).</p> <p>(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.</p>									



BUREAU
VERITAS

Bureau Veritas Job #: C338553
Report Date: 2023/06/08

Ausenco Sustainability Inc.
Client Project #: 102604-01
Sampler Initials: EN

VALIDATION SIGNATURE PAGE

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

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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



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Bureau Veritas
4000 19th N.E. Calgary, Alberta Canada T2E 6P8 Tel: (403) 291-3077 Toll-free 800-563-0266 Fax: (403) 291-3465 www.bvna.com

1137

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #10658 Ausenco Sustainability Inc.	Company Name: <u>AUSENCO</u>	Quotation #: C21878	Bureau Veritas Job #: <u>C338553</u>	Bottle Order #:			
Attention: Accounts Payable	Attention: <u>Erin Moffatt</u>	P.O. #:	102604-01	Project Manager:	<u>Geraldyn Gauthro</u>		
Address: Suite 1430, 401-9 Avenue CALGARY AB T2P 3C5	Address: <u>401 9 AVE SW SUITE 1430 CALGARY AB T2P 3C5</u>	Project Name:		COC #:			
Tel: (403) 264-0671 Fax: (403) 264-0670	Tel: _____ Fax: _____	Site #:		Sampled By: <u>E. Northcott, E. Moffatt</u>	C/595881 02 01		
Email: procure2pay.na@ausenco.com	Email: <u>erin.moffatt@ausenco.com</u>						

Regulatory Criteria: <input type="checkbox"/> ATI <input checked="" type="checkbox"/> CCME <input type="checkbox"/> Other	Special Instructions:	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects.		
		Metals Field Filled? (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	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.	<input checked="" type="checkbox"/>
													Job Specific Rush TAT (if applies to entire submission)	<input type="checkbox"/>
													Date Required:	<input type="checkbox"/>
													Rush Confirmation Number:	

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS										# of Bottles	Comments						
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filled? (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	WQ05B	23/05/20	0830	Water	Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
2	WQ04D		0925		Y											8	
3	WQ04B		0945		Y											8	
4	WQ07		1115		Y											8	
5	WQ06		1130		Y											8	
6	WQ03		1230		Y											8	
7	WQ04A		1430		Y	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
8																	
9																	
10																	

* RELINQUISHED BY: (Signature/Print) <u>Erin Moffatt</u>	Date: (YY/MM/DD) <u>23/05/20</u>	Time	RECEIVED BY: (Signature/Print) <u>Magorie Cantor</u>	Date: (YY/MM/DD) <u>2023/05/20</u>	Time <u>1635</u>	# Jars used and not submitted	Laboratory Use Only
							Temperature Sensitive <input type="checkbox"/> Temperature (°C) on Receipt <u>13, 14, 15</u> Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No While: Bureau Veritas Yellow: Client <u>Joe - yes</u>

* 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.

10, 13, 18
3, 10, 13

Appendix C

Raw Fall Sampling Data



Your Project #: 102604-01
Your C.O.C. #: 1OF1

Attention: Erin Moffatt

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

Report Date: 2023/10/27
Report #: R3417423
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 2320 B m
Biochemical Oxygen Demand	6	2023/10/19	2023/10/24	AB SOP-00017	SM 23 5210B m
Cadmium - low level CCME - Dissolved	6	N/A	2023/10/21		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	6	N/A	2023/10/24	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
COD by Colorimeter	6	N/A	2023/10/23	AB SOP-00016	SM 23 5220D m
Oxygen (Dissolved) (2)	6	N/A	2023/10/20	AB SOP-00058	SM 23 4500-O C m
Conductivity @25C (1)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 2510 B m
Hardness	1	N/A	2023/10/25		Auto Calc
Hardness	5	N/A	2023/10/26		Auto Calc
Elements by ICP - Dissolved (3)	1	N/A	2023/10/24	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Dissolved (3)	5	N/A	2023/10/26	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (3)	6	N/A	2023/10/20	AB SOP-00043	EPA 6020b R2 m
Ion Balance	1	N/A	2023/10/25	BBY WI-00033	Auto Calc
Ion Balance	5	N/A	2023/10/26	BBY WI-00033	Auto Calc
Sum of cations, anions	1	N/A	2023/10/25	BBY WI-00033	Auto Calc
Sum of cations, anions	5	N/A	2023/10/26	BBY WI-00033	Auto Calc
Nitrogen (Total) (1)	6	N/A	2023/10/25	BBY6SOP-00016	SM 24 4500-N C m
Ammonia-N (Total)	6	N/A	2023/10/20	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite	6	N/A	2023/10/26		Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2023/10/26		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	6	N/A	2023/10/24	AB SOP-00023	SM 23 4110 B m
pH @25°C (1, 4)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 4500-H+ B m
Orthophosphate by Automated Analyzer (5)	6	N/A	2023/10/23	AB SOP-00025	SM 24 4500-P A,B,F m
Total Dissolved Solids (Filt. Residue)	6	2023/10/24	2023/10/25	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Calculated)	1	N/A	2023/10/25	BBY WI-00033	Calculated Parameter
Total Dissolved Solids (Calculated)	5	N/A	2023/10/26	BBY WI-00033	Calculated Parameter
Total Kjeldahl Nitrogen (Total)	6	N/A	2023/10/26	BBY WI-00033	Auto Calc
Total Phosphorus Dissolved client FF/FP (6)	4	2023/10/21	2023/10/23	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus Dissolved client FF/FP (6)	2	2023/10/23	2023/10/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	6	2023/10/23	2023/10/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Suspended Solids (NFR)	6	2023/10/23	2023/10/24	AB SOP-00061	SM 24 2540 D m



Your Project #: 102604-01
Your C.O.C. #: 1OF1

Attention: Erin Moffatt

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

Report Date: 2023/10/27
Report #: R3417423
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Turbidity	6	N/A	2023/10/21	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, MELCC, EPA, APHA.

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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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) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5
- (2) 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.
- (3) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (4) 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.
- (5) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (6) Dissolved Phosphorus > Total Phosphorus Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.



Your Project #: 102604-01
Your C.O.C. #: 1OF1

Attention: Erin Moffatt

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

Report Date: 2023/10/27
Report #: R3417423
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Encryption Key



Bureau Veritas
27 Oct 2023 13:22:30

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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BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG202			CCG203		
Sampling Date		2023/10/19 10:25			2023/10/18 14:20		
COC Number		1OF1			1OF1		
	UNITS	WQ-02	RDL	QC Batch	WQ-4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	11	N/A	B161844	9.0	N/A	B161844
Cation Sum	meq/L	13	N/A	B161844	9.1	N/A	B161844
Hardness (CaCO3)	mg/L	500	0.50	B161793	360	0.50	B161793
Ion Balance (% Difference)	%	8.7	N/A	B161242	0.78	N/A	B161242
Nitrate (NO3)	mg/L	<0.044	0.044	B161800	2.4	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	590	10	B161845	560	10	B161845

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
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Misc. Inorganics

Conductivity	uS/cm	970	2.0	B166331	900	2.0	B166331
pH	pH	8.25	N/A	B166311	6.54	N/A	B166311

Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	370	1.0	B166328	81	1.0	B166328
Bicarbonate (HCO3)	mg/L	450	1.0	B166328	98	1.0	B166328
Carbonate (CO3)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	14	1.0	B167221	6.2	1.0	B167251
Sulphate (SO4)	mg/L	130	5.0	B167221	340	5.0	B167251

Elements

Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163016
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163016
Dissolved Arsenic (As)	mg/L	0.00069	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Barium (Ba)	mg/L	0.099	0.010	B167951	0.074	0.010	B167830
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Boron (B)	mg/L	0.047	0.020	B167951	0.045	0.020	B167830
Dissolved Calcium (Ca)	mg/L	85	0.30	B167951	74	0.30	B167830
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163016
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.060	0.060	B167830

RDL = Reportable Detection Limit
N/A = Not Applicable



ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG202			CCG203		
Sampling Date		2023/10/19 10:25			2023/10/18 14:20		
COC Number		1OF1			1OF1		
	UNITS	WQ-02	RDL	QC Batch	WQ-4A	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Lithium (Li)	mg/L	0.025	0.020	B167951	<0.020	0.020	B167830
Dissolved Magnesium (Mg)	mg/L	71	0.20	B167951	42	0.20	B167830
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	B167951	<0.0060	0.0060	B167830
Dissolved Molybdenum (Mo)	mg/L	0.0017	0.00020	B163053	0.0025	0.00020	B163016
Dissolved Nickel (Ni)	mg/L	0.00068	0.00050	B163053	<0.00050	0.00050	B163016
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.10	0.10	B167830
Dissolved Potassium (K)	mg/L	6.0	0.30	B167951	4.0	0.30	B167830
Dissolved Selenium (Se)	mg/L	0.00061	0.00020	B163053	0.0022	0.00020	B163016
Dissolved Silicon (Si)	mg/L	4.9	0.50	B167951	4.1	0.50	B167830
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163016
Dissolved Sodium (Na)	mg/L	55	0.50	B167951	42	0.50	B167830
Dissolved Strontium (Sr)	mg/L	0.80	0.020	B167951	0.73	0.020	B167830
Dissolved Sulphur (S)	mg/L	36	0.20	B167951	17	0.20	B167830
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Uranium (U)	mg/L	0.0042	0.00010	B163053	0.0043	0.00010	B163016
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163016
RDL = Reportable Detection Limit							



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Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG204			CCG205		
Sampling Date		2023/10/18 13:55			2023/10/19 10:50		
COC Number		1OF1			1OF1		
	UNITS	WQ-4B	RDL	QC Batch	WQ-4C	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	9.1	N/A	B161844	9.9	N/A	B161844
Cation Sum	meq/L	10	N/A	B161844	11	N/A	B161844
Hardness (CaCO3)	mg/L	400	0.50	B161793	430	0.50	B161793
Ion Balance (% Difference)	%	5.5	N/A	B161242	5.2	N/A	B161242
Nitrate (NO3)	mg/L	2.3	0.044	B161800	<0.044	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	480	10	B161845	520	10	B161845
Elements							
Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
Misc. Inorganics							
Conductivity	uS/cm	850	2.0	B166331	880	2.0	B166331
pH	pH	8.21	N/A	B166311	8.34	N/A	B166311
Anions							
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B166328	12	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	340	1.0	B166328	390	1.0	B166328
Bicarbonate (HCO3)	mg/L	410	1.0	B166328	450	1.0	B166328
Carbonate (CO3)	mg/L	<1.0	1.0	B166328	14	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	39	1.0	B167251	14	1.0	B167251
Sulphate (SO4)	mg/L	55	1.0	B167251	82	1.0	B167251
Elements							
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163053
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163053
Dissolved Arsenic (As)	mg/L	0.00023	0.00020	B163053	0.00043	0.00020	B163053
Dissolved Barium (Ba)	mg/L	0.076	0.010	B167951	0.11	0.050	B167950
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Boron (B)	mg/L	0.090	0.020	B167951	<0.10	0.10	B167950
Dissolved Calcium (Ca)	mg/L	81	0.30	B167951	74	1.5	B167950
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163053
Dissolved Copper (Cu)	mg/L	0.0014	0.0010	B163053	0.0013	0.0010	B163053
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.30	0.30	B167950
RDL = Reportable Detection Limit N/A = Not Applicable							



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Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG204			CCG205		
Sampling Date		2023/10/18 13:55			2023/10/19 10:50		
COC Number		1OF1			1OF1		
	UNITS	WQ-4B	RDL	QC Batch	WQ-4C	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163053
Dissolved Lithium (Li)	mg/L	0.022	0.020	B167951	<0.10	0.10	B167950
Dissolved Magnesium (Mg)	mg/L	48	0.20	B167951	60	1.0	B167950
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	B167951	<0.020	0.020	B167950
Dissolved Molybdenum (Mo)	mg/L	0.0014	0.00020	B163053	0.0015	0.00020	B163053
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	B163053	0.00050	0.00050	B163053
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.50	0.50	B167950
Dissolved Potassium (K)	mg/L	4.7	0.30	B167951	5.3	1.5	B167950
Dissolved Selenium (Se)	mg/L	0.0020	0.00020	B163053	0.00068	0.00020	B163053
Dissolved Silicon (Si)	mg/L	3.4	0.50	B167951	5.3	2.5	B167950
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163053
Dissolved Sodium (Na)	mg/L	45	0.50	B167951	50	2.5	B167950
Dissolved Strontium (Sr)	mg/L	0.83	0.020	B167951	0.80	0.10	B167950
Dissolved Sulphur (S)	mg/L	18	0.20	B167951	27	1.0	B167950
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163053
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Uranium (U)	mg/L	0.0035	0.00010	B163053	0.0039	0.00010	B163053
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Zinc (Zn)	mg/L	0.0036	0.0030	B163053	0.0033	0.0030	B163053
RDL = Reportable Detection Limit							



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Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG206			CCG207		
Sampling Date		2023/10/18 13:24			2023/10/18 12:55		
COC Number		1OF1			1OF1		
	UNITS	WQ-4D	RDL	QC Batch	WQ-5B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.7	N/A	B161844	12	N/A	B161844
Cation Sum	meq/L	9.5	N/A	B161844	14	N/A	B161844
Hardness (CaCO3)	mg/L	370	0.50	B161793	620	0.50	B161793
Ion Balance (% Difference)	%	4.2	N/A	B161242	10	N/A	B161242
Nitrate (NO3)	mg/L	<0.044	0.044	B161800	<0.044	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	460	10	B161845	640	10	B161845

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
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Misc. Inorganics

Conductivity	uS/cm	790	2.0	B166331	1000	2.0	B166331
pH	pH	8.47	N/A	B166311	8.26	N/A	B166311

Anions

Alkalinity (PP as CaCO3)	mg/L	20	1.0	B166328	<1.0	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	360	1.0	B166328	420	1.0	B166328
Bicarbonate (HCO3)	mg/L	390	1.0	B166328	510	1.0	B166328
Carbonate (CO3)	mg/L	24	1.0	B166328	<1.0	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	11	1.0	B167251	11	1.0	B167251
Sulphate (SO4)	mg/L	60	1.0	B167251	140	5.0	B167251

Elements

Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163046
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163046
Dissolved Arsenic (As)	mg/L	0.00024	0.00020	B163053	0.00092	0.00020	B163046
Dissolved Barium (Ba)	mg/L	0.078	0.010	B167951	0.20	0.050	B167950
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Boron (B)	mg/L	0.041	0.020	B167951	<0.10	0.10	B167950
Dissolved Calcium (Ca)	mg/L	71	0.30	B167951	110	1.5	B167950
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163046
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.30	0.30	B167950

RDL = Reportable Detection Limit
N/A = Not Applicable



ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG206			CCG207		
Sampling Date		2023/10/18 13:24			2023/10/18 12:55		
COC Number		1OF1			1OF1		
	UNITS	WQ-4D	RDL	QC Batch	WQ-5B	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	0.00036	0.00020	B163046
Dissolved Lithium (Li)	mg/L	0.026	0.020	B167951	<0.10	0.10	B167950
Dissolved Magnesium (Mg)	mg/L	46	0.20	B167951	87	1.0	B167950
Dissolved Manganese (Mn)	mg/L	0.0045	0.0040	B167951	<0.020	0.020	B167950
Dissolved Molybdenum (Mo)	mg/L	0.0014	0.00020	B163053	0.0018	0.00020	B163046
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	B163053	0.0016	0.00050	B163046
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.50	0.50	B167950
Dissolved Potassium (K)	mg/L	6.3	0.30	B167951	6.3	1.5	B167950
Dissolved Selenium (Se)	mg/L	0.00057	0.00020	B163053	0.00036	0.00020	B163046
Dissolved Silicon (Si)	mg/L	5.3	0.50	B167951	3.9	2.5	B167950
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163046
Dissolved Sodium (Na)	mg/L	47	0.50	B167951	40	2.5	B167950
Dissolved Strontium (Sr)	mg/L	0.71	0.020	B167951	0.73	0.10	B167950
Dissolved Sulphur (S)	mg/L	20	0.20	B167951	44	1.0	B167950
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163046
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Uranium (U)	mg/L	0.0020	0.00010	B163053	0.0063	0.00010	B163046
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Zinc (Zn)	mg/L	0.043	0.0030	B163053	<0.0030	0.0030	B163046
RDL = Reportable Detection Limit							



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Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CCG202		CCG203			CCG204		
Sampling Date		2023/10/19 10:25		2023/10/18 14:20			2023/10/18 13:55		
COC Number		1OF1		1OF1			1OF1		
	UNITS	WQ-02	QC Batch	WQ-4A	RDL	QC Batch	WQ-4B	RDL	QC Batch
Calculated Parameters									
Nitrate plus Nitrite (N)	mg/L	<0.014	B167733	0.54	0.014	B167486	0.51	0.014	B167486
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.290	B161152	0.613	0.020	B161152	0.121	0.020	B161152
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	B160996	<3.0	2.0	B160996	<2.0	2.0	B160996
Chemical Oxygen Demand	mg/L	26	B165855	55	10	B165855	38	10	B165855
Misc. Inorganics									
Dissolved Oxygen (O2)	mg/L	11	B162488	4.6	0.10	B162488	16	0.10	B162488
Total Dissolved Solids	mg/L	530	B166885	420	10	B166885	460	10	B166885
Total Suspended Solids	mg/L	35	B165224	210	1.0	B165224	<0.98	0.98	B165224
Nutrients									
Total Ammonia (N)	mg/L	<0.015	B163091	<0.015	0.015	B163091	<0.015	0.015	B163091
Orthophosphate (P)	mg/L	<0.0030	B166593	<0.0030	0.0030	B166593	<0.0030	0.0030	B166593
Dissolved Phosphorus (P)	mg/L	<0.0030	B165681	<0.0030	0.0030	B164442	<0.0030	0.0030	B164442
Total Phosphorus (P)	mg/L	0.0088	B165729	0.11	0.0030	B165729	<0.0030	0.0030	B165729
Total Nitrogen (N)	mg/L	0.290	B168711	1.15	0.020	B168711	0.632	0.020	B168711
Nitrite (N)	mg/L	<0.010	B169779	<0.010	0.010	B169753	<0.010	0.010	B169786
Nitrate (N)	mg/L	<0.010	B169779	0.54	0.010	B169753	0.51	0.010	B169786
Physical Properties									
Turbidity	NTU	19	B163746	70	0.10	B163745	1.5	0.10	B163745
RDL = Reportable Detection Limit									



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Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CCG205		CCG206		CCG207		
Sampling Date		2023/10/19 10:50		2023/10/18 13:24		2023/10/18 12:55		
COC Number		1OF1		1OF1		1OF1		
	UNITS	WQ-4C	QC Batch	WQ-4D	QC Batch	WQ-5B	RDL	QC Batch
Calculated Parameters								
Nitrate plus Nitrite (N)	mg/L	<0.014	B167733	<0.014	B167486	<0.014	0.014	B167486
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.227	B161152	0.336	B161851	0.524	0.020	B161851
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	B160996	<2.0	B160996	<2.5	2.0	B160996
Chemical Oxygen Demand	mg/L	19	B165855	25	B165855	40	10	B165855
Misc. Inorganics								
Dissolved Oxygen (O2)	mg/L	10	B162488	13	B162488	>15 (1)	0.10	B162488
Total Dissolved Solids	mg/L	500	B166885	440	B166885	590	10	B166885
Total Suspended Solids	mg/L	13	B165224	110	B165224	5.7	1.0	B165224
Nutrients								
Total Ammonia (N)	mg/L	<0.015	B163091	<0.015	B163091	<0.015	0.015	B163091
Orthophosphate (P)	mg/L	<0.0030	B166593	<0.0030	B166593	0.0035	0.0030	B166593
Dissolved Phosphorus (P)	mg/L	<0.0030	B164442	<0.0030	B165681	<0.0030 (2)	0.0030	B164442
Total Phosphorus (P)	mg/L	<0.0030	B165729	0.028	B165729	0.025	0.0030	B165186
Total Nitrogen (N)	mg/L	0.227	B168711	0.336	B168711	0.524	0.020	B168970
Nitrite (N)	mg/L	<0.010	B169786	<0.010	B169786	<0.010	0.010	B169786
Nitrate (N)	mg/L	<0.010	B169786	<0.010	B169786	<0.010	0.010	B169786
Physical Properties								
Turbidity	NTU	10	B163746	39	B163745	3.6	0.10	B163745
RDL = Reportable Detection Limit								
(1) Result is greater than DO saturation limit due to possible matrix interference.								
(2) Phosphorus < Orthophosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.								



GENERAL COMMENTS

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

Package 1	4.7°C
Package 2	4.7°C

Sample CCG202 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Nitrogen (Nitrite - Nitrate) by IC completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample CCG203 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG204 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG205 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Nitrogen (Nitrite - Nitrate) by IC completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample CCG206 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG207 [WQ-5B] : 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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

ROUTINE WATER & DISS. REGULATED METALS (WATER) Comments

Sample CCG205 [WQ-4C] Elements by ICP - Dissolved: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample CCG207 [WQ-5B] Elements by ICP - Dissolved: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

RESULTS OF CHEMICAL ANALYSES OF WATER Comments

Sample CCG203 [WQ-4A] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time, due to instrument issues, sample were rerun outside hold time.

Sample CCG204 [WQ-4B] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Sample CCG206 [WQ-4D] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Sample CCG207 [WQ-5B] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	B160996	LYV	Spiked Blank	Biochemical Oxygen Demand	2023/10/24		91	%	85 - 115
	B160996	LYV	Method Blank	Biochemical Oxygen Demand	2023/10/24	<2.0		mg/L	
	B160996	LYV	RPD	Biochemical Oxygen Demand	2023/10/24	3.6		%	20
	B162488	BYM	Spiked Blank	Dissolved Oxygen (O2)	2023/10/20		93	%	80 - 120
	B162488	BYM	RPD [CCG202-01]	Dissolved Oxygen (O2)	2023/10/20	1.8		%	20
	B163016	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/10/20		100	%	80 - 120
				Dissolved Antimony (Sb)	2023/10/20		101	%	80 - 120
				Dissolved Arsenic (As)	2023/10/20		102	%	80 - 120
				Dissolved Beryllium (Be)	2023/10/20		94	%	80 - 120
				Dissolved Chromium (Cr)	2023/10/20		97	%	80 - 120
				Dissolved Cobalt (Co)	2023/10/20		98	%	80 - 120
				Dissolved Copper (Cu)	2023/10/20		96	%	80 - 120
				Dissolved Lead (Pb)	2023/10/20		89	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/10/20		NC	%	80 - 120
				Dissolved Nickel (Ni)	2023/10/20		97	%	80 - 120
				Dissolved Selenium (Se)	2023/10/20		98	%	80 - 120
				Dissolved Silver (Ag)	2023/10/20		87	%	80 - 120
				Dissolved Thallium (Tl)	2023/10/20		87	%	80 - 120
				Dissolved Tin (Sn)	2023/10/20		93	%	80 - 120
				Dissolved Titanium (Ti)	2023/10/20		101	%	80 - 120
				Dissolved Uranium (U)	2023/10/20		93	%	80 - 120
				Dissolved Vanadium (V)	2023/10/20		99	%	80 - 120
				Dissolved Zinc (Zn)	2023/10/20		94	%	80 - 120
	B163016	JAB	Spiked Blank	Dissolved Aluminum (Al)	2023/10/20		112	%	80 - 120
				Dissolved Antimony (Sb)	2023/10/20		108	%	80 - 120
				Dissolved Arsenic (As)	2023/10/20		104	%	80 - 120
				Dissolved Beryllium (Be)	2023/10/20		102	%	80 - 120
				Dissolved Chromium (Cr)	2023/10/20		103	%	80 - 120
				Dissolved Cobalt (Co)	2023/10/20		105	%	80 - 120
				Dissolved Copper (Cu)	2023/10/20		105	%	80 - 120
				Dissolved Lead (Pb)	2023/10/20		97	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/10/20		99	%	80 - 120
				Dissolved Nickel (Ni)	2023/10/20		104	%	80 - 120
				Dissolved Selenium (Se)	2023/10/20		98	%	80 - 120
				Dissolved Silver (Ag)	2023/10/20		93	%	80 - 120
				Dissolved Thallium (Tl)	2023/10/20		94	%	80 - 120
				Dissolved Tin (Sn)	2023/10/20		94	%	80 - 120
				Dissolved Titanium (Ti)	2023/10/20		109	%	80 - 120
				Dissolved Uranium (U)	2023/10/20		98	%	80 - 120
				Dissolved Vanadium (V)	2023/10/20		103	%	80 - 120
				Dissolved Zinc (Zn)	2023/10/20		100	%	80 - 120
	B163016	JAB	Method Blank	Dissolved Aluminum (Al)	2023/10/20	<0.0030		mg/L	
				Dissolved Antimony (Sb)	2023/10/20	<0.00060		mg/L	
				Dissolved Arsenic (As)	2023/10/20	<0.00020		mg/L	
				Dissolved Beryllium (Be)	2023/10/20	<0.0010		mg/L	
				Dissolved Chromium (Cr)	2023/10/20	<0.0010		mg/L	
				Dissolved Cobalt (Co)	2023/10/20	<0.00030		mg/L	
				Dissolved Copper (Cu)	2023/10/20	<0.0010		mg/L	
				Dissolved Lead (Pb)	2023/10/20	<0.00020		mg/L	
				Dissolved Molybdenum (Mo)	2023/10/20	<0.00020		mg/L	
				Dissolved Nickel (Ni)	2023/10/20	<0.00050		mg/L	
				Dissolved Selenium (Se)	2023/10/20	<0.00020		mg/L	
				Dissolved Silver (Ag)	2023/10/20	<0.00010		mg/L	
				Dissolved Thallium (Tl)	2023/10/20	<0.00020		mg/L	
				Dissolved Tin (Sn)	2023/10/20	<0.0010		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
B163016	JAB	RPD	Dissolved Titanium (Ti)	2023/10/20	<0.0010		mg/L				
			Dissolved Uranium (U)	2023/10/20	<0.00010		mg/L				
			Dissolved Vanadium (V)	2023/10/20	<0.0010		mg/L				
			Dissolved Zinc (Zn)	2023/10/20	<0.0030		mg/L				
			Dissolved Aluminum (Al)	2023/10/20	NC		%	20			
			Dissolved Antimony (Sb)	2023/10/20	NC		%	20			
			Dissolved Arsenic (As)	2023/10/20	1.5		%	20			
			Dissolved Beryllium (Be)	2023/10/20	NC		%	20			
			Dissolved Chromium (Cr)	2023/10/20	NC		%	20			
			Dissolved Cobalt (Co)	2023/10/20	NC		%	20			
			Dissolved Copper (Cu)	2023/10/20	NC		%	20			
			Dissolved Lead (Pb)	2023/10/20	NC		%	20			
			Dissolved Molybdenum (Mo)	2023/10/20	3.9		%	20			
			Dissolved Nickel (Ni)	2023/10/20	6.2		%	20			
			Dissolved Selenium (Se)	2023/10/20	NC		%	20			
			Dissolved Silver (Ag)	2023/10/20	NC		%	20			
			Dissolved Thallium (Tl)	2023/10/20	NC		%	20			
			Dissolved Tin (Sn)	2023/10/20	NC		%	20			
			Dissolved Titanium (Ti)	2023/10/20	NC		%	20			
			Dissolved Uranium (U)	2023/10/20	0.74		%	20			
Dissolved Vanadium (V)	2023/10/20	NC		%	20						
Dissolved Zinc (Zn)	2023/10/20	NC		%	20						
B163046	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/10/21		104	%	80 - 120			
			Dissolved Antimony (Sb)	2023/10/21		104	%	80 - 120			
			Dissolved Arsenic (As)	2023/10/21		95	%	80 - 120			
			Dissolved Beryllium (Be)	2023/10/21		97	%	80 - 120			
			Dissolved Chromium (Cr)	2023/10/21		97	%	80 - 120			
			Dissolved Cobalt (Co)	2023/10/21		94	%	80 - 120			
			Dissolved Copper (Cu)	2023/10/21		92	%	80 - 120			
			Dissolved Lead (Pb)	2023/10/21		95	%	80 - 120			
			Dissolved Molybdenum (Mo)	2023/10/21		104	%	80 - 120			
			Dissolved Nickel (Ni)	2023/10/21		92	%	80 - 120			
			Dissolved Selenium (Se)	2023/10/21		95	%	80 - 120			
			Dissolved Silver (Ag)	2023/10/21		93	%	80 - 120			
			Dissolved Thallium (Tl)	2023/10/21		96	%	80 - 120			
			Dissolved Tin (Sn)	2023/10/21		99	%	80 - 120			
			Dissolved Titanium (Ti)	2023/10/21		98	%	80 - 120			
			Dissolved Uranium (U)	2023/10/21		97	%	80 - 120			
			Dissolved Vanadium (V)	2023/10/21		97	%	80 - 120			
			Dissolved Zinc (Zn)	2023/10/21		93	%	80 - 120			
			B163046	JAB	Spiked Blank	Dissolved Aluminum (Al)	2023/10/20		118	%	80 - 120
						Dissolved Antimony (Sb)	2023/10/20		104	%	80 - 120
Dissolved Arsenic (As)	2023/10/20					102	%	80 - 120			
Dissolved Beryllium (Be)	2023/10/20					100	%	80 - 120			
Dissolved Chromium (Cr)	2023/10/20					101	%	80 - 120			
Dissolved Cobalt (Co)	2023/10/20					102	%	80 - 120			
Dissolved Copper (Cu)	2023/10/20					101	%	80 - 120			
Dissolved Lead (Pb)	2023/10/20					94	%	80 - 120			
Dissolved Molybdenum (Mo)	2023/10/20					99	%	80 - 120			
Dissolved Nickel (Ni)	2023/10/20					101	%	80 - 120			
Dissolved Selenium (Se)	2023/10/20					99	%	80 - 120			
Dissolved Silver (Ag)	2023/10/20					94	%	80 - 120			
Dissolved Thallium (Tl)	2023/10/20					92	%	80 - 120			
Dissolved Tin (Sn)	2023/10/20					93	%	80 - 120			
Dissolved Titanium (Ti)	2023/10/20		102	%	80 - 120						



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits	
B163046	JAB	Method Blank	Dissolved Uranium (U)	2023/10/20		95	%	80 - 120	
			Dissolved Vanadium (V)	2023/10/20		101	%	80 - 120	
			Dissolved Zinc (Zn)	2023/10/20		97	%	80 - 120	
			Dissolved Aluminum (Al)	2023/10/20	<0.0030			mg/L	
			Dissolved Antimony (Sb)	2023/10/20	<0.00060			mg/L	
			Dissolved Arsenic (As)	2023/10/20	<0.00020			mg/L	
			Dissolved Beryllium (Be)	2023/10/20	<0.0010			mg/L	
			Dissolved Chromium (Cr)	2023/10/20	<0.0010			mg/L	
			Dissolved Cobalt (Co)	2023/10/20	<0.00030			mg/L	
			Dissolved Copper (Cu)	2023/10/20	<0.0010			mg/L	
			Dissolved Lead (Pb)	2023/10/20	<0.00020			mg/L	
			Dissolved Molybdenum (Mo)	2023/10/20	<0.00020			mg/L	
			Dissolved Nickel (Ni)	2023/10/20	<0.00050			mg/L	
			Dissolved Selenium (Se)	2023/10/20	<0.00020			mg/L	
			Dissolved Silver (Ag)	2023/10/20	<0.00010			mg/L	
			Dissolved Thallium (Tl)	2023/10/20	<0.00020			mg/L	
			Dissolved Tin (Sn)	2023/10/20	<0.0010			mg/L	
			Dissolved Titanium (Ti)	2023/10/20	<0.0010			mg/L	
			Dissolved Uranium (U)	2023/10/20	<0.00010			mg/L	
Dissolved Vanadium (V)	2023/10/20	<0.0010			mg/L				
Dissolved Zinc (Zn)	2023/10/20	<0.0030			mg/L				
B163046	JAB	RPD	Dissolved Aluminum (Al)	2023/10/20	8.2		%	20	
			Dissolved Antimony (Sb)	2023/10/20	NC		%	20	
			Dissolved Arsenic (As)	2023/10/20	1.4		%	20	
			Dissolved Beryllium (Be)	2023/10/20	NC		%	20	
			Dissolved Chromium (Cr)	2023/10/20	NC		%	20	
			Dissolved Cobalt (Co)	2023/10/20	4.2		%	20	
			Dissolved Copper (Cu)	2023/10/20	NC		%	20	
			Dissolved Lead (Pb)	2023/10/20	NC		%	20	
			Dissolved Molybdenum (Mo)	2023/10/20	15		%	20	
			Dissolved Nickel (Ni)	2023/10/20	NC		%	20	
			Dissolved Selenium (Se)	2023/10/20	NC		%	20	
			Dissolved Silver (Ag)	2023/10/20	NC		%	20	
			Dissolved Thallium (Tl)	2023/10/20	NC		%	20	
			Dissolved Tin (Sn)	2023/10/20	NC		%	20	
			Dissolved Titanium (Ti)	2023/10/20	NC		%	20	
			Dissolved Uranium (U)	2023/10/20	7.9		%	20	
			Dissolved Vanadium (V)	2023/10/20	3.5		%	20	
			Dissolved Zinc (Zn)	2023/10/20	NC		%	20	
			B163053	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/10/20		111
Dissolved Antimony (Sb)	2023/10/20					98	%	80 - 120	
Dissolved Arsenic (As)	2023/10/20					100	%	80 - 120	
Dissolved Beryllium (Be)	2023/10/20					99	%	80 - 120	
Dissolved Chromium (Cr)	2023/10/20					99	%	80 - 120	
Dissolved Cobalt (Co)	2023/10/20					99	%	80 - 120	
Dissolved Copper (Cu)	2023/10/20					99	%	80 - 120	
Dissolved Lead (Pb)	2023/10/20					90	%	80 - 120	
Dissolved Molybdenum (Mo)	2023/10/20					96	%	80 - 120	
Dissolved Nickel (Ni)	2023/10/20					98	%	80 - 120	
Dissolved Selenium (Se)	2023/10/20					100	%	80 - 120	
Dissolved Silver (Ag)	2023/10/20					90	%	80 - 120	
Dissolved Thallium (Tl)	2023/10/20					88	%	80 - 120	
Dissolved Tin (Sn)	2023/10/20					90	%	80 - 120	
Dissolved Titanium (Ti)	2023/10/20					100	%	80 - 120	
Dissolved Uranium (U)	2023/10/20					92	%	80 - 120	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B163053	JAB	Spiked Blank	Dissolved Vanadium (V)	2023/10/20		99	%	80 - 120
			Dissolved Zinc (Zn)	2023/10/20		96	%	80 - 120
			Dissolved Aluminum (Al)	2023/10/21		94	%	80 - 120
			Dissolved Antimony (Sb)	2023/10/21		116	%	80 - 120
			Dissolved Arsenic (As)	2023/10/21		115	%	80 - 120
			Dissolved Beryllium (Be)	2023/10/21		117	%	80 - 120
			Dissolved Chromium (Cr)	2023/10/21		115	%	80 - 120
			Dissolved Cobalt (Co)	2023/10/21		116	%	80 - 120
			Dissolved Copper (Cu)	2023/10/21		117	%	80 - 120
			Dissolved Lead (Pb)	2023/10/21		106	%	80 - 120
			Dissolved Molybdenum (Mo)	2023/10/21		110	%	80 - 120
			Dissolved Nickel (Ni)	2023/10/21		115	%	80 - 120
			Dissolved Selenium (Se)	2023/10/21		111	%	80 - 120
			Dissolved Silver (Ag)	2023/10/21		106	%	80 - 120
			Dissolved Thallium (Tl)	2023/10/21		103	%	80 - 120
			Dissolved Tin (Sn)	2023/10/21		105	%	80 - 120
			Dissolved Titanium (Ti)	2023/10/21		113	%	80 - 120
Dissolved Uranium (U)	2023/10/21		106	%	80 - 120			
Dissolved Vanadium (V)	2023/10/21		114	%	80 - 120			
Dissolved Zinc (Zn)	2023/10/21		112	%	80 - 120			
B163053	JAB	Method Blank	Dissolved Aluminum (Al)	2023/10/20	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2023/10/20	<0.00060		mg/L	
			Dissolved Arsenic (As)	2023/10/20	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2023/10/20	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2023/10/20	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2023/10/20	<0.00030		mg/L	
			Dissolved Copper (Cu)	2023/10/20	<0.0010		mg/L	
			Dissolved Lead (Pb)	2023/10/20	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2023/10/20	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2023/10/20	<0.00050		mg/L	
			Dissolved Selenium (Se)	2023/10/20	<0.00020		mg/L	
			Dissolved Silver (Ag)	2023/10/20	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2023/10/20	<0.00020		mg/L	
			Dissolved Tin (Sn)	2023/10/20	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2023/10/20	<0.0010		mg/L	
			Dissolved Uranium (U)	2023/10/20	<0.00010		mg/L	
			Dissolved Vanadium (V)	2023/10/20	<0.0010		mg/L	
Dissolved Zinc (Zn)	2023/10/20	<0.0030		mg/L				
B163053	JAB	RPD	Dissolved Aluminum (Al)	2023/10/20	NC		%	20
			Dissolved Antimony (Sb)	2023/10/20	NC		%	20
			Dissolved Arsenic (As)	2023/10/20	NC		%	20
			Dissolved Beryllium (Be)	2023/10/20	NC		%	20
			Dissolved Chromium (Cr)	2023/10/20	NC		%	20
			Dissolved Cobalt (Co)	2023/10/20	NC		%	20
			Dissolved Copper (Cu)	2023/10/20	NC		%	20
			Dissolved Lead (Pb)	2023/10/20	NC		%	20
			Dissolved Molybdenum (Mo)	2023/10/20	3.3		%	20
			Dissolved Nickel (Ni)	2023/10/20	NC		%	20
			Dissolved Selenium (Se)	2023/10/20	NC		%	20
			Dissolved Silver (Ag)	2023/10/20	NC		%	20
			Dissolved Thallium (Tl)	2023/10/20	NC		%	20
			Dissolved Tin (Sn)	2023/10/20	NC		%	20
Dissolved Titanium (Ti)	2023/10/20	NC		%	20			
Dissolved Uranium (U)	2023/10/20	NC		%	20			
Dissolved Vanadium (V)	2023/10/20	NC		%	20			



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Zinc (Zn)	2023/10/20	NC		%	20
B163091	ISW	Matrix Spike [CCG206-07]	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163091	ISW	Spiked Blank	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163091	ISW	Method Blank	Total Ammonia (N)	2023/10/20	<0.015		mg/L	
B163091	ISW	RPD [CCG206-07]	Total Ammonia (N)	2023/10/20	NC		%	20
B163097	ISW	Matrix Spike [CCG207-07]	Total Ammonia (N)	2023/10/20		104	%	80 - 120
B163097	ISW	Spiked Blank	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163097	ISW	Method Blank	Total Ammonia (N)	2023/10/20	<0.015		mg/L	
B163097	ISW	RPD [CCG207-07]	Total Ammonia (N)	2023/10/20	NC		%	20
B163745	DVN	Spiked Blank	Turbidity	2023/10/21		100	%	80 - 120
B163745	DVN	Method Blank	Turbidity	2023/10/21	<0.10		NTU	
B163745	DVN	RPD	Turbidity	2023/10/21	6.3		%	20
B163746	DVN	Spiked Blank	Turbidity	2023/10/21		100	%	80 - 120
B163746	DVN	Method Blank	Turbidity	2023/10/21	<0.10		NTU	
B163746	DVN	RPD	Turbidity	2023/10/21	3.9		%	20
B164442	MAP	Matrix Spike	Dissolved Phosphorus (P)	2023/10/23		100	%	80 - 120
B164442	MAP	QC Standard	Dissolved Phosphorus (P)	2023/10/23		88	%	80 - 120
B164442	MAP	Spiked Blank	Dissolved Phosphorus (P)	2023/10/23		98	%	80 - 120
B164442	MAP	Method Blank	Dissolved Phosphorus (P)	2023/10/23	<0.0030		mg/L	
B164442	MAP	RPD	Dissolved Phosphorus (P)	2023/10/23	NC		%	20
B165186	MAP	Matrix Spike	Total Phosphorus (P)	2023/10/24		109	%	80 - 120
B165186	MAP	QC Standard	Total Phosphorus (P)	2023/10/24		88	%	80 - 120
B165186	MAP	Spiked Blank	Total Phosphorus (P)	2023/10/24		98	%	80 - 120
B165186	MAP	Method Blank	Total Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165186	MAP	RPD	Total Phosphorus (P)	2023/10/24	12		%	20
B165224	RTM	Matrix Spike	Total Suspended Solids	2023/10/24		99	%	80 - 120
B165224	RTM	Spiked Blank	Total Suspended Solids	2023/10/24		108	%	80 - 120
B165224	RTM	Method Blank	Total Suspended Solids	2023/10/24	<1.0		mg/L	
B165224	RTM	RPD	Total Suspended Solids	2023/10/24	6.2		%	20
B165681	MAP	Matrix Spike	Dissolved Phosphorus (P)	2023/10/24		98	%	80 - 120
B165681	MAP	QC Standard	Dissolved Phosphorus (P)	2023/10/24		86	%	80 - 120
B165681	MAP	Spiked Blank	Dissolved Phosphorus (P)	2023/10/24		96	%	80 - 120
B165681	MAP	Method Blank	Dissolved Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165681	MAP	RPD	Dissolved Phosphorus (P)	2023/10/24	NC		%	20
B165729	MAP	Matrix Spike	Total Phosphorus (P)	2023/10/24		98	%	80 - 120
B165729	MAP	QC Standard	Total Phosphorus (P)	2023/10/24		85	%	80 - 120
B165729	MAP	Spiked Blank	Total Phosphorus (P)	2023/10/24		95	%	80 - 120
B165729	MAP	Method Blank	Total Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165729	MAP	RPD	Total Phosphorus (P)	2023/10/24	2.8		%	20
B165855	LYV	Matrix Spike	Chemical Oxygen Demand	2023/10/23		108	%	80 - 120
B165855	LYV	Spiked Blank	Chemical Oxygen Demand	2023/10/23		100	%	80 - 120
B165855	LYV	Method Blank	Chemical Oxygen Demand	2023/10/23	<10		mg/L	
B165855	LYV	RPD	Chemical Oxygen Demand	2023/10/23	0		%	20
B166311	BTM	Spiked Blank	pH	2023/10/23		100	%	97 - 103
B166311	BTM	RPD [CCG202-04]	pH	2023/10/23	0.19		%	N/A
B166328	BTM	Spiked Blank	Alkalinity (Total as CaCO3)	2023/10/23		96	%	80 - 120
B166328	BTM	Method Blank	Alkalinity (PP as CaCO3)	2023/10/23	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2023/10/23	<1.0		mg/L	
			Bicarbonate (HCO3)	2023/10/23	<1.0		mg/L	
			Carbonate (CO3)	2023/10/23	<1.0		mg/L	
			Hydroxide (OH)	2023/10/23	<1.0		mg/L	
B166328	BTM	RPD [CCG202-04]	Alkalinity (PP as CaCO3)	2023/10/23	NC		%	20
			Alkalinity (Total as CaCO3)	2023/10/23	2.8		%	20
			Bicarbonate (HCO3)	2023/10/23	2.8		%	20
			Carbonate (CO3)	2023/10/23	NC		%	20



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hydroxide (OH)	2023/10/23	NC		%	20
B166331	BTM	Spiked Blank	Conductivity	2023/10/23		101	%	90 - 110
B166331	BTM	Method Blank	Conductivity	2023/10/23	<2.0		uS/cm	
B166331	BTM	RPD [CCG202-04]	Conductivity	2023/10/23	3.6		%	10
B166593	MAP	Matrix Spike [CCG207-04]	Orthophosphate (P)	2023/10/23		97	%	80 - 120
B166593	MAP	Spiked Blank	Orthophosphate (P)	2023/10/23		101	%	80 - 120
B166593	MAP	Method Blank	Orthophosphate (P)	2023/10/23	<0.0030		mg/L	
B166593	MAP	RPD [CCG207-04]	Orthophosphate (P)	2023/10/23	8.8		%	20
B166885	DVN	Matrix Spike [CCG202-03]	Total Dissolved Solids	2023/10/25		NC	%	80 - 120
B166885	DVN	Spiked Blank	Total Dissolved Solids	2023/10/25		95	%	80 - 120
B166885	DVN	Method Blank	Total Dissolved Solids	2023/10/25	<10		mg/L	
B166885	DVN	RPD [CCG202-03]	Total Dissolved Solids	2023/10/25	0.75		%	20
B167221	JAV	Matrix Spike [CCG202-04]	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		NC	%	80 - 120
B167221	JAV	Spiked Blank	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		100	%	80 - 120
B167221	JAV	Method Blank	Chloride (Cl)	2023/10/24	<1.0		mg/L	
			Sulphate (SO4)	2023/10/24	<1.0		mg/L	
B167221	JAV	RPD [CCG202-04]	Chloride (Cl)	2023/10/24	1.5		%	20
			Sulphate (SO4)	2023/10/24	1.0		%	20
B167251	JAV	Matrix Spike	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		98	%	80 - 120
B167251	JAV	Spiked Blank	Chloride (Cl)	2023/10/24		98	%	80 - 120
			Sulphate (SO4)	2023/10/24		104	%	80 - 120
B167251	JAV	Method Blank	Chloride (Cl)	2023/10/24	<1.0		mg/L	
			Sulphate (SO4)	2023/10/24	<1.0		mg/L	
B167251	JAV	RPD	Chloride (Cl)	2023/10/24	NC		%	20
			Sulphate (SO4)	2023/10/24	0.39		%	20
B167830	MPU	Matrix Spike	Dissolved Barium (Ba)	2023/10/24		98	%	80 - 120
			Dissolved Boron (B)	2023/10/24		99	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/24		98	%	80 - 120
			Dissolved Iron (Fe)	2023/10/24		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/24		97	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/24		101	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/24		102	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/24		98	%	80 - 120
			Dissolved Potassium (K)	2023/10/24		101	%	80 - 120
			Dissolved Silicon (Si)	2023/10/24		91	%	80 - 120
			Dissolved Sodium (Na)	2023/10/24		100	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/24		97	%	80 - 120
			Dissolved Sulphur (S)	2023/10/24		101	%	80 - 120
B167830	MPU	Spiked Blank	Dissolved Barium (Ba)	2023/10/24		101	%	80 - 120
			Dissolved Boron (B)	2023/10/24		100	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/24		101	%	80 - 120
			Dissolved Iron (Fe)	2023/10/24		105	%	80 - 120
			Dissolved Lithium (Li)	2023/10/24		100	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/24		105	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/24		108	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/24		101	%	80 - 120
			Dissolved Potassium (K)	2023/10/24		103	%	80 - 120
			Dissolved Silicon (Si)	2023/10/24		98	%	80 - 120
			Dissolved Sodium (Na)	2023/10/24		101	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/24		101	%	80 - 120
			Dissolved Sulphur (S)	2023/10/24		99	%	80 - 120
B167830	MPU	Method Blank	Dissolved Barium (Ba)	2023/10/24	<0.010		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B167830	MPU	RPD	Dissolved Boron (B)	2023/10/24	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/24	<0.30		mg/L	
			Dissolved Iron (Fe)	2023/10/24	<0.060		mg/L	
			Dissolved Lithium (Li)	2023/10/24	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2023/10/24	<0.20		mg/L	
			Dissolved Manganese (Mn)	2023/10/24	0.0060,		mg/L	
					RDL=0.0060			
			Dissolved Phosphorus (P)	2023/10/24	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/24	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/24	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/24	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/24	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/24	<0.20		mg/L	
			Dissolved Barium (Ba)	2023/10/24	0.74		%	20
			Dissolved Boron (B)	2023/10/24	NC		%	20
			Dissolved Calcium (Ca)	2023/10/24	0.34		%	20
			Dissolved Iron (Fe)	2023/10/24	0.75		%	20
			Dissolved Lithium (Li)	2023/10/24	NC		%	20
			Dissolved Magnesium (Mg)	2023/10/24	0.24		%	20
Dissolved Manganese (Mn)	2023/10/24	5.3		%	20			
Dissolved Phosphorus (P)	2023/10/24	NC		%	20			
Dissolved Potassium (K)	2023/10/24	0.31		%	20			
Dissolved Silicon (Si)	2023/10/24	0.36		%	20			
Dissolved Sodium (Na)	2023/10/24	0.36		%	20			
Dissolved Strontium (Sr)	2023/10/24	0.48		%	20			
Dissolved Sulphur (S)	2023/10/24	0.58		%	20			
B167950	MPU	Matrix Spike	Dissolved Barium (Ba)	2023/10/25		96	%	80 - 120
			Dissolved Boron (B)	2023/10/25		97	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		97	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		98	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		102	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		100	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		94	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		100	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		88	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		95	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		93	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		94	%	80 - 120
B167950	MPU	Spiked Blank	Dissolved Barium (Ba)	2023/10/25		102	%	80 - 120
			Dissolved Boron (B)	2023/10/25		103	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		104	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		109	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		105	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		111	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		111	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		101	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		106	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		99	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		104	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		99	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		99	%	80 - 120
B167950	MPU	Method Blank	Dissolved Barium (Ba)	2023/10/26	<0.010		mg/L	
			Dissolved Boron (B)	2023/10/26	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/26	<0.30		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B167950	MPU	RPD	Dissolved Iron (Fe)	2023/10/26	<0.060		mg/L	
			Dissolved Lithium (Li)	2023/10/26	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2023/10/26	<0.20		mg/L	
			Dissolved Manganese (Mn)	2023/10/26	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2023/10/26	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/26	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/26	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/26	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/26	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/26	<0.20		mg/L	
B167950	MPU	RPD	Dissolved Barium (Ba)	2023/10/26	2.4		%	20
			Dissolved Boron (B)	2023/10/26	8.0		%	20
			Dissolved Calcium (Ca)	2023/10/26	10		%	20
			Dissolved Iron (Fe)	2023/10/26	1.4		%	20
			Dissolved Lithium (Li)	2023/10/26	11		%	20
			Dissolved Magnesium (Mg)	2023/10/26	14		%	20
			Dissolved Manganese (Mn)	2023/10/26	0.16		%	20
			Dissolved Phosphorus (P)	2023/10/26	NC		%	20
			Dissolved Potassium (K)	2023/10/26	8.9		%	20
			Dissolved Silicon (Si)	2023/10/26	0.41		%	20
B167951	MPU	Matrix Spike [CCG204-05]	Dissolved Barium (Ba)	2023/10/25		95	%	80 - 120
			Dissolved Boron (B)	2023/10/25		97	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		94	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		98	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		101	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		100	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		95	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		99	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		89	%	80 - 120
B167951	MPU	Spiked Blank	Dissolved Sodium (Na)	2023/10/25		94	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		90	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		99	%	80 - 120
			Dissolved Barium (Ba)	2023/10/25		102	%	80 - 120
			Dissolved Boron (B)	2023/10/25		102	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		103	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		108	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		104	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		110	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		109	%	80 - 120
B167951	MPU	Method Blank	Dissolved Phosphorus (P)	2023/10/25		100	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		106	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		98	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		103	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		99	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		98	%	80 - 120
			Dissolved Barium (Ba)	2023/10/26	<0.010		mg/L	
			Dissolved Boron (B)	2023/10/26	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/26	<0.30		mg/L	
			Dissolved Iron (Fe)	2023/10/26	<0.060		mg/L	
Dissolved Lithium (Li)	2023/10/26	<0.020		mg/L				
Dissolved Magnesium (Mg)	2023/10/26	<0.20		mg/L				



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Manganese (Mn)	2023/10/26	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2023/10/26	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/26	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/26	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/26	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/26	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/26	<0.20		mg/L	
B167951	MPU	RPD [CCG204-05]	Dissolved Barium (Ba)	2023/10/26	3.9		%	20
			Dissolved Boron (B)	2023/10/26	NC		%	20
			Dissolved Calcium (Ca)	2023/10/26	1.5		%	20
			Dissolved Iron (Fe)	2023/10/26	NC		%	20
			Dissolved Lithium (Li)	2023/10/26	NC		%	20
			Dissolved Magnesium (Mg)	2023/10/26	0.57		%	20
			Dissolved Manganese (Mn)	2023/10/26	NC		%	20
			Dissolved Phosphorus (P)	2023/10/26	NC		%	20
			Dissolved Potassium (K)	2023/10/26	2.2		%	20
			Dissolved Silicon (Si)	2023/10/26	1.1		%	20
			Dissolved Sodium (Na)	2023/10/26	1.1		%	20
			Dissolved Strontium (Sr)	2023/10/26	1.8		%	20
			Dissolved Sulphur (S)	2023/10/26	1.6		%	20
B168711	BB3	Spiked Blank	Total Nitrogen (N)	2023/10/25		92	%	80 - 120
B168711	BB3	Method Blank	Total Nitrogen (N)	2023/10/25	<0.020		mg/L	
B168970	BB3	Matrix Spike	Total Nitrogen (N)	2023/10/25		111	%	80 - 120
B168970	BB3	Spiked Blank	Total Nitrogen (N)	2023/10/25		95	%	80 - 120
B168970	BB3	Method Blank	Total Nitrogen (N)	2023/10/25	<0.020		mg/L	
B168970	BB3	RPD	Total Nitrogen (N)	2023/10/25	NC		%	20
B169753	KDB	Matrix Spike	Nitrite (N)	2023/10/24		98	%	80 - 120
			Nitrate (N)	2023/10/24		100	%	80 - 120
B169753	KDB	Spiked Blank	Nitrite (N)	2023/10/24		101	%	80 - 120
			Nitrate (N)	2023/10/24		104	%	80 - 120
B169753	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169753	KDB	RPD	Nitrite (N)	2023/10/24	1.8		%	20
			Nitrate (N)	2023/10/24	1.1		%	20
B169779	KDB	Matrix Spike	Nitrite (N)	2023/10/24		99	%	80 - 120
			Nitrate (N)	2023/10/24		102	%	80 - 120
B169779	KDB	Spiked Blank	Nitrite (N)	2023/10/24		101	%	80 - 120
			Nitrate (N)	2023/10/24		104	%	80 - 120
B169779	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169779	KDB	RPD	Nitrite (N)	2023/10/24	NC		%	20
			Nitrate (N)	2023/10/24	NC		%	20
B169786	KDB	Matrix Spike	Nitrite (N)	2023/10/24		92	%	80 - 120
			Nitrate (N)	2023/10/24		102	%	80 - 120
B169786	KDB	Spiked Blank	Nitrite (N)	2023/10/24		94	%	80 - 120
			Nitrate (N)	2023/10/24		103	%	80 - 120
B169786	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169786	KDB	RPD	Nitrite (N)	2023/10/24	NC		%	20



QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Nitrate (N)	2023/10/24	NC		%	20
<p>N/A = Not Applicable</p> <p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>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.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>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)</p> <p>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).</p>								



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/10/27

Ausenco Sustainability Inc.
Client Project #: 102604-01

VALIDATION SIGNATURE PAGE

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

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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



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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.



INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #10658 Ausenco Sustainability Inc.	Company Name:	Company Name: Erin Moffatt	Quotation #: C21878	Bureau Veritas Job #:	Bottle Order #:	709129	
Attention: Accounts Payable	Attention:	Attention: Erin Moffatt	P.O. #:	709129		709129	
Address: Suite 1430, 401-9 Avenue	Address:	Address:	Project: 102604-01	COC #:	Project Manager:	Danielle Boisvert	
Address: CALGARY AB T2P 3C5	Address:	Address:	Project Name:	C#709129-02-01		Danielle Boisvert	
Tel: (403) 264-0671 Fax: (403) 264-0670	Tel:	Tel:	Site #:	C#709129-02-01		Danielle Boisvert	
Email: procure2pay.na@ausenco.com	Email:	Email: erin.moffatt@ausenco.com	Sampled By:				

Regulatory Criteria: <input type="checkbox"/> ATI <input type="checkbox"/> CCME <input type="checkbox"/> Other:	Special Instructions:	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)											Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
		Metals Field Filtered ? (Y/N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Kometab	Ammonia-N (Total)	Total Kjeldahl Nitrogen (Total)	Biochemical Oxygen Demand	COD by Colorimeter	Oxygen (Dissolved)	Total Phosphorus	Phosphorus-P (Total, Dissolved)	TSS, TDS, TURB	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	<input type="checkbox"/>
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS													Job Specific Rush TAT (if applies to entire submission)	<input type="checkbox"/>
													Date Required:	<input type="checkbox"/>
													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 Kometab	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	WG-02	23/10/19	1025	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	soil & water sample
2	WG-4a	23/10/18	1420	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
3	WG-4B	23/10/18	1355	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
4	WG-4C	23/10/19	1050	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
5	WG-4D	23/10/18	1324	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
6	WG-5B	23/10/18	1255	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
7	WG-06	23/10/19	1018	S													only soil
8	WG-07	23/10/19	1007	S													only soil
9	WG-03	23/10/19	1120	S													only soil
10																	

RELINQUISHED BY: (Signature/Print) Erin Moffatt	Date: (YY/MM/DD) 23/10/19	Time 13:10	RECEIVED BY: (Signature/Print) RAJRAV28	Date: (YY/MM/DD) 2023/10/19	Time 13:11	# Jars used and not submitted	Time Sensitive <input type="checkbox"/>	Temperature (°C) on Receipt 4/5/5	Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
								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 90 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER



mca-10-1590



Your Project #: 102604-01
 Your C.O.C. #: 1OF1

Attention: Erin Moffatt

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

Report Date: 2023/11/10
 Report #: R3425153
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Sample Matrix: Soil
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio	3	N/A	2023/11/06		Auto Calc
Cation/EC Ratio	5	N/A	2023/11/09		Auto Calc
Chloride (Soluble)	3	2023/11/05	2023/11/05	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Chloride (Soluble)	5	2023/11/07	2023/11/08	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1)	6	2023/11/04	2023/11/04	AB SOP-00063	SM 24 3500-Cr B m
Hexavalent Chromium (1)	2	2023/11/06	2023/11/06	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble)	3	2023/11/05	2023/11/05	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Conductivity @25C (Soluble)	5	2023/11/07	2023/11/08	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Elements by ICPMS - Soils	3	2023/11/05	2023/11/06	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils	5	2023/11/07	2023/11/07	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions	3	N/A	2023/11/06		Auto Calc
Sum of Cations, Anions	5	N/A	2023/11/09		Auto Calc
Moisture	2	N/A	2023/11/04	AB SOP-00002	CCME PHC-CWS m
Moisture	6	N/A	2023/11/05	AB SOP-00002	CCME PHC-CWS m
pH @25C (1:2 Calcium Chloride Extract)	3	2023/11/05	2023/11/05	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
pH @25C (1:2 Calcium Chloride Extract)	5	2023/11/10	2023/11/10	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio	3	N/A	2023/11/06		Auto Calc
Sodium Adsorption Ratio	5	N/A	2023/11/09		Auto Calc
Soluble Ions	3	2023/11/05	2023/11/05	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Ions	5	2023/11/07	2023/11/08	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	3	2023/11/05	2023/11/05	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Paste	5	2023/11/07	2023/11/07	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation	3	N/A	2023/11/06		Auto Calc



Your Project #: 102604-01
Your C.O.C. #: 1OF1

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Ausenco Sustainability Inc.
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CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Soluble Boron Calculation	5	N/A	2023/11/09		Auto Calc
Soluble Ions Calculation	2	N/A	2023/11/04		Auto Calc
Soluble Ions Calculation	6	N/A	2023/11/05		Auto Calc
Theoretical Gypsum Requirement (2)	3	N/A	2023/11/06		Auto Calc
Theoretical Gypsum Requirement (2)	5	N/A	2023/11/09		Auto Calc

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity @25C (pp, total), CO3,HCO3,OH (3)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 2320 B m
Biochemical Oxygen Demand	6	2023/10/19	2023/10/24	AB SOP-00017	SM 23 5210B m
Cadmium - low level CCME - Dissolved	6	N/A	2023/10/21		Auto Calc
Chloride/Sulphate by Auto Colourimetry (3)	6	N/A	2023/10/24	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
COD by Colorimeter	6	N/A	2023/10/23	AB SOP-00016	SM 23 5220D m
Oxygen (Dissolved) (4)	6	N/A	2023/10/20	AB SOP-00058	SM 23 4500-O C m
Conductivity @25C (3)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 2510 B m
Hardness	1	N/A	2023/10/25		Auto Calc
Hardness	5	N/A	2023/10/26		Auto Calc
Elements by ICP - Dissolved (5)	1	N/A	2023/10/24	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Dissolved (5)	5	N/A	2023/10/26	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (5)	6	N/A	2023/10/20	AB SOP-00043	EPA 6020b R2 m
Ion Balance	1	N/A	2023/10/25	BBY WI-00033	Auto Calc
Ion Balance	5	N/A	2023/10/26	BBY WI-00033	Auto Calc
Sum of cations, anions	1	N/A	2023/10/25	BBY WI-00033	Auto Calc
Sum of cations, anions	5	N/A	2023/10/26	BBY WI-00033	Auto Calc
Nitrogen (Total) (3)	6	N/A	2023/10/25	BBY6SOP-00016	SM 24 4500-N C m
Ammonia-N (Total)	6	N/A	2023/10/20	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite	6	N/A	2023/10/26		Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2023/10/26		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	6	N/A	2023/10/24	AB SOP-00023	SM 23 4110 B m
pH @25°C (3, 6)	6	N/A	2023/10/23	BBY6SOP-00026	SM 24 4500-H+ B m



Your Project #: 102604-01
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CANADA T2P 3C5

Report Date: 2023/11/10
Report #: R3425153
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Orthophosphate by Automated Analyzer (7)	6	N/A	2023/10/23	AB SOP-00025	SM 24 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	6	2023/10/24	2023/10/25	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Calculated)	1	N/A	2023/10/25	BBY WI-00033	Calculated Parameter
Total Dissolved Solids (Calculated)	5	N/A	2023/10/26	BBY WI-00033	Calculated Parameter
Total Kjeldahl Nitrogen (Total)	6	N/A	2023/10/26	BBY WI-00033	Auto Calc
Total Phosphorus Dissolved client FF/FP (8)	4	2023/10/21	2023/10/23	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus Dissolved client FF/FP (8)	2	2023/10/23	2023/10/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus	6	2023/10/23	2023/10/24	AB SOP-00024	SM 24 4500-P A,B,F m
Total Suspended Solids (NFR)	6	2023/10/23	2023/10/24	AB SOP-00061	SM 24 2540 D m
Turbidity	6	N/A	2023/10/21	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, MELCC, EPA, APHA.

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.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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.



Your Project #: 102604-01
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CANADA T2P 3C5

Report Date: 2023/11/10
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Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C385037

Received: 2023/10/19, 13:11

- (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.
- (3) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5
- (4) 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.
- (5) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (6) 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.
- (7) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (8) 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

Danielle Boisvert
Customer Solutions Representative
10 Nov 2023 14:33:49

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		CCG208		CCG209		CCG210		CCG211			
Sampling Date		2023/10/19 10:25		2023/10/18 14:20		2023/10/18 13:55		2023/10/19 10:50			
COC Number		1OF1		1OF1		1OF1		1OF1			
	UNITS	WQ-02 SOIL	RDL	WQ-4A SOIL	RDL	WQ-4B SOIL	RDL	QC Batch	WQ-4C SOIL	RDL	QC Batch

Calculated Parameters											
Anion Sum	meq/L	9.0	N/A	46	N/A	24	N/A	B176849	4.2	N/A	B176849
Cation Sum	meq/L	19	N/A	52	N/A	17	N/A	B176849	10	N/A	B176849
Cation/EC Ratio	N/A	14	0.10	15	0.10	12	0.10	B176836	13	0.10	B176836
Calculated Calcium (Ca)	mg/kg	120	1.2	660	1.7	99	0.89	B176870	35	0.81	B176870
Calculated Magnesium (Mg)	mg/kg	75	0.80	240	1.1	36	0.60	B176870	22	0.54	B176870
Calculated Sodium (Na)	mg/kg	59	2.0	110	2.8	47	1.5	B176870	40	1.4	B176870
Calculated Potassium (K)	mg/kg	11	1.0	25	1.5	9.5	0.77	B176870	7.0	0.70	B176870
Calculated Boron (B)	mg/kg	<0.080	0.080	<0.11	0.11	<0.060	0.060	B175913	0.12	0.054	B175913
Calculated Chloride (Cl)	mg/kg	14	8.0	150	11	150	6.0	B176870	14	5.4	B176870
Calculated Sulphate (SO4)	mg/kg	330	4.0	2300	5.6	490	3.0	B176870	91	2.7	B176870

Elements											
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	<0.21 (1)	0.21	<0.080	0.080	B185721	<0.080	0.080	B185721

Soluble Parameters											
Soluble Boron (B)	mg/L	<0.10	0.10	<0.10	0.10	<0.10	0.10	B191443	0.22	0.10	B186342
Soluble Chloride (Cl)	mg/L	17	10	130	10	250	10	B191531	26	10	B186241
Soluble Conductivity	dS/m	1.4	0.020	3.4	0.020	1.4	0.020	B191618	0.80	0.020	B186247
Soluble (CaCl2) pH	pH	7.72	N/A	7.40	N/A	7.54	N/A	B185383	7.81	N/A	B185850
Sodium Adsorption Ratio	N/A	1.2	0.10	0.87	0.10	1.3	0.10	B176859	1.8	0.10	B176859
Soluble Calcium (Ca)	mg/L	150	1.5	590	1.5	170	1.5	B191443	64	1.5	B186342
Soluble Magnesium (Mg)	mg/L	93	1.0	210	1.0	60	1.0	B191443	40	1.0	B186342
Soluble Sodium (Na)	mg/L	73	2.5	97	2.5	78	2.5	B191443	75	2.5	B186342
Soluble Potassium (K)	mg/L	13	1.3	22	1.3	16	1.3	B191443	13	1.3	B186342
Saturation %	%	80	N/A	110	N/A	60	N/A	B185382	54	N/A	B185848
Soluble Sulphate (SO4)	mg/L	410	5.0	2000	5.0	830	5.0	B191443	170	5.0	B186342
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	B176880	<0.20	0.20	B176880

Elements											
Total Antimony (Sb)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	B188501	<0.50	0.50	B186205
Total Arsenic (As)	mg/kg	4.4	1.0	1.9	1.0	5.1	1.0	B188501	4.0	1.0	B186205
Total Barium (Ba)	mg/kg	240	1.0	110	1.0	170	1.0	B188501	220	1.0	B186205
Total Beryllium (Be)	mg/kg	0.56	0.40	<0.40	0.40	0.57	0.40	B188501	0.43	0.40	B186205
Total Cadmium (Cd)	mg/kg	0.49	0.050	0.65	0.050	0.34	0.050	B188501	0.41	0.050	B186205

RDL = Reportable Detection Limit

N/A = Not Applicable

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



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CCG208		CCG209		CCG210			CCG211		
Sampling Date		2023/10/19 10:25		2023/10/18 14:20		2023/10/18 13:55			2023/10/19 10:50		
COC Number		1OF1		1OF1		1OF1			1OF1		
	UNITS	WQ-02 SOIL	RDL	WQ-4A SOIL	RDL	WQ-4B SOIL	RDL	QC Batch	WQ-4C SOIL	RDL	QC Batch
Total Chromium (Cr)	mg/kg	14	1.0	10	1.0	15	1.0	B188501	11	1.0	B186205
Total Cobalt (Co)	mg/kg	6.2	0.50	3.1	0.50	8.3	0.50	B188501	4.7	0.50	B186205
Total Copper (Cu)	mg/kg	17	1.0	15	1.0	15	1.0	B188501	10	1.0	B186205
Total Lead (Pb)	mg/kg	10	0.50	8.3	0.50	9.8	0.50	B188501	6.9	0.50	B186205
Total Mercury (Hg)	mg/kg	<0.050	0.050	<0.050	0.050	<0.050	0.050	B188501	<0.050	0.050	B186205
Total Molybdenum (Mo)	mg/kg	0.69	0.40	1.8	0.40	0.53	0.40	B188501	0.55	0.40	B186205
Total Nickel (Ni)	mg/kg	20	1.0	12	1.0	18	1.0	B188501	14	1.0	B186205
Total Selenium (Se)	mg/kg	2.0	0.50	5.9	0.50	0.66	0.50	B188501	1.8	0.50	B186205
Total Silver (Ag)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	B188501	<0.20	0.20	B186205
Total Thallium (Tl)	mg/kg	0.21	0.10	0.19	0.10	0.17	0.10	B188501	0.14	0.10	B186205
Total Tin (Sn)	mg/kg	<1.0	1.0	1.1	1.0	<1.0	1.0	B188501	<1.0	1.0	B186205
Total Uranium (U)	mg/kg	1.4	0.20	3.4	0.20	0.57	0.20	B188501	0.80	0.20	B186205
Total Vanadium (V)	mg/kg	24	1.0	13	1.0	23	1.0	B188501	18	1.0	B186205
Total Zinc (Zn)	mg/kg	87	10	47	10	85	10	B188501	91	10	B186205
RDL = Reportable Detection Limit											



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CCG212			CCG213		CCG214		
Sampling Date		2023/10/18 13:24			2023/10/19 10:18		2023/10/19 10:07		
COC Number		1OF1			1OF1		1OF1		
	UNITS	WQ-4D SOIL	RDL	QC Batch	WQ-06	RDL	WQ-07	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	23	N/A	B176849	95	N/A	70	N/A	B176849
Cation Sum	meq/L	21	N/A	B176849	120	N/A	100	N/A	B176849
Cation/EC Ratio	N/A	13	0.10	B176836	18	0.10	14	0.10	B176836
Calculated Calcium (Ca)	mg/kg	150	1.4	B176870	440	1.3	420	1.1	B176870
Calculated Magnesium (Mg)	mg/kg	82	0.94	B176870	830	0.88	500	0.75	B176870
Calculated Sodium (Na)	mg/kg	110	2.4	B176870	270	2.2	310	1.9	B176870
Calculated Potassium (K)	mg/kg	24	1.2	B176870	28	1.1	29	0.98	B176870
Calculated Boron (B)	mg/kg	0.24	0.095	B175913	0.15	0.088	<0.076	0.076	B175913
Calculated Chloride (Cl)	mg/kg	85	9.4	B176870	79	8.8	110	7.5	B176870
Calculated Sulphate (SO4)	mg/kg	920	4.7	B176870	3900	4.4	2400	3.8	B176870

Elements

Hex. Chromium (Cr 6+)	mg/kg	<0.17 (1)	0.17	B187162	<0.080	0.080	<0.080	0.080	B185721
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Soluble Parameters

Soluble Boron (B)	mg/L	0.25	0.10	B186342	0.18	0.10	<0.10	0.10	B191443
Soluble Chloride (Cl)	mg/L	90	10	B186241	90	10	150	10	B191531
Soluble Conductivity	dS/m	1.5	0.020	B186247	6.6	0.020	7.0	0.020	B191618
Soluble (CaCl2) pH	pH	7.57	N/A	B185850	7.77	N/A	7.69	N/A	B185383
Sodium Adsorption Ratio	N/A	1.8	0.10	B176859	1.9	0.10	2.8	0.10	B176859
Soluble Calcium (Ca)	mg/L	150	1.5	B186342	500	1.5	560	1.5	B191443
Soluble Magnesium (Mg)	mg/L	87	1.0	B186342	940	1.0	670	1.0	B191443
Soluble Sodium (Na)	mg/L	110	2.5	B186342	310	2.5	410	2.5	B191443
Soluble Potassium (K)	mg/L	26	1.3	B186342	32	1.3	39	1.3	B191443
Saturation %	%	94	N/A	B185848	88	N/A	75	N/A	B185382
Soluble Sulphate (SO4)	mg/L	970	5.0	B186342	4400	5.0	3100	5.0	B191443
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B176880	<0.20	0.20	<0.20	0.20	B176880

Elements

Total Antimony (Sb)	mg/kg	<0.50	0.50	B186205	0.51	0.50	0.61	0.50	B188501
Total Arsenic (As)	mg/kg	4.4	1.0	B186205	6.1	1.0	6.5	1.0	B188501
Total Barium (Ba)	mg/kg	220	1.0	B186205	220	1.0	270	1.0	B188501
Total Beryllium (Be)	mg/kg	0.41	0.40	B186205	0.60	0.40	0.68	0.40	B188501
Total Cadmium (Cd)	mg/kg	0.36	0.050	B186205	0.45	0.050	0.49	0.050	B188501

RDL = Reportable Detection Limit

N/A = Not Applicable

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



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CCG212			CCG213		CCG214		
Sampling Date		2023/10/18 13:24			2023/10/19 10:18		2023/10/19 10:07		
COC Number		1OF1			1OF1		1OF1		
	UNITS	WQ-4D SOIL	RDL	QC Batch	WQ-06	RDL	WQ-07	RDL	QC Batch
Total Chromium (Cr)	mg/kg	12	1.0	B186205	14	1.0	15	1.0	B188501
Total Cobalt (Co)	mg/kg	5.5	0.50	B186205	6.9	0.50	6.9	0.50	B188501
Total Copper (Cu)	mg/kg	12	1.0	B186205	18	1.0	19	1.0	B188501
Total Lead (Pb)	mg/kg	7.1	0.50	B186205	11	0.50	11	0.50	B188501
Total Mercury (Hg)	mg/kg	<0.050	0.050	B186205	<0.050	0.050	<0.050	0.050	B188501
Total Molybdenum (Mo)	mg/kg	0.57	0.40	B186205	1.0	0.40	1.6	0.40	B188501
Total Nickel (Ni)	mg/kg	14	1.0	B186205	21	1.0	22	1.0	B188501
Total Selenium (Se)	mg/kg	2.7	0.50	B186205	1.4	0.50	1.1	0.50	B188501
Total Silver (Ag)	mg/kg	<0.20	0.20	B186205	<0.20	0.20	<0.20	0.20	B188501
Total Thallium (Tl)	mg/kg	0.16	0.10	B186205	0.21	0.10	0.23	0.10	B188501
Total Tin (Sn)	mg/kg	<1.0	1.0	B186205	<1.0	1.0	<1.0	1.0	B188501
Total Uranium (U)	mg/kg	0.79	0.20	B186205	2.2	0.20	2.3	0.20	B188501
Total Vanadium (V)	mg/kg	18	1.0	B186205	25	1.0	27	1.0	B188501
Total Zinc (Zn)	mg/kg	1500	50	B186205	78	10	81	10	B188501
RDL = Reportable Detection Limit									



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CCG215		
Sampling Date		2023/10/19 11:20		
COC Number		10F1		
	UNITS	WQ-03	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	55	N/A	B176849
Cation Sum	meq/L	63	N/A	B176849
Cation/EC Ratio	N/A	16	0.10	B176836
Calculated Calcium (Ca)	mg/kg	470	1.2	B176870
Calculated Magnesium (Mg)	mg/kg	280	0.82	B176870
Calculated Sodium (Na)	mg/kg	100	2.1	B176870
Calculated Potassium (K)	mg/kg	35	1.1	B176870
Calculated Boron (B)	mg/kg	0.20	0.082	B175913
Calculated Chloride (Cl)	mg/kg	56	8.2	B176870
Calculated Sulphate (SO4)	mg/kg	2100	4.1	B176870
Elements				
Hex. Chromium (Cr 6+)	mg/kg	<0.080	0.080	B187162
Soluble Parameters				
Soluble Boron (B)	mg/L	0.24	0.10	B186342
Soluble Chloride (Cl)	mg/L	69	10	B186241
Soluble Conductivity	dS/m	3.9	0.020	B186247
Soluble (CaCl2) pH	pH	7.55	N/A	B185850
Sodium Adsorption Ratio	N/A	0.99	0.10	B176859
Soluble Calcium (Ca)	mg/L	580	1.5	B186342
Soluble Magnesium (Mg)	mg/L	340	1.0	B186342
Soluble Sodium (Na)	mg/L	120	2.5	B186342
Soluble Potassium (K)	mg/L	43	1.3	B186342
Saturation %	%	82	N/A	B185848
Soluble Sulphate (SO4)	mg/L	2600	5.0	B186342
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B176880
Elements				
Total Antimony (Sb)	mg/kg	<0.50	0.50	B186205
Total Arsenic (As)	mg/kg	4.4	1.0	B186205
Total Barium (Ba)	mg/kg	250	1.0	B186205
Total Beryllium (Be)	mg/kg	0.54	0.40	B186205
Total Cadmium (Cd)	mg/kg	0.47	0.050	B186205
Total Chromium (Cr)	mg/kg	14	1.0	B186205
RDL = Reportable Detection Limit N/A = Not Applicable				



AT1 METALS & SALINITY IN SOIL (SOIL)

Bureau Veritas ID		CCG215		
Sampling Date		2023/10/19 11:20		
COC Number		10F1		
	UNITS	WQ-03	RDL	QC Batch
Total Cobalt (Co)	mg/kg	6.0	0.50	B186205
Total Copper (Cu)	mg/kg	16	1.0	B186205
Total Lead (Pb)	mg/kg	10	0.50	B186205
Total Mercury (Hg)	mg/kg	<0.050	0.050	B186205
Total Molybdenum (Mo)	mg/kg	0.70	0.40	B186205
Total Nickel (Ni)	mg/kg	20	1.0	B186205
Total Selenium (Se)	mg/kg	1.4	0.50	B186205
Total Silver (Ag)	mg/kg	<0.20	0.20	B186205
Total Thallium (Tl)	mg/kg	0.19	0.10	B186205
Total Tin (Sn)	mg/kg	<1.0	1.0	B186205
Total Uranium (U)	mg/kg	1.4	0.20	B186205
Total Vanadium (V)	mg/kg	23	1.0	B186205
Total Zinc (Zn)	mg/kg	74	10	B186205
RDL = Reportable Detection Limit				



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG202			CCG203		
Sampling Date		2023/10/19 10:25			2023/10/18 14:20		
COC Number		1OF1			1OF1		
	UNITS	WQ-02	RDL	QC Batch	WQ-4A	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	11	N/A	B161844	9.0	N/A	B161844
Cation Sum	meq/L	13	N/A	B161844	9.1	N/A	B161844
Hardness (CaCO3)	mg/L	500	0.50	B161793	360	0.50	B161793
Ion Balance (% Difference)	%	8.7	N/A	B161242	0.78	N/A	B161242
Nitrate (NO3)	mg/L	<0.044	0.044	B161800	2.4	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	590	10	B161845	560	10	B161845

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
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Misc. Inorganics

Conductivity	uS/cm	970	2.0	B166331	900	2.0	B166331
pH	pH	8.25	N/A	B166311	6.54	N/A	B166311

Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	370	1.0	B166328	81	1.0	B166328
Bicarbonate (HCO3)	mg/L	450	1.0	B166328	98	1.0	B166328
Carbonate (CO3)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	14	1.0	B167221	6.2	1.0	B167251
Sulphate (SO4)	mg/L	130	5.0	B167221	340	5.0	B167251

Elements

Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163016
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163016
Dissolved Arsenic (As)	mg/L	0.00069	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Barium (Ba)	mg/L	0.099	0.010	B167951	0.074	0.010	B167830
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Boron (B)	mg/L	0.047	0.020	B167951	0.045	0.020	B167830
Dissolved Calcium (Ca)	mg/L	85	0.30	B167951	74	0.30	B167830
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163016
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.060	0.060	B167830

RDL = Reportable Detection Limit
N/A = Not Applicable



ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG202			CCG203		
Sampling Date		2023/10/19 10:25			2023/10/18 14:20		
COC Number		1OF1			1OF1		
	UNITS	WQ-02	RDL	QC Batch	WQ-4A	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Lithium (Li)	mg/L	0.025	0.020	B167951	<0.020	0.020	B167830
Dissolved Magnesium (Mg)	mg/L	71	0.20	B167951	42	0.20	B167830
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	B167951	<0.0060	0.0060	B167830
Dissolved Molybdenum (Mo)	mg/L	0.0017	0.00020	B163053	0.0025	0.00020	B163016
Dissolved Nickel (Ni)	mg/L	0.00068	0.00050	B163053	<0.00050	0.00050	B163016
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.10	0.10	B167830
Dissolved Potassium (K)	mg/L	6.0	0.30	B167951	4.0	0.30	B167830
Dissolved Selenium (Se)	mg/L	0.00061	0.00020	B163053	0.0022	0.00020	B163016
Dissolved Silicon (Si)	mg/L	4.9	0.50	B167951	4.1	0.50	B167830
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163016
Dissolved Sodium (Na)	mg/L	55	0.50	B167951	42	0.50	B167830
Dissolved Strontium (Sr)	mg/L	0.80	0.020	B167951	0.73	0.020	B167830
Dissolved Sulphur (S)	mg/L	36	0.20	B167951	17	0.20	B167830
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163016
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Uranium (U)	mg/L	0.0042	0.00010	B163053	0.0043	0.00010	B163016
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163016
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163016
RDL = Reportable Detection Limit							



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG204			CCG205		
Sampling Date		2023/10/18 13:55			2023/10/19 10:50		
COC Number		1OF1			1OF1		
	UNITS	WQ-4B	RDL	QC Batch	WQ-4C	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	9.1	N/A	B161844	9.9	N/A	B161844
Cation Sum	meq/L	10	N/A	B161844	11	N/A	B161844
Hardness (CaCO3)	mg/L	400	0.50	B161793	430	0.50	B161793
Ion Balance (% Difference)	%	5.5	N/A	B161242	5.2	N/A	B161242
Nitrate (NO3)	mg/L	2.3	0.044	B161800	<0.044	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	480	10	B161845	520	10	B161845

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
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Misc. Inorganics

Conductivity	uS/cm	850	2.0	B166331	880	2.0	B166331
pH	pH	8.21	N/A	B166311	8.34	N/A	B166311

Anions

Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B166328	12	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	340	1.0	B166328	390	1.0	B166328
Bicarbonate (HCO3)	mg/L	410	1.0	B166328	450	1.0	B166328
Carbonate (CO3)	mg/L	<1.0	1.0	B166328	14	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	39	1.0	B167251	14	1.0	B167251
Sulphate (SO4)	mg/L	55	1.0	B167251	82	1.0	B167251

Elements

Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163053
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163053
Dissolved Arsenic (As)	mg/L	0.00023	0.00020	B163053	0.00043	0.00020	B163053
Dissolved Barium (Ba)	mg/L	0.076	0.010	B167951	0.11	0.050	B167950
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Boron (B)	mg/L	0.090	0.020	B167951	<0.10	0.10	B167950
Dissolved Calcium (Ca)	mg/L	81	0.30	B167951	74	1.5	B167950
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163053
Dissolved Copper (Cu)	mg/L	0.0014	0.0010	B163053	0.0013	0.0010	B163053
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.30	0.30	B167950

RDL = Reportable Detection Limit
N/A = Not Applicable



ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG204			CCG205		
Sampling Date		2023/10/18 13:55			2023/10/19 10:50		
COC Number		1OF1			1OF1		
	UNITS	WQ-4B	RDL	QC Batch	WQ-4C	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163053
Dissolved Lithium (Li)	mg/L	0.022	0.020	B167951	<0.10	0.10	B167950
Dissolved Magnesium (Mg)	mg/L	48	0.20	B167951	60	1.0	B167950
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	B167951	<0.020	0.020	B167950
Dissolved Molybdenum (Mo)	mg/L	0.0014	0.00020	B163053	0.0015	0.00020	B163053
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	B163053	0.00050	0.00050	B163053
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.50	0.50	B167950
Dissolved Potassium (K)	mg/L	4.7	0.30	B167951	5.3	1.5	B167950
Dissolved Selenium (Se)	mg/L	0.0020	0.00020	B163053	0.00068	0.00020	B163053
Dissolved Silicon (Si)	mg/L	3.4	0.50	B167951	5.3	2.5	B167950
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163053
Dissolved Sodium (Na)	mg/L	45	0.50	B167951	50	2.5	B167950
Dissolved Strontium (Sr)	mg/L	0.83	0.020	B167951	0.80	0.10	B167950
Dissolved Sulphur (S)	mg/L	18	0.20	B167951	27	1.0	B167950
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163053
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Uranium (U)	mg/L	0.0035	0.00010	B163053	0.0039	0.00010	B163053
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163053
Dissolved Zinc (Zn)	mg/L	0.0036	0.0030	B163053	0.0033	0.0030	B163053
RDL = Reportable Detection Limit							



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Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG206			CCG207		
Sampling Date		2023/10/18 13:24			2023/10/18 12:55		
COC Number		1OF1			1OF1		
	UNITS	WQ-4D	RDL	QC Batch	WQ-5B	RDL	QC Batch

Calculated Parameters

Anion Sum	meq/L	8.7	N/A	B161844	12	N/A	B161844
Cation Sum	meq/L	9.5	N/A	B161844	14	N/A	B161844
Hardness (CaCO3)	mg/L	370	0.50	B161793	620	0.50	B161793
Ion Balance (% Difference)	%	4.2	N/A	B161242	10	N/A	B161242
Nitrate (NO3)	mg/L	<0.044	0.044	B161800	<0.044	0.044	B161800
Nitrite (NO2)	mg/L	<0.033	0.033	B161800	<0.033	0.033	B161800
Calculated Total Dissolved Solids	mg/L	460	10	B161845	640	10	B161845

Elements

Dissolved Cadmium (Cd)	mg/L	<0.000020	0.000020	B161789	<0.000020	0.000020	B161789
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Misc. Inorganics

Conductivity	uS/cm	790	2.0	B166331	1000	2.0	B166331
pH	pH	8.47	N/A	B166311	8.26	N/A	B166311

Anions

Alkalinity (PP as CaCO3)	mg/L	20	1.0	B166328	<1.0	1.0	B166328
Alkalinity (Total as CaCO3)	mg/L	360	1.0	B166328	420	1.0	B166328
Bicarbonate (HCO3)	mg/L	390	1.0	B166328	510	1.0	B166328
Carbonate (CO3)	mg/L	24	1.0	B166328	<1.0	1.0	B166328
Hydroxide (OH)	mg/L	<1.0	1.0	B166328	<1.0	1.0	B166328
Chloride (Cl)	mg/L	11	1.0	B167251	11	1.0	B167251
Sulphate (SO4)	mg/L	60	1.0	B167251	140	5.0	B167251

Elements

Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	B163053	<0.0030	0.0030	B163046
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	B163053	<0.00060	0.00060	B163046
Dissolved Arsenic (As)	mg/L	0.00024	0.00020	B163053	0.00092	0.00020	B163046
Dissolved Barium (Ba)	mg/L	0.078	0.010	B167951	0.20	0.050	B167950
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Boron (B)	mg/L	0.041	0.020	B167951	<0.10	0.10	B167950
Dissolved Calcium (Ca)	mg/L	71	0.30	B167951	110	1.5	B167950
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	B163053	<0.00030	0.00030	B163046
Dissolved Copper (Cu)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Iron (Fe)	mg/L	<0.060	0.060	B167951	<0.30	0.30	B167950

RDL = Reportable Detection Limit
N/A = Not Applicable



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Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Bureau Veritas ID		CCG206			CCG207		
Sampling Date		2023/10/18 13:24			2023/10/18 12:55		
COC Number		1OF1			1OF1		
	UNITS	WQ-4D	RDL	QC Batch	WQ-5B	RDL	QC Batch
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	B163053	0.00036	0.00020	B163046
Dissolved Lithium (Li)	mg/L	0.026	0.020	B167951	<0.10	0.10	B167950
Dissolved Magnesium (Mg)	mg/L	46	0.20	B167951	87	1.0	B167950
Dissolved Manganese (Mn)	mg/L	0.0045	0.0040	B167951	<0.020	0.020	B167950
Dissolved Molybdenum (Mo)	mg/L	0.0014	0.00020	B163053	0.0018	0.00020	B163046
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	B163053	0.0016	0.00050	B163046
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	B167951	<0.50	0.50	B167950
Dissolved Potassium (K)	mg/L	6.3	0.30	B167951	6.3	1.5	B167950
Dissolved Selenium (Se)	mg/L	0.00057	0.00020	B163053	0.00036	0.00020	B163046
Dissolved Silicon (Si)	mg/L	5.3	0.50	B167951	3.9	2.5	B167950
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	B163053	<0.00010	0.00010	B163046
Dissolved Sodium (Na)	mg/L	47	0.50	B167951	40	2.5	B167950
Dissolved Strontium (Sr)	mg/L	0.71	0.020	B167951	0.73	0.10	B167950
Dissolved Sulphur (S)	mg/L	20	0.20	B167951	44	1.0	B167950
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	B163053	<0.00020	0.00020	B163046
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Uranium (U)	mg/L	0.0020	0.00010	B163053	0.0063	0.00010	B163046
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	B163053	<0.0010	0.0010	B163046
Dissolved Zinc (Zn)	mg/L	0.043	0.0030	B163053	<0.0030	0.0030	B163046
RDL = Reportable Detection Limit							



PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CCG208	CCG209	CCG210	CCG211		CCG212		
Sampling Date		2023/10/19 10:25	2023/10/18 14:20	2023/10/18 13:55	2023/10/19 10:50		2023/10/18 13:24		
COC Number		1OF1	1OF1	1OF1	1OF1		1OF1		
	UNITS	WQ-02 SOIL	WQ-4A SOIL	WQ-4B SOIL	WQ-4C SOIL	QC Batch	WQ-4D SOIL	RDL	QC Batch
Physical Properties									
Moisture	%	50	62	39	47	B185580	53	0.30	B185200
RDL = Reportable Detection Limit									

Bureau Veritas ID		CCG213	CCG214		CCG215		
Sampling Date		2023/10/19 10:18	2023/10/19 10:07		2023/10/19 11:20		
COC Number		1OF1	1OF1		1OF1		
	UNITS	WQ-06	WQ-07	QC Batch	WQ-03	RDL	QC Batch
Physical Properties							
Moisture	%	38	30	B185580	47	0.30	B185200
RDL = Reportable Detection Limit							



RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CCG202		CCG203			CCG204		
Sampling Date		2023/10/19 10:25		2023/10/18 14:20			2023/10/18 13:55		
COC Number		1OF1		1OF1			1OF1		
	UNITS	WQ-02	QC Batch	WQ-4A	RDL	QC Batch	WQ-4B	RDL	QC Batch
Calculated Parameters									
Nitrate plus Nitrite (N)	mg/L	<0.014	B167733	0.54	0.014	B167486	0.51	0.014	B167486
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.290	B161152	0.613	0.020	B161152	0.121	0.020	B161152
Demand Parameters									
Biochemical Oxygen Demand	mg/L	<2.0	B160996	<3.0	2.0	B160996	<2.0	2.0	B160996
Chemical Oxygen Demand	mg/L	26	B165855	55	10	B165855	38	10	B165855
Misc. Inorganics									
Dissolved Oxygen (O2)	mg/L	11	B162488	4.6	0.10	B162488	16	0.10	B162488
Total Dissolved Solids	mg/L	530	B166885	420	10	B166885	460	10	B166885
Total Suspended Solids	mg/L	35	B165224	210	1.0	B165224	<0.98	0.98	B165224
Nutrients									
Total Ammonia (N)	mg/L	<0.015	B163091	<0.015	0.015	B163091	<0.015	0.015	B163091
Orthophosphate (P)	mg/L	<0.0030	B166593	<0.0030	0.0030	B166593	<0.0030	0.0030	B166593
Dissolved Phosphorus (P)	mg/L	<0.0030	B165681	<0.0030	0.0030	B164442	<0.0030	0.0030	B164442
Total Phosphorus (P)	mg/L	0.0088	B165729	0.11	0.0030	B165729	<0.0030	0.0030	B165729
Total Nitrogen (N)	mg/L	0.290	B168711	1.15	0.020	B168711	0.632	0.020	B168711
Nitrite (N)	mg/L	<0.010	B169779	<0.010	0.010	B169753	<0.010	0.010	B169786
Nitrate (N)	mg/L	<0.010	B169779	0.54	0.010	B169753	0.51	0.010	B169786
Physical Properties									
Turbidity	NTU	19	B163746	70	0.10	B163745	1.5	0.10	B163745
RDL = Reportable Detection Limit									



RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CCG205		CCG206		CCG207		
Sampling Date		2023/10/19 10:50		2023/10/18 13:24		2023/10/18 12:55		
COC Number		1OF1		1OF1		1OF1		
	UNITS	WQ-4C	QC Batch	WQ-4D	QC Batch	WQ-5B	RDL	QC Batch
Calculated Parameters								
Nitrate plus Nitrite (N)	mg/L	<0.014	B167733	<0.014	B167486	<0.014	0.014	B167486
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.227	B161152	0.336	B161851	0.524	0.020	B161851
Demand Parameters								
Biochemical Oxygen Demand	mg/L	<2.0	B160996	<2.0	B160996	<2.5	2.0	B160996
Chemical Oxygen Demand	mg/L	19	B165855	25	B165855	40	10	B165855
Misc. Inorganics								
Dissolved Oxygen (O2)	mg/L	10	B162488	13	B162488	>15 (1)	0.10	B162488
Total Dissolved Solids	mg/L	500	B166885	440	B166885	590	10	B166885
Total Suspended Solids	mg/L	13	B165224	110	B165224	5.7	1.0	B165224
Nutrients								
Total Ammonia (N)	mg/L	<0.015	B163091	<0.015	B163091	<0.015	0.015	B163091
Orthophosphate (P)	mg/L	<0.0030	B166593	<0.0030	B166593	0.0035	0.0030	B166593
Dissolved Phosphorus (P)	mg/L	<0.0030	B164442	<0.0030	B165681	<0.0030 (2)	0.0030	B164442
Total Phosphorus (P)	mg/L	<0.0030	B165729	0.028	B165729	0.025	0.0030	B165186
Total Nitrogen (N)	mg/L	0.227	B168711	0.336	B168711	0.524	0.020	B168970
Nitrite (N)	mg/L	<0.010	B169786	<0.010	B169786	<0.010	0.010	B169786
Nitrate (N)	mg/L	<0.010	B169786	<0.010	B169786	<0.010	0.010	B169786
Physical Properties								
Turbidity	NTU	10	B163746	39	B163745	3.6	0.10	B163745
RDL = Reportable Detection Limit								
(1) Result is greater than DO saturation limit due to possible matrix interference.								
(2) Phosphorus < Orthophosphate: Both values fall within the method uncertainty for duplicates and are likely equivalent.								



GENERAL COMMENTS

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

Package 1	4.7°C
Package 2	4.7°C

Version 2: Report reissued to include results for Metals and Salinity on samples WQ-02 (CCG208), WQ-4A (CCG209), WQ-4B (CCG210), WQ4C (CCG211), WQ-4D (CCG212), WQ-06 (CCG213), WQ-07 (CCG214) and WQ-03 (CCG215) as per client request received 2023/10/30.

Sample CCG202 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Nitrogen (Nitrite - Nitrate) by IC completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample CCG203 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG204 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG205 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Nitrogen (Nitrite - Nitrate) by IC completed within five days of sampling. Data is satisfactory for compliance purposes.

Sample CCG206 [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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CCG207 [WQ-5B] : 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. Orthophosphate by Automated Analyzer completed within five days of sampling. Data is satisfactory for compliance purposes. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

ROUTINE WATER & DISS. REGULATED METALS (WATER) Comments

Sample CCG205 [WQ-4C] Elements by ICP - Dissolved: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample CCG207 [WQ-5B] Elements by ICP - Dissolved: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

RESULTS OF CHEMICAL ANALYSES OF WATER Comments

Sample CCG203 [WQ-4A] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time, due to instrument issues, sample were rerun outside hold time.

Sample CCG204 [WQ-4B] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Sample CCG206 [WQ-4D] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Sample CCG207 [WQ-5B] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Due to instrument run time, samples ran past midnight and were reported outside hold time

Results relate only to the items tested.



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Bureau Veritas Job #: C385037
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Report Date: 2023/11/10

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QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	B160996	LYV	Spiked Blank	Biochemical Oxygen Demand	2023/10/24		91	%	85 - 115
	B160996	LYV	Method Blank	Biochemical Oxygen Demand	2023/10/24	<2.0		mg/L	
	B160996	LYV	RPD	Biochemical Oxygen Demand	2023/10/24	3.6		%	20
	B162488	BYM	Spiked Blank	Dissolved Oxygen (O2)	2023/10/20		93	%	80 - 120
	B162488	BYM	RPD [CCG202-01]	Dissolved Oxygen (O2)	2023/10/20	1.8		%	20
	B163016	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/10/20		100	%	80 - 120
				Dissolved Antimony (Sb)	2023/10/20		101	%	80 - 120
				Dissolved Arsenic (As)	2023/10/20		102	%	80 - 120
				Dissolved Beryllium (Be)	2023/10/20		94	%	80 - 120
				Dissolved Chromium (Cr)	2023/10/20		97	%	80 - 120
				Dissolved Cobalt (Co)	2023/10/20		98	%	80 - 120
				Dissolved Copper (Cu)	2023/10/20		96	%	80 - 120
				Dissolved Lead (Pb)	2023/10/20		89	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/10/20		NC	%	80 - 120
				Dissolved Nickel (Ni)	2023/10/20		97	%	80 - 120
				Dissolved Selenium (Se)	2023/10/20		98	%	80 - 120
				Dissolved Silver (Ag)	2023/10/20		87	%	80 - 120
				Dissolved Thallium (Tl)	2023/10/20		87	%	80 - 120
				Dissolved Tin (Sn)	2023/10/20		93	%	80 - 120
				Dissolved Titanium (Ti)	2023/10/20		101	%	80 - 120
				Dissolved Uranium (U)	2023/10/20		93	%	80 - 120
				Dissolved Vanadium (V)	2023/10/20		99	%	80 - 120
				Dissolved Zinc (Zn)	2023/10/20		94	%	80 - 120
	B163016	JAB	Spiked Blank	Dissolved Aluminum (Al)	2023/10/20		112	%	80 - 120
				Dissolved Antimony (Sb)	2023/10/20		108	%	80 - 120
				Dissolved Arsenic (As)	2023/10/20		104	%	80 - 120
				Dissolved Beryllium (Be)	2023/10/20		102	%	80 - 120
				Dissolved Chromium (Cr)	2023/10/20		103	%	80 - 120
				Dissolved Cobalt (Co)	2023/10/20		105	%	80 - 120
				Dissolved Copper (Cu)	2023/10/20		105	%	80 - 120
				Dissolved Lead (Pb)	2023/10/20		97	%	80 - 120
				Dissolved Molybdenum (Mo)	2023/10/20		99	%	80 - 120
				Dissolved Nickel (Ni)	2023/10/20		104	%	80 - 120
				Dissolved Selenium (Se)	2023/10/20		98	%	80 - 120
				Dissolved Silver (Ag)	2023/10/20		93	%	80 - 120
				Dissolved Thallium (Tl)	2023/10/20		94	%	80 - 120
				Dissolved Tin (Sn)	2023/10/20		94	%	80 - 120
				Dissolved Titanium (Ti)	2023/10/20		109	%	80 - 120
				Dissolved Uranium (U)	2023/10/20		98	%	80 - 120
				Dissolved Vanadium (V)	2023/10/20		103	%	80 - 120
				Dissolved Zinc (Zn)	2023/10/20		100	%	80 - 120
	B163016	JAB	Method Blank	Dissolved Aluminum (Al)	2023/10/20	<0.0030		mg/L	
				Dissolved Antimony (Sb)	2023/10/20	<0.00060		mg/L	
				Dissolved Arsenic (As)	2023/10/20	<0.00020		mg/L	
				Dissolved Beryllium (Be)	2023/10/20	<0.0010		mg/L	
				Dissolved Chromium (Cr)	2023/10/20	<0.0010		mg/L	
				Dissolved Cobalt (Co)	2023/10/20	<0.00030		mg/L	
				Dissolved Copper (Cu)	2023/10/20	<0.0010		mg/L	
				Dissolved Lead (Pb)	2023/10/20	<0.00020		mg/L	
				Dissolved Molybdenum (Mo)	2023/10/20	<0.00020		mg/L	
				Dissolved Nickel (Ni)	2023/10/20	<0.00050		mg/L	
				Dissolved Selenium (Se)	2023/10/20	<0.00020		mg/L	
				Dissolved Silver (Ag)	2023/10/20	<0.00010		mg/L	
				Dissolved Thallium (Tl)	2023/10/20	<0.00020		mg/L	
				Dissolved Tin (Sn)	2023/10/20	<0.0010		mg/L	



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Bureau Veritas Job #: C385037
Report Date: 2023/11/10

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Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
B163016	JAB	RPD	Dissolved Titanium (Ti)	2023/10/20	<0.0010		mg/L				
			Dissolved Uranium (U)	2023/10/20	<0.00010		mg/L				
			Dissolved Vanadium (V)	2023/10/20	<0.0010		mg/L				
			Dissolved Zinc (Zn)	2023/10/20	<0.0030		mg/L				
			Dissolved Aluminum (Al)	2023/10/20	NC		%	20			
			Dissolved Antimony (Sb)	2023/10/20	NC		%	20			
			Dissolved Arsenic (As)	2023/10/20	1.5		%	20			
			Dissolved Beryllium (Be)	2023/10/20	NC		%	20			
			Dissolved Chromium (Cr)	2023/10/20	NC		%	20			
			Dissolved Cobalt (Co)	2023/10/20	NC		%	20			
			Dissolved Copper (Cu)	2023/10/20	NC		%	20			
			Dissolved Lead (Pb)	2023/10/20	NC		%	20			
			Dissolved Molybdenum (Mo)	2023/10/20	3.9		%	20			
			Dissolved Nickel (Ni)	2023/10/20	6.2		%	20			
			Dissolved Selenium (Se)	2023/10/20	NC		%	20			
			Dissolved Silver (Ag)	2023/10/20	NC		%	20			
			Dissolved Thallium (Tl)	2023/10/20	NC		%	20			
			Dissolved Tin (Sn)	2023/10/20	NC		%	20			
			Dissolved Titanium (Ti)	2023/10/20	NC		%	20			
			Dissolved Uranium (U)	2023/10/20	0.74		%	20			
Dissolved Vanadium (V)	2023/10/20	NC		%	20						
Dissolved Zinc (Zn)	2023/10/20	NC		%	20						
B163046	JAB	Matrix Spike	Dissolved Aluminum (Al)	2023/10/21		104	%	80 - 120			
			Dissolved Antimony (Sb)	2023/10/21		104	%	80 - 120			
			Dissolved Arsenic (As)	2023/10/21		95	%	80 - 120			
			Dissolved Beryllium (Be)	2023/10/21		97	%	80 - 120			
			Dissolved Chromium (Cr)	2023/10/21		97	%	80 - 120			
			Dissolved Cobalt (Co)	2023/10/21		94	%	80 - 120			
			Dissolved Copper (Cu)	2023/10/21		92	%	80 - 120			
			Dissolved Lead (Pb)	2023/10/21		95	%	80 - 120			
			Dissolved Molybdenum (Mo)	2023/10/21		104	%	80 - 120			
			Dissolved Nickel (Ni)	2023/10/21		92	%	80 - 120			
			Dissolved Selenium (Se)	2023/10/21		95	%	80 - 120			
			Dissolved Silver (Ag)	2023/10/21		93	%	80 - 120			
			Dissolved Thallium (Tl)	2023/10/21		96	%	80 - 120			
			Dissolved Tin (Sn)	2023/10/21		99	%	80 - 120			
			Dissolved Titanium (Ti)	2023/10/21		98	%	80 - 120			
			Dissolved Uranium (U)	2023/10/21		97	%	80 - 120			
			Dissolved Vanadium (V)	2023/10/21		97	%	80 - 120			
			Dissolved Zinc (Zn)	2023/10/21		93	%	80 - 120			
			B163046	JAB	Spiked Blank	Dissolved Aluminum (Al)	2023/10/20		118	%	80 - 120
						Dissolved Antimony (Sb)	2023/10/20		104	%	80 - 120
Dissolved Arsenic (As)	2023/10/20					102	%	80 - 120			
Dissolved Beryllium (Be)	2023/10/20					100	%	80 - 120			
Dissolved Chromium (Cr)	2023/10/20					101	%	80 - 120			
Dissolved Cobalt (Co)	2023/10/20					102	%	80 - 120			
Dissolved Copper (Cu)	2023/10/20					101	%	80 - 120			
Dissolved Lead (Pb)	2023/10/20					94	%	80 - 120			
Dissolved Molybdenum (Mo)	2023/10/20					99	%	80 - 120			
Dissolved Nickel (Ni)	2023/10/20					101	%	80 - 120			
Dissolved Selenium (Se)	2023/10/20					99	%	80 - 120			
Dissolved Silver (Ag)	2023/10/20					94	%	80 - 120			
Dissolved Thallium (Tl)	2023/10/20					92	%	80 - 120			
Dissolved Tin (Sn)	2023/10/20					93	%	80 - 120			
Dissolved Titanium (Ti)	2023/10/20		102	%	80 - 120						



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits	
B163046	JAB	Method Blank	Dissolved Uranium (U)	2023/10/20		95	%	80 - 120	
			Dissolved Vanadium (V)	2023/10/20		101	%	80 - 120	
			Dissolved Zinc (Zn)	2023/10/20		97	%	80 - 120	
			Dissolved Aluminum (Al)	2023/10/20	<0.0030			mg/L	
			Dissolved Antimony (Sb)	2023/10/20	<0.00060			mg/L	
			Dissolved Arsenic (As)	2023/10/20	<0.00020			mg/L	
			Dissolved Beryllium (Be)	2023/10/20	<0.0010			mg/L	
			Dissolved Chromium (Cr)	2023/10/20	<0.0010			mg/L	
			Dissolved Cobalt (Co)	2023/10/20	<0.00030			mg/L	
			Dissolved Copper (Cu)	2023/10/20	<0.0010			mg/L	
			Dissolved Lead (Pb)	2023/10/20	<0.00020			mg/L	
			Dissolved Molybdenum (Mo)	2023/10/20	<0.00020			mg/L	
			Dissolved Nickel (Ni)	2023/10/20	<0.00050			mg/L	
			Dissolved Selenium (Se)	2023/10/20	<0.00020			mg/L	
			Dissolved Silver (Ag)	2023/10/20	<0.00010			mg/L	
			Dissolved Thallium (Tl)	2023/10/20	<0.00020			mg/L	
			B163046	JAB	RPD	Dissolved Tin (Sn)	2023/10/20	<0.0010	
Dissolved Titanium (Ti)	2023/10/20	<0.0010					mg/L		
Dissolved Uranium (U)	2023/10/20	<0.00010						mg/L	
Dissolved Vanadium (V)	2023/10/20	<0.0010						mg/L	
Dissolved Zinc (Zn)	2023/10/20	<0.0030						mg/L	
Dissolved Aluminum (Al)	2023/10/20	8.2				%	20		
Dissolved Antimony (Sb)	2023/10/20	NC				%	20		
Dissolved Arsenic (As)	2023/10/20	1.4				%	20		
Dissolved Beryllium (Be)	2023/10/20	NC				%	20		
Dissolved Chromium (Cr)	2023/10/20	NC				%	20		
Dissolved Cobalt (Co)	2023/10/20	4.2				%	20		
Dissolved Copper (Cu)	2023/10/20	NC				%	20		
Dissolved Lead (Pb)	2023/10/20	NC				%	20		
Dissolved Molybdenum (Mo)	2023/10/20	15				%	20		
Dissolved Nickel (Ni)	2023/10/20	NC				%	20		
Dissolved Selenium (Se)	2023/10/20	NC				%	20		
Dissolved Silver (Ag)	2023/10/20	NC				%	20		
Dissolved Thallium (Tl)	2023/10/20	NC	%	20					
B163053	JAB	Matrix Spike	Dissolved Tin (Sn)	2023/10/20	NC		%	20	
			Dissolved Titanium (Ti)	2023/10/20	NC		%	20	
			Dissolved Uranium (U)	2023/10/20	7.9	%	20		
			Dissolved Vanadium (V)	2023/10/20	3.5	%	20		
			Dissolved Zinc (Zn)	2023/10/20	NC		%	20	
			Dissolved Aluminum (Al)	2023/10/20		111	%	80 - 120	
			Dissolved Antimony (Sb)	2023/10/20		98	%	80 - 120	
			Dissolved Arsenic (As)	2023/10/20		100	%	80 - 120	
			Dissolved Beryllium (Be)	2023/10/20		99	%	80 - 120	
			Dissolved Chromium (Cr)	2023/10/20		99	%	80 - 120	
			Dissolved Cobalt (Co)	2023/10/20		99	%	80 - 120	
			Dissolved Copper (Cu)	2023/10/20		99	%	80 - 120	
			Dissolved Lead (Pb)	2023/10/20		90	%	80 - 120	
			Dissolved Molybdenum (Mo)	2023/10/20		96	%	80 - 120	
			Dissolved Nickel (Ni)	2023/10/20		98	%	80 - 120	
			Dissolved Selenium (Se)	2023/10/20		100	%	80 - 120	
			Dissolved Silver (Ag)	2023/10/20		90	%	80 - 120	
Dissolved Thallium (Tl)	2023/10/20		88	%	80 - 120				
Dissolved Tin (Sn)	2023/10/20		90	%	80 - 120				
Dissolved Titanium (Ti)	2023/10/20		100	%	80 - 120				
Dissolved Uranium (U)	2023/10/20		92	%	80 - 120				



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B163053	JAB	Spiked Blank	Dissolved Vanadium (V)	2023/10/20		99	%	80 - 120
			Dissolved Zinc (Zn)	2023/10/20		96	%	80 - 120
			Dissolved Aluminum (Al)	2023/10/21		94	%	80 - 120
			Dissolved Antimony (Sb)	2023/10/21		116	%	80 - 120
			Dissolved Arsenic (As)	2023/10/21		115	%	80 - 120
			Dissolved Beryllium (Be)	2023/10/21		117	%	80 - 120
			Dissolved Chromium (Cr)	2023/10/21		115	%	80 - 120
			Dissolved Cobalt (Co)	2023/10/21		116	%	80 - 120
			Dissolved Copper (Cu)	2023/10/21		117	%	80 - 120
			Dissolved Lead (Pb)	2023/10/21		106	%	80 - 120
			Dissolved Molybdenum (Mo)	2023/10/21		110	%	80 - 120
			Dissolved Nickel (Ni)	2023/10/21		115	%	80 - 120
			Dissolved Selenium (Se)	2023/10/21		111	%	80 - 120
			Dissolved Silver (Ag)	2023/10/21		106	%	80 - 120
			Dissolved Thallium (Tl)	2023/10/21		103	%	80 - 120
			Dissolved Tin (Sn)	2023/10/21		105	%	80 - 120
			Dissolved Titanium (Ti)	2023/10/21		113	%	80 - 120
			Dissolved Uranium (U)	2023/10/21		106	%	80 - 120
			B163053	JAB	Method Blank	Dissolved Vanadium (V)	2023/10/21	
Dissolved Zinc (Zn)	2023/10/21					112	%	80 - 120
Dissolved Aluminum (Al)	2023/10/20	<0.0030					mg/L	
Dissolved Antimony (Sb)	2023/10/20	<0.00060					mg/L	
Dissolved Arsenic (As)	2023/10/20	<0.00020					mg/L	
Dissolved Beryllium (Be)	2023/10/20	<0.0010					mg/L	
Dissolved Chromium (Cr)	2023/10/20	<0.0010					mg/L	
Dissolved Cobalt (Co)	2023/10/20	<0.00030					mg/L	
Dissolved Copper (Cu)	2023/10/20	<0.0010					mg/L	
Dissolved Lead (Pb)	2023/10/20	<0.00020					mg/L	
Dissolved Molybdenum (Mo)	2023/10/20	<0.00020					mg/L	
Dissolved Nickel (Ni)	2023/10/20	<0.00050					mg/L	
Dissolved Selenium (Se)	2023/10/20	<0.00020					mg/L	
Dissolved Silver (Ag)	2023/10/20	<0.00010					mg/L	
Dissolved Thallium (Tl)	2023/10/20	<0.00020					mg/L	
Dissolved Tin (Sn)	2023/10/20	<0.0010					mg/L	
Dissolved Titanium (Ti)	2023/10/20	<0.0010					mg/L	
Dissolved Uranium (U)	2023/10/20	<0.00010					mg/L	
Dissolved Vanadium (V)	2023/10/20	<0.0010					mg/L	
Dissolved Zinc (Zn)	2023/10/20	<0.0030		mg/L				
B163053	JAB	RPD	Dissolved Aluminum (Al)	2023/10/20	NC		%	20
			Dissolved Antimony (Sb)	2023/10/20	NC		%	20
			Dissolved Arsenic (As)	2023/10/20	NC		%	20
			Dissolved Beryllium (Be)	2023/10/20	NC		%	20
			Dissolved Chromium (Cr)	2023/10/20	NC		%	20
			Dissolved Cobalt (Co)	2023/10/20	NC		%	20
			Dissolved Copper (Cu)	2023/10/20	NC		%	20
			Dissolved Lead (Pb)	2023/10/20	NC		%	20
			Dissolved Molybdenum (Mo)	2023/10/20	3.3		%	20
			Dissolved Nickel (Ni)	2023/10/20	NC		%	20
			Dissolved Selenium (Se)	2023/10/20	NC		%	20
			Dissolved Silver (Ag)	2023/10/20	NC		%	20
			Dissolved Thallium (Tl)	2023/10/20	NC		%	20
			Dissolved Tin (Sn)	2023/10/20	NC		%	20
Dissolved Titanium (Ti)	2023/10/20	NC		%	20			
Dissolved Uranium (U)	2023/10/20	NC		%	20			
Dissolved Vanadium (V)	2023/10/20	NC		%	20			



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Zinc (Zn)	2023/10/20	NC		%	20
B163091	ISW	Matrix Spike [CCG206-07]	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163091	ISW	Spiked Blank	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163091	ISW	Method Blank	Total Ammonia (N)	2023/10/20	<0.015		mg/L	
B163091	ISW	RPD [CCG206-07]	Total Ammonia (N)	2023/10/20	NC		%	20
B163097	ISW	Matrix Spike [CCG207-07]	Total Ammonia (N)	2023/10/20		104	%	80 - 120
B163097	ISW	Spiked Blank	Total Ammonia (N)	2023/10/20		100	%	80 - 120
B163097	ISW	Method Blank	Total Ammonia (N)	2023/10/20	<0.015		mg/L	
B163097	ISW	RPD [CCG207-07]	Total Ammonia (N)	2023/10/20	NC		%	20
B163745	DVN	Spiked Blank	Turbidity	2023/10/21		100	%	80 - 120
B163745	DVN	Method Blank	Turbidity	2023/10/21	<0.10		NTU	
B163745	DVN	RPD	Turbidity	2023/10/21	6.3		%	20
B163746	DVN	Spiked Blank	Turbidity	2023/10/21		100	%	80 - 120
B163746	DVN	Method Blank	Turbidity	2023/10/21	<0.10		NTU	
B163746	DVN	RPD	Turbidity	2023/10/21	3.9		%	20
B164442	MAP	Matrix Spike	Dissolved Phosphorus (P)	2023/10/23		100	%	80 - 120
B164442	MAP	QC Standard	Dissolved Phosphorus (P)	2023/10/23		88	%	80 - 120
B164442	MAP	Spiked Blank	Dissolved Phosphorus (P)	2023/10/23		98	%	80 - 120
B164442	MAP	Method Blank	Dissolved Phosphorus (P)	2023/10/23	<0.0030		mg/L	
B164442	MAP	RPD	Dissolved Phosphorus (P)	2023/10/23	NC		%	20
B165186	MAP	Matrix Spike	Total Phosphorus (P)	2023/10/24		109	%	80 - 120
B165186	MAP	QC Standard	Total Phosphorus (P)	2023/10/24		88	%	80 - 120
B165186	MAP	Spiked Blank	Total Phosphorus (P)	2023/10/24		98	%	80 - 120
B165186	MAP	Method Blank	Total Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165186	MAP	RPD	Total Phosphorus (P)	2023/10/24	12		%	20
B165224	RTM	Matrix Spike	Total Suspended Solids	2023/10/24		99	%	80 - 120
B165224	RTM	Spiked Blank	Total Suspended Solids	2023/10/24		108	%	80 - 120
B165224	RTM	Method Blank	Total Suspended Solids	2023/10/24	<1.0		mg/L	
B165224	RTM	RPD	Total Suspended Solids	2023/10/24	6.2		%	20
B165681	MAP	Matrix Spike	Dissolved Phosphorus (P)	2023/10/24		98	%	80 - 120
B165681	MAP	QC Standard	Dissolved Phosphorus (P)	2023/10/24		86	%	80 - 120
B165681	MAP	Spiked Blank	Dissolved Phosphorus (P)	2023/10/24		96	%	80 - 120
B165681	MAP	Method Blank	Dissolved Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165681	MAP	RPD	Dissolved Phosphorus (P)	2023/10/24	NC		%	20
B165729	MAP	Matrix Spike	Total Phosphorus (P)	2023/10/24		98	%	80 - 120
B165729	MAP	QC Standard	Total Phosphorus (P)	2023/10/24		85	%	80 - 120
B165729	MAP	Spiked Blank	Total Phosphorus (P)	2023/10/24		95	%	80 - 120
B165729	MAP	Method Blank	Total Phosphorus (P)	2023/10/24	<0.0030		mg/L	
B165729	MAP	RPD	Total Phosphorus (P)	2023/10/24	2.8		%	20
B165855	LYV	Matrix Spike	Chemical Oxygen Demand	2023/10/23		108	%	80 - 120
B165855	LYV	Spiked Blank	Chemical Oxygen Demand	2023/10/23		100	%	80 - 120
B165855	LYV	Method Blank	Chemical Oxygen Demand	2023/10/23	<10		mg/L	
B165855	LYV	RPD	Chemical Oxygen Demand	2023/10/23	0		%	20
B166311	BTM	Spiked Blank	pH	2023/10/23		100	%	97 - 103
B166311	BTM	RPD [CCG202-04]	pH	2023/10/23	0.19		%	N/A
B166328	BTM	Spiked Blank	Alkalinity (Total as CaCO3)	2023/10/23		96	%	80 - 120
B166328	BTM	Method Blank	Alkalinity (PP as CaCO3)	2023/10/23	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2023/10/23	<1.0		mg/L	
			Bicarbonate (HCO3)	2023/10/23	<1.0		mg/L	
			Carbonate (CO3)	2023/10/23	<1.0		mg/L	
			Hydroxide (OH)	2023/10/23	<1.0		mg/L	
B166328	BTM	RPD [CCG202-04]	Alkalinity (PP as CaCO3)	2023/10/23	NC		%	20
			Alkalinity (Total as CaCO3)	2023/10/23	2.8		%	20
			Bicarbonate (HCO3)	2023/10/23	2.8		%	20
			Carbonate (CO3)	2023/10/23	NC		%	20



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hydroxide (OH)	2023/10/23	NC		%	20
B166331	BTM	Spiked Blank	Conductivity	2023/10/23		101	%	90 - 110
B166331	BTM	Method Blank	Conductivity	2023/10/23	<2.0		uS/cm	
B166331	BTM	RPD [CCG202-04]	Conductivity	2023/10/23	3.6		%	10
B166593	MAP	Matrix Spike [CCG207-04]	Orthophosphate (P)	2023/10/23		97	%	80 - 120
B166593	MAP	Spiked Blank	Orthophosphate (P)	2023/10/23		101	%	80 - 120
B166593	MAP	Method Blank	Orthophosphate (P)	2023/10/23	<0.0030		mg/L	
B166593	MAP	RPD [CCG207-04]	Orthophosphate (P)	2023/10/23	8.8		%	20
B166885	DVN	Matrix Spike [CCG202-03]	Total Dissolved Solids	2023/10/25		NC	%	80 - 120
B166885	DVN	Spiked Blank	Total Dissolved Solids	2023/10/25		95	%	80 - 120
B166885	DVN	Method Blank	Total Dissolved Solids	2023/10/25	<10		mg/L	
B166885	DVN	RPD [CCG202-03]	Total Dissolved Solids	2023/10/25	0.75		%	20
B167221	JAV	Matrix Spike [CCG202-04]	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		NC	%	80 - 120
B167221	JAV	Spiked Blank	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		100	%	80 - 120
B167221	JAV	Method Blank	Chloride (Cl)	2023/10/24	<1.0		mg/L	
			Sulphate (SO4)	2023/10/24	<1.0		mg/L	
B167221	JAV	RPD [CCG202-04]	Chloride (Cl)	2023/10/24	1.5		%	20
			Sulphate (SO4)	2023/10/24	1.0		%	20
B167251	JAV	Matrix Spike	Chloride (Cl)	2023/10/24		97	%	80 - 120
			Sulphate (SO4)	2023/10/24		98	%	80 - 120
B167251	JAV	Spiked Blank	Chloride (Cl)	2023/10/24		98	%	80 - 120
			Sulphate (SO4)	2023/10/24		104	%	80 - 120
B167251	JAV	Method Blank	Chloride (Cl)	2023/10/24	<1.0		mg/L	
			Sulphate (SO4)	2023/10/24	<1.0		mg/L	
B167251	JAV	RPD	Chloride (Cl)	2023/10/24	NC		%	20
			Sulphate (SO4)	2023/10/24	0.39		%	20
B167830	MPU	Matrix Spike	Dissolved Barium (Ba)	2023/10/24		98	%	80 - 120
			Dissolved Boron (B)	2023/10/24		99	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/24		98	%	80 - 120
			Dissolved Iron (Fe)	2023/10/24		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/24		97	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/24		101	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/24		102	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/24		98	%	80 - 120
			Dissolved Potassium (K)	2023/10/24		101	%	80 - 120
			Dissolved Silicon (Si)	2023/10/24		91	%	80 - 120
			Dissolved Sodium (Na)	2023/10/24		100	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/24		97	%	80 - 120
			Dissolved Sulphur (S)	2023/10/24		101	%	80 - 120
B167830	MPU	Spiked Blank	Dissolved Barium (Ba)	2023/10/24		101	%	80 - 120
			Dissolved Boron (B)	2023/10/24		100	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/24		101	%	80 - 120
			Dissolved Iron (Fe)	2023/10/24		105	%	80 - 120
			Dissolved Lithium (Li)	2023/10/24		100	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/24		105	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/24		108	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/24		101	%	80 - 120
			Dissolved Potassium (K)	2023/10/24		103	%	80 - 120
			Dissolved Silicon (Si)	2023/10/24		98	%	80 - 120
			Dissolved Sodium (Na)	2023/10/24		101	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/24		101	%	80 - 120
			Dissolved Sulphur (S)	2023/10/24		99	%	80 - 120
B167830	MPU	Method Blank	Dissolved Barium (Ba)	2023/10/24	<0.010		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B167830	MPU	RPD	Dissolved Boron (B)	2023/10/24	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/24	<0.30		mg/L	
			Dissolved Iron (Fe)	2023/10/24	<0.060		mg/L	
			Dissolved Lithium (Li)	2023/10/24	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2023/10/24	<0.20		mg/L	
			Dissolved Manganese (Mn)	2023/10/24	0.0060,		mg/L	
					RDL=0.0060			
			Dissolved Phosphorus (P)	2023/10/24	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/24	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/24	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/24	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/24	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/24	<0.20		mg/L	
			Dissolved Barium (Ba)	2023/10/24	0.74		%	20
			Dissolved Boron (B)	2023/10/24	NC		%	20
			Dissolved Calcium (Ca)	2023/10/24	0.34		%	20
			Dissolved Iron (Fe)	2023/10/24	0.75		%	20
			Dissolved Lithium (Li)	2023/10/24	NC		%	20
			Dissolved Magnesium (Mg)	2023/10/24	0.24		%	20
			Dissolved Manganese (Mn)	2023/10/24	5.3		%	20
Dissolved Phosphorus (P)	2023/10/24	NC		%	20			
Dissolved Potassium (K)	2023/10/24	0.31		%	20			
Dissolved Silicon (Si)	2023/10/24	0.36		%	20			
Dissolved Sodium (Na)	2023/10/24	0.36		%	20			
Dissolved Strontium (Sr)	2023/10/24	0.48		%	20			
Dissolved Sulphur (S)	2023/10/24	0.58		%	20			
B167950	MPU	Matrix Spike	Dissolved Barium (Ba)	2023/10/25		96	%	80 - 120
			Dissolved Boron (B)	2023/10/25		97	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		97	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		98	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		102	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		100	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		94	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		100	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		88	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		95	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		93	%	80 - 120
Dissolved Sulphur (S)	2023/10/25		94	%	80 - 120			
B167950	MPU	Spiked Blank	Dissolved Barium (Ba)	2023/10/25		102	%	80 - 120
			Dissolved Boron (B)	2023/10/25		103	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		104	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		109	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		105	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		111	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		111	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		101	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		106	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		99	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		104	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		99	%	80 - 120
Dissolved Sulphur (S)	2023/10/25		99	%	80 - 120			
B167950	MPU	Method Blank	Dissolved Barium (Ba)	2023/10/26	<0.010		mg/L	
			Dissolved Boron (B)	2023/10/26	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/26	<0.30		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Iron (Fe)	2023/10/26	<0.060		mg/L	
			Dissolved Lithium (Li)	2023/10/26	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2023/10/26	<0.20		mg/L	
			Dissolved Manganese (Mn)	2023/10/26	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2023/10/26	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/26	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/26	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/26	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/26	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/26	<0.20		mg/L	
B167950	MPU	RPD	Dissolved Barium (Ba)	2023/10/26	2.4		%	20
			Dissolved Boron (B)	2023/10/26	8.0		%	20
			Dissolved Calcium (Ca)	2023/10/26	10		%	20
			Dissolved Iron (Fe)	2023/10/26	1.4		%	20
			Dissolved Lithium (Li)	2023/10/26	11		%	20
			Dissolved Magnesium (Mg)	2023/10/26	14		%	20
			Dissolved Manganese (Mn)	2023/10/26	0.16		%	20
			Dissolved Phosphorus (P)	2023/10/26	NC		%	20
			Dissolved Potassium (K)	2023/10/26	8.9		%	20
			Dissolved Silicon (Si)	2023/10/26	0.41		%	20
B167951	MPU	Matrix Spike [CCG204-05]	Dissolved Barium (Ba)	2023/10/25		95	%	80 - 120
			Dissolved Boron (B)	2023/10/25		97	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		94	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		99	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		98	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		101	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		100	%	80 - 120
			Dissolved Phosphorus (P)	2023/10/25		95	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		99	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		89	%	80 - 120
B167951	MPU	Spiked Blank	Dissolved Sodium (Na)	2023/10/25		94	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		90	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		99	%	80 - 120
			Dissolved Barium (Ba)	2023/10/25		102	%	80 - 120
			Dissolved Boron (B)	2023/10/25		102	%	80 - 120
			Dissolved Calcium (Ca)	2023/10/25		103	%	80 - 120
			Dissolved Iron (Fe)	2023/10/25		108	%	80 - 120
			Dissolved Lithium (Li)	2023/10/25		104	%	80 - 120
			Dissolved Magnesium (Mg)	2023/10/25		110	%	80 - 120
			Dissolved Manganese (Mn)	2023/10/25		109	%	80 - 120
B167951	MPU	Method Blank	Dissolved Phosphorus (P)	2023/10/25		100	%	80 - 120
			Dissolved Potassium (K)	2023/10/25		106	%	80 - 120
			Dissolved Silicon (Si)	2023/10/25		98	%	80 - 120
			Dissolved Sodium (Na)	2023/10/25		103	%	80 - 120
			Dissolved Strontium (Sr)	2023/10/25		99	%	80 - 120
			Dissolved Sulphur (S)	2023/10/25		98	%	80 - 120
			Dissolved Barium (Ba)	2023/10/26	<0.010		mg/L	
			Dissolved Boron (B)	2023/10/26	<0.020		mg/L	
			Dissolved Calcium (Ca)	2023/10/26	<0.30		mg/L	
			Dissolved Iron (Fe)	2023/10/26	<0.060		mg/L	
Dissolved Lithium (Li)	2023/10/26	<0.020		mg/L				
Dissolved Magnesium (Mg)	2023/10/26	<0.20		mg/L				



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Manganese (Mn)	2023/10/26	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2023/10/26	<0.10		mg/L	
			Dissolved Potassium (K)	2023/10/26	<0.30		mg/L	
			Dissolved Silicon (Si)	2023/10/26	<0.50		mg/L	
			Dissolved Sodium (Na)	2023/10/26	<0.50		mg/L	
			Dissolved Strontium (Sr)	2023/10/26	<0.020		mg/L	
			Dissolved Sulphur (S)	2023/10/26	<0.20		mg/L	
B167951	MPU	RPD [CCG204-05]	Dissolved Barium (Ba)	2023/10/26	3.9		%	20
			Dissolved Boron (B)	2023/10/26	NC		%	20
			Dissolved Calcium (Ca)	2023/10/26	1.5		%	20
			Dissolved Iron (Fe)	2023/10/26	NC		%	20
			Dissolved Lithium (Li)	2023/10/26	NC		%	20
			Dissolved Magnesium (Mg)	2023/10/26	0.57		%	20
			Dissolved Manganese (Mn)	2023/10/26	NC		%	20
			Dissolved Phosphorus (P)	2023/10/26	NC		%	20
			Dissolved Potassium (K)	2023/10/26	2.2		%	20
			Dissolved Silicon (Si)	2023/10/26	1.1		%	20
			Dissolved Sodium (Na)	2023/10/26	1.1		%	20
			Dissolved Strontium (Sr)	2023/10/26	1.8		%	20
			Dissolved Sulphur (S)	2023/10/26	1.6		%	20
B168711	BB3	Spiked Blank	Total Nitrogen (N)	2023/10/25		92	%	80 - 120
B168711	BB3	Method Blank	Total Nitrogen (N)	2023/10/25	<0.020		mg/L	
B168970	BB3	Matrix Spike	Total Nitrogen (N)	2023/10/25		111	%	80 - 120
B168970	BB3	Spiked Blank	Total Nitrogen (N)	2023/10/25		95	%	80 - 120
B168970	BB3	Method Blank	Total Nitrogen (N)	2023/10/25	<0.020		mg/L	
B168970	BB3	RPD	Total Nitrogen (N)	2023/10/25	NC		%	20
B169753	KDB	Matrix Spike	Nitrite (N)	2023/10/24		98	%	80 - 120
			Nitrate (N)	2023/10/24		100	%	80 - 120
B169753	KDB	Spiked Blank	Nitrite (N)	2023/10/24		101	%	80 - 120
			Nitrate (N)	2023/10/24		104	%	80 - 120
B169753	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169753	KDB	RPD	Nitrite (N)	2023/10/24	1.8		%	20
			Nitrate (N)	2023/10/24	1.1		%	20
B169779	KDB	Matrix Spike	Nitrite (N)	2023/10/24		99	%	80 - 120
			Nitrate (N)	2023/10/24		102	%	80 - 120
B169779	KDB	Spiked Blank	Nitrite (N)	2023/10/24		101	%	80 - 120
			Nitrate (N)	2023/10/24		104	%	80 - 120
B169779	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169779	KDB	RPD	Nitrite (N)	2023/10/24	NC		%	20
			Nitrate (N)	2023/10/24	NC		%	20
B169786	KDB	Matrix Spike	Nitrite (N)	2023/10/24		92	%	80 - 120
			Nitrate (N)	2023/10/24		102	%	80 - 120
B169786	KDB	Spiked Blank	Nitrite (N)	2023/10/24		94	%	80 - 120
			Nitrate (N)	2023/10/24		103	%	80 - 120
B169786	KDB	Method Blank	Nitrite (N)	2023/10/24	<0.010		mg/L	
			Nitrate (N)	2023/10/24	<0.010		mg/L	
B169786	KDB	RPD	Nitrite (N)	2023/10/24	NC		%	20
			Nitrate (N)	2023/10/24	NC		%	20
B185200	NBJ	Method Blank	Moisture	2023/11/04	<0.30		%	
B185200	NBJ	RPD	Moisture	2023/11/04	7.3		%	20
B185382	KVA	QC Standard	Saturation %	2023/11/07		107	%	75 - 125
B185382	KVA	RPD	Saturation %	2023/11/07	1.4		%	12
B185383	HAP	QC Standard	Soluble (CaCl2) pH	2023/11/10		100	%	97 - 103



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits		
B185383	HAP	Spiked Blank	Soluble (CaCl2) pH	2023/11/10		100	%	97 - 103		
B185383	HAP	RPD	Soluble (CaCl2) pH	2023/11/10	0.39		%	N/A		
B185580	YLN	Method Blank	Moisture	2023/11/05	<0.30		%			
B185580	YLN	RPD	Moisture	2023/11/05	4.8		%	20		
B185721	TOR	Matrix Spike	Hex. Chromium (Cr 6+)	2023/11/04		94	%	75 - 125		
B185721	TOR	Spiked Blank	Hex. Chromium (Cr 6+)	2023/11/04		101	%	80 - 120		
B185721	TOR	Method Blank	Hex. Chromium (Cr 6+)	2023/11/04	<0.080		mg/kg			
B185721	TOR	RPD	Hex. Chromium (Cr 6+)	2023/11/04	NC		%	35		
B185848	KVA	QC Standard	Saturation %	2023/11/05		103	%	75 - 125		
B185848	KVA	RPD	Saturation %	2023/11/05	1.8		%	12		
B185850	STB	QC Standard	Soluble (CaCl2) pH	2023/11/05		100	%	97 - 103		
B185850	STB	Spiked Blank	Soluble (CaCl2) pH	2023/11/05		100	%	97 - 103		
B185850	STB	RPD	Soluble (CaCl2) pH	2023/11/05	0.38		%	N/A		
B186205	KH2	Matrix Spike	Total Antimony (Sb)	2023/11/06		85	%	75 - 125		
Total Arsenic (As)			2023/11/06		90	%	75 - 125			
Total Barium (Ba)			2023/11/06		NC	%	75 - 125			
Total Beryllium (Be)			2023/11/06		91	%	75 - 125			
Total Cadmium (Cd)			2023/11/06		92	%	75 - 125			
Total Chromium (Cr)			2023/11/06		105	%	75 - 125			
Total Cobalt (Co)			2023/11/06		87	%	75 - 125			
Total Copper (Cu)			2023/11/06		87	%	75 - 125			
Total Lead (Pb)			2023/11/06		89	%	75 - 125			
Total Mercury (Hg)			2023/11/06		103	%	75 - 125			
Total Molybdenum (Mo)			2023/11/06		95	%	75 - 125			
Total Nickel (Ni)			2023/11/06		87	%	75 - 125			
Total Selenium (Se)			2023/11/06		89	%	75 - 125			
Total Silver (Ag)			2023/11/06		88	%	75 - 125			
Total Thallium (Tl)			2023/11/06		94	%	75 - 125			
Total Tin (Sn)			2023/11/06		97	%	75 - 125			
Total Uranium (U)			2023/11/06		90	%	75 - 125			
Total Vanadium (V)			2023/11/06		134 (1)	%	75 - 125			
Total Zinc (Zn)			2023/11/06		NC	%	75 - 125			
B186205			KH2	QC Standard	Total Antimony (Sb)	2023/11/06		91	%	14 - 183
Total Arsenic (As)					2023/11/06		102	%	53 - 147	
Total Barium (Ba)					2023/11/06		84	%	80 - 119	
Total Cadmium (Cd)					2023/11/06		103	%	71 - 129	
Total Chromium (Cr)					2023/11/06		84	%	59 - 141	
Total Cobalt (Co)					2023/11/06		84	%	58 - 142	
Total Copper (Cu)					2023/11/06		103	%	83 - 117	
Total Lead (Pb)					2023/11/06		94	%	79 - 121	
Total Molybdenum (Mo)	2023/11/06				91	%	67 - 134			
Total Nickel (Ni)	2023/11/06				94	%	78 - 122			
Total Silver (Ag)	2023/11/06				87	%	46 - 154			
Total Tin (Sn)	2023/11/06				97	%	67 - 133			
Total Uranium (U)	2023/11/06				81	%	77 - 123			
Total Vanadium (V)	2023/11/06				89	%	79 - 121			
Total Zinc (Zn)	2023/11/06				90	%	79 - 122			
B186205	KH2	Spiked Blank	Total Antimony (Sb)	2023/11/06		93	%	80 - 120		
Total Arsenic (As)			2023/11/06		95	%	80 - 120			
Total Barium (Ba)			2023/11/06		93	%	80 - 120			
Total Beryllium (Be)			2023/11/06		93	%	80 - 120			
Total Cadmium (Cd)			2023/11/06		93	%	80 - 120			
Total Chromium (Cr)			2023/11/06		95	%	80 - 120			
Total Copper (Cu)			2023/11/06		96	%	80 - 120			



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lead (Pb)	2023/11/06		95	%	80 - 120
			Total Mercury (Hg)	2023/11/06		118	%	80 - 120
			Total Molybdenum (Mo)	2023/11/06		94	%	80 - 120
			Total Nickel (Ni)	2023/11/06		95	%	80 - 120
			Total Selenium (Se)	2023/11/06		94	%	80 - 120
			Total Silver (Ag)	2023/11/06		90	%	80 - 120
			Total Thallium (Tl)	2023/11/06		99	%	80 - 120
			Total Tin (Sn)	2023/11/06		95	%	80 - 120
			Total Uranium (U)	2023/11/06		99	%	80 - 120
			Total Vanadium (V)	2023/11/06		94	%	80 - 120
			Total Zinc (Zn)	2023/11/06		93	%	80 - 120
B186205	KH2	Method Blank	Total Antimony (Sb)	2023/11/06	<0.50		mg/kg	
			Total Arsenic (As)	2023/11/06	<1.0		mg/kg	
			Total Barium (Ba)	2023/11/06	<1.0		mg/kg	
			Total Beryllium (Be)	2023/11/06	<0.40		mg/kg	
			Total Cadmium (Cd)	2023/11/06	<0.050		mg/kg	
			Total Chromium (Cr)	2023/11/06	<1.0		mg/kg	
			Total Cobalt (Co)	2023/11/06	<0.50		mg/kg	
			Total Copper (Cu)	2023/11/06	<1.0		mg/kg	
			Total Lead (Pb)	2023/11/06	<0.50		mg/kg	
			Total Mercury (Hg)	2023/11/06	<0.050		mg/kg	
			Total Molybdenum (Mo)	2023/11/06	<0.40		mg/kg	
			Total Nickel (Ni)	2023/11/06	<1.0		mg/kg	
			Total Selenium (Se)	2023/11/06	<0.50		mg/kg	
			Total Silver (Ag)	2023/11/06	<0.20		mg/kg	
			Total Thallium (Tl)	2023/11/06	<0.10		mg/kg	
			Total Tin (Sn)	2023/11/06	<1.0		mg/kg	
			Total Uranium (U)	2023/11/06	<0.20		mg/kg	
			Total Vanadium (V)	2023/11/06	<1.0		mg/kg	
			Total Zinc (Zn)	2023/11/06	<10		mg/kg	
B186205	KH2	RPD	Total Antimony (Sb)	2023/11/06	NC		%	30
			Total Arsenic (As)	2023/11/06	14		%	30
			Total Barium (Ba)	2023/11/06	19		%	35
			Total Beryllium (Be)	2023/11/06	20		%	30
			Total Cadmium (Cd)	2023/11/06	7.7		%	30
			Total Chromium (Cr)	2023/11/06	14		%	30
			Total Cobalt (Co)	2023/11/06	12		%	30
			Total Copper (Cu)	2023/11/06	16		%	30
			Total Lead (Pb)	2023/11/06	12		%	35
			Total Mercury (Hg)	2023/11/06	NC		%	35
			Total Molybdenum (Mo)	2023/11/06	9.6		%	35
			Total Nickel (Ni)	2023/11/06	8.6		%	30
			Total Selenium (Se)	2023/11/06	NC		%	30
			Total Silver (Ag)	2023/11/06	NC		%	35
			Total Thallium (Tl)	2023/11/06	11		%	30
			Total Tin (Sn)	2023/11/06	NC		%	35
			Total Uranium (U)	2023/11/06	14		%	30
			Total Vanadium (V)	2023/11/06	21		%	30
			Total Zinc (Zn)	2023/11/06	15		%	30
B186241	EBO	Matrix Spike	Soluble Chloride (Cl)	2023/11/05		96	%	75 - 125
B186241	EBO	QC Standard	Soluble Chloride (Cl)	2023/11/05		84	%	75 - 125
B186241	EBO	Spiked Blank	Soluble Chloride (Cl)	2023/11/05		100	%	80 - 120
B186241	EBO	Method Blank	Soluble Chloride (Cl)	2023/11/05	<10		mg/L	
B186241	EBO	RPD	Soluble Chloride (Cl)	2023/11/05	4.8		%	30
B186247	EBO	QC Standard	Soluble Conductivity	2023/11/05		97	%	75 - 125



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	B186247	EBO	Spiked Blank	Soluble Conductivity	2023/11/05		97	%	90 - 110
	B186247	EBO	Method Blank	Soluble Conductivity	2023/11/05	<0.020		dS/m	
	B186247	EBO	RPD	Soluble Conductivity	2023/11/05	3.6		%	20
	B186342	VSC	Matrix Spike	Soluble Boron (B)	2023/11/05		94	%	75 - 125
				Soluble Calcium (Ca)	2023/11/05		104	%	75 - 125
				Soluble Magnesium (Mg)	2023/11/05		109	%	75 - 125
				Soluble Sodium (Na)	2023/11/05		99	%	75 - 125
				Soluble Potassium (K)	2023/11/05		104	%	75 - 125
	B186342	VSC	QC Standard	Soluble Calcium (Ca)	2023/11/05		107	%	75 - 125
				Soluble Magnesium (Mg)	2023/11/05		111	%	75 - 125
				Soluble Sodium (Na)	2023/11/05		110	%	75 - 125
				Soluble Sulphate (SO4)	2023/11/05		100	%	75 - 125
	B186342	VSC	Spiked Blank	Soluble Boron (B)	2023/11/05		95	%	80 - 120
				Soluble Calcium (Ca)	2023/11/05		105	%	80 - 120
				Soluble Magnesium (Mg)	2023/11/05		110	%	80 - 120
				Soluble Sodium (Na)	2023/11/05		99	%	80 - 120
				Soluble Potassium (K)	2023/11/05		104	%	80 - 120
	B186342	VSC	Method Blank	Soluble Boron (B)	2023/11/05	<0.10		mg/L	
				Soluble Calcium (Ca)	2023/11/05	<1.5		mg/L	
				Soluble Magnesium (Mg)	2023/11/05	<1.0		mg/L	
				Soluble Sodium (Na)	2023/11/05	<2.5		mg/L	
				Soluble Potassium (K)	2023/11/05	<1.3		mg/L	
				Soluble Sulphate (SO4)	2023/11/05	<5.0		mg/L	
	B186342	VSC	RPD	Soluble Calcium (Ca)	2023/11/05	14		%	30
				Soluble Magnesium (Mg)	2023/11/05	17		%	30
				Soluble Sodium (Na)	2023/11/05	11		%	30
				Soluble Potassium (K)	2023/11/05	NC		%	30
				Soluble Sulphate (SO4)	2023/11/05	4.9		%	30
	B187162	JTH	Matrix Spike	Hex. Chromium (Cr 6+)	2023/11/06		94	%	75 - 125
	B187162	JTH	Spiked Blank	Hex. Chromium (Cr 6+)	2023/11/06		92	%	80 - 120
	B187162	JTH	Method Blank	Hex. Chromium (Cr 6+)	2023/11/06	<0.080		mg/kg	
	B187162	JTH	RPD	Hex. Chromium (Cr 6+)	2023/11/06	NC		%	35
	B188501	KH2	Matrix Spike	Total Antimony (Sb)	2023/11/07		105	%	75 - 125
				Total Arsenic (As)	2023/11/07		105	%	75 - 125
				Total Barium (Ba)	2023/11/07		NC	%	75 - 125
				Total Beryllium (Be)	2023/11/07		105	%	75 - 125
				Total Cadmium (Cd)	2023/11/07		104	%	75 - 125
				Total Chromium (Cr)	2023/11/07		115	%	75 - 125
				Total Cobalt (Co)	2023/11/07		99	%	75 - 125
				Total Copper (Cu)	2023/11/07		93	%	75 - 125
				Total Lead (Pb)	2023/11/07		99	%	75 - 125
				Total Mercury (Hg)	2023/11/07		120	%	75 - 125
				Total Molybdenum (Mo)	2023/11/07		110	%	75 - 125
				Total Nickel (Ni)	2023/11/07		97	%	75 - 125
				Total Selenium (Se)	2023/11/07		105	%	75 - 125
				Total Silver (Ag)	2023/11/07		99	%	75 - 125
				Total Thallium (Tl)	2023/11/07		102	%	75 - 125
				Total Tin (Sn)	2023/11/07		109	%	75 - 125
				Total Uranium (U)	2023/11/07		100	%	75 - 125
				Total Vanadium (V)	2023/11/07		131 (1)	%	75 - 125
				Total Zinc (Zn)	2023/11/07		NC	%	75 - 125
	B188501	KH2	QC Standard	Total Antimony (Sb)	2023/11/07		117	%	14 - 183
				Total Arsenic (As)	2023/11/07		127	%	53 - 147
				Total Barium (Ba)	2023/11/07		106	%	80 - 119
				Total Cadmium (Cd)	2023/11/07		109	%	71 - 129



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Chromium (Cr)	2023/11/07		96	%	59 - 141
			Total Cobalt (Co)	2023/11/07		101	%	58 - 142
			Total Copper (Cu)	2023/11/07		109	%	83 - 117
			Total Lead (Pb)	2023/11/07		110	%	79 - 121
			Total Molybdenum (Mo)	2023/11/07		118	%	67 - 134
			Total Nickel (Ni)	2023/11/07		108	%	78 - 122
			Total Silver (Ag)	2023/11/07		93	%	46 - 154
			Total Tin (Sn)	2023/11/07		108	%	67 - 133
			Total Uranium (U)	2023/11/07		91	%	77 - 123
			Total Vanadium (V)	2023/11/07		105	%	79 - 121
			Total Zinc (Zn)	2023/11/07		108	%	79 - 122
B188501	KH2	Spiked Blank	Total Antimony (Sb)	2023/11/07		104	%	80 - 120
			Total Arsenic (As)	2023/11/07		100	%	80 - 120
			Total Barium (Ba)	2023/11/07		100	%	80 - 120
			Total Beryllium (Be)	2023/11/07		96	%	80 - 120
			Total Cadmium (Cd)	2023/11/07		96	%	80 - 120
			Total Chromium (Cr)	2023/11/07		97	%	80 - 120
			Total Cobalt (Co)	2023/11/07		97	%	80 - 120
			Total Copper (Cu)	2023/11/07		98	%	80 - 120
			Total Lead (Pb)	2023/11/07		98	%	80 - 120
			Total Mercury (Hg)	2023/11/07		118	%	80 - 120
			Total Molybdenum (Mo)	2023/11/07		98	%	80 - 120
			Total Nickel (Ni)	2023/11/07		96	%	80 - 120
			Total Selenium (Se)	2023/11/07		102	%	80 - 120
			Total Silver (Ag)	2023/11/07		94	%	80 - 120
			Total Thallium (Tl)	2023/11/07		101	%	80 - 120
			Total Tin (Sn)	2023/11/07		97	%	80 - 120
			Total Uranium (U)	2023/11/07		99	%	80 - 120
			Total Vanadium (V)	2023/11/07		97	%	80 - 120
			Total Zinc (Zn)	2023/11/07		98	%	80 - 120
B188501	KH2	Method Blank	Total Antimony (Sb)	2023/11/07	<0.50		mg/kg	
			Total Arsenic (As)	2023/11/07	<1.0		mg/kg	
			Total Barium (Ba)	2023/11/07	<1.0		mg/kg	
			Total Beryllium (Be)	2023/11/07	<0.40		mg/kg	
			Total Cadmium (Cd)	2023/11/07	<0.050		mg/kg	
			Total Chromium (Cr)	2023/11/07	<1.0		mg/kg	
			Total Cobalt (Co)	2023/11/07	<0.50		mg/kg	
			Total Copper (Cu)	2023/11/07	<1.0		mg/kg	
			Total Lead (Pb)	2023/11/07	<0.50		mg/kg	
			Total Mercury (Hg)	2023/11/07	<0.050		mg/kg	
			Total Molybdenum (Mo)	2023/11/07	<0.40		mg/kg	
			Total Nickel (Ni)	2023/11/07	<1.0		mg/kg	
			Total Selenium (Se)	2023/11/07	<0.50		mg/kg	
			Total Silver (Ag)	2023/11/07	<0.20		mg/kg	
			Total Thallium (Tl)	2023/11/07	<0.10		mg/kg	
			Total Tin (Sn)	2023/11/07	<1.0		mg/kg	
			Total Uranium (U)	2023/11/07	<0.20		mg/kg	
			Total Vanadium (V)	2023/11/07	<1.0		mg/kg	
			Total Zinc (Zn)	2023/11/07	<10		mg/kg	
B188501	KH2	RPD	Total Antimony (Sb)	2023/11/07	8.1		%	30
			Total Arsenic (As)	2023/11/07	3.8		%	30
			Total Barium (Ba)	2023/11/07	0.14		%	35
			Total Beryllium (Be)	2023/11/07	12		%	30
			Total Cadmium (Cd)	2023/11/07	0.67		%	30
			Total Chromium (Cr)	2023/11/07	6.4		%	30



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cobalt (Co)	2023/11/07	9.4		%	30
			Total Copper (Cu)	2023/11/07	7.6		%	30
			Total Lead (Pb)	2023/11/07	5.2		%	35
			Total Mercury (Hg)	2023/11/07	NC		%	35
			Total Molybdenum (Mo)	2023/11/07	5.0		%	35
			Total Nickel (Ni)	2023/11/07	8.8		%	30
			Total Selenium (Se)	2023/11/07	NC		%	30
			Total Silver (Ag)	2023/11/07	NC		%	35
			Total Thallium (Tl)	2023/11/07	7.4		%	30
			Total Tin (Sn)	2023/11/07	NC		%	35
			Total Uranium (U)	2023/11/07	3.2		%	30
			Total Vanadium (V)	2023/11/07	6.8		%	30
			Total Zinc (Zn)	2023/11/07	5.5		%	30
B191443	MPU	Matrix Spike	Soluble Boron (B)	2023/11/08		96	%	75 - 125
			Soluble Calcium (Ca)	2023/11/08		97	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/08		105	%	75 - 125
			Soluble Sodium (Na)	2023/11/08		NC	%	75 - 125
			Soluble Potassium (K)	2023/11/08		98	%	75 - 125
B191443	MPU	QC Standard	Soluble Calcium (Ca)	2023/11/09		97	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/09		97	%	75 - 125
			Soluble Sodium (Na)	2023/11/09		95	%	75 - 125
			Soluble Potassium (K)	2023/11/09		90	%	75 - 125
			Soluble Sulphate (SO4)	2023/11/09		83	%	75 - 125
B191443	MPU	Spiked Blank	Soluble Boron (B)	2023/11/08		95	%	80 - 120
			Soluble Calcium (Ca)	2023/11/08		100	%	80 - 120
			Soluble Magnesium (Mg)	2023/11/08		104	%	80 - 120
			Soluble Sodium (Na)	2023/11/08		98	%	80 - 120
			Soluble Potassium (K)	2023/11/08		97	%	80 - 120
B191443	MPU	Method Blank	Soluble Boron (B)	2023/11/08	<0.10		mg/L	
			Soluble Calcium (Ca)	2023/11/08	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/11/08	<1.0		mg/L	
			Soluble Sodium (Na)	2023/11/08	<2.5		mg/L	
			Soluble Potassium (K)	2023/11/08	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/11/08	<5.0		mg/L	
B191443	MPU	RPD	Soluble Calcium (Ca)	2023/11/08	2.2		%	30
			Soluble Magnesium (Mg)	2023/11/08	4.4		%	30
			Soluble Sodium (Na)	2023/11/08	0.90		%	30
			Soluble Potassium (K)	2023/11/08	3.9		%	30
			Soluble Sulphate (SO4)	2023/11/08	2.0		%	30
B191531	ZI	Matrix Spike	Soluble Chloride (Cl)	2023/11/08		100	%	75 - 125
B191531	ZI	QC Standard	Soluble Chloride (Cl)	2023/11/08		90	%	75 - 125
B191531	ZI	Spiked Blank	Soluble Chloride (Cl)	2023/11/08		102	%	80 - 120
B191531	ZI	Method Blank	Soluble Chloride (Cl)	2023/11/08	<10		mg/L	
B191531	ZI	RPD	Soluble Chloride (Cl)	2023/11/08	6.3		%	30
B191618	EBO	QC Standard	Soluble Conductivity	2023/11/08		92	%	75 - 125
B191618	EBO	Spiked Blank	Soluble Conductivity	2023/11/08		96	%	90 - 110
B191618	EBO	Method Blank	Soluble Conductivity	2023/11/08	<0.020		dS/m	



BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	B191618	EBO	RPD	Soluble Conductivity	2023/11/08	3.3		%	20
<p>N/A = Not Applicable</p> <p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>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.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>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)</p> <p>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).</p> <p>(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.</p>									



VALIDATION SIGNATURE PAGE

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

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Maria Magdalena Florescu, Ph.D., P.Chem., QP, Laboratory Manager

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



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BUREAU
VERITAS

Bureau Veritas Job #: C385037
Report Date: 2023/11/10

Ausenco Sustainability Inc.
Client Project #: 102604-01

VALIDATION SIGNATURE PAGE(CONT'D)

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

General Manager responsible for Alberta Environmental laboratory operations.



INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #10658 Ausenco Sustainability Inc.	Company Name:	Company Name: Erin Moffatt	Quotation #: C21878	Bureau Veritas Job #:	Bottle Order #:	709129	
Attention: Accounts Payable	Attention:	Attention: Erin Moffatt	P.O. #:	709129		Barcode: 709129	
Address: Suite 1430, 401-9 Avenue	Address:	Address:	Project: 102604-01	COC #:	Project Manager:	Danielle Boisvert	
Address: CALGARY AB T2P 3C5	Address:	Address:	Project Name:	Barcode: C#709129-02-01		Danielle Boisvert	
Tel: (403) 264-0671 Fax: (403) 264-0670	Tel:	Tel:	Site #:	Barcode: C#709129-02-01		Danielle Boisvert	
Email: procure2pay.na@ausenco.com	Email:	Email: erin.moffatt@ausenco.com	Sampled By:				

Regulatory Criteria: <input type="checkbox"/> ATI <input type="checkbox"/> CCME <input type="checkbox"/> Other:	Special Instructions:	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)											Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
		Metals Field Filtered ? (Y/N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Kometab	Ammonia-N (Total)	Total Kjeldahl Nitrogen (Total)	Biochemical Oxygen Demand	COD by Colorimeter	Oxygen (Dissolved)	Total Phosphorus	Phosphorus-P (Total, Dissolved)	TSS, TDS, TURB	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 #)	

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y/N)	Routine Water & Diss. Regulated Metals	Orthophosphate by Kometab	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	WG-02	23/10/19	1025	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	soil & water sample
2	WG-4a	23/10/18	1420	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
3	WG-4B	23/10/18	1355	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
4	WG-4C	23/10/19	1050	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
5	WG-4D	23/10/18	1324	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
6	WG-5B	23/10/18	1255	W/S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	
7	WA-06	23/10/19	1018	S													only soil
8	WA-07	23/10/19	1007	S													only soil
9	WA-03	23/10/19	1120	S													only soil
10																	

* 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		
Erin Moffatt		23/10/19	13:10	AJRAV28		2023/10/19	13:11		Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
									<input type="checkbox"/>	4/5/5	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
										0/4/4	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 90 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER



mca-10-1590

Appendix D

Photo Log



Photo 1 View west from WQ-01 sample site, located within the Reference Wetland. Photo taken on May 30, 2023.



Photo 2 View north from WQ-01 sample site, located within the Reference Wetland. Photo taken on May 30, 2023



Photo 3 View east from WQ-01 sample site, located within the Reference Wetland. Photo taken on May 30, 2023.

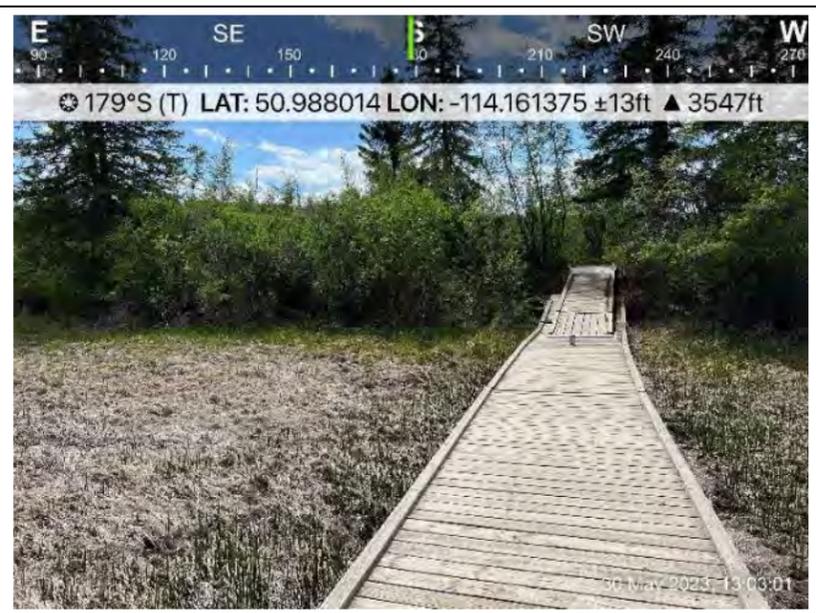


Photo 4 View south from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on May 30, 2023

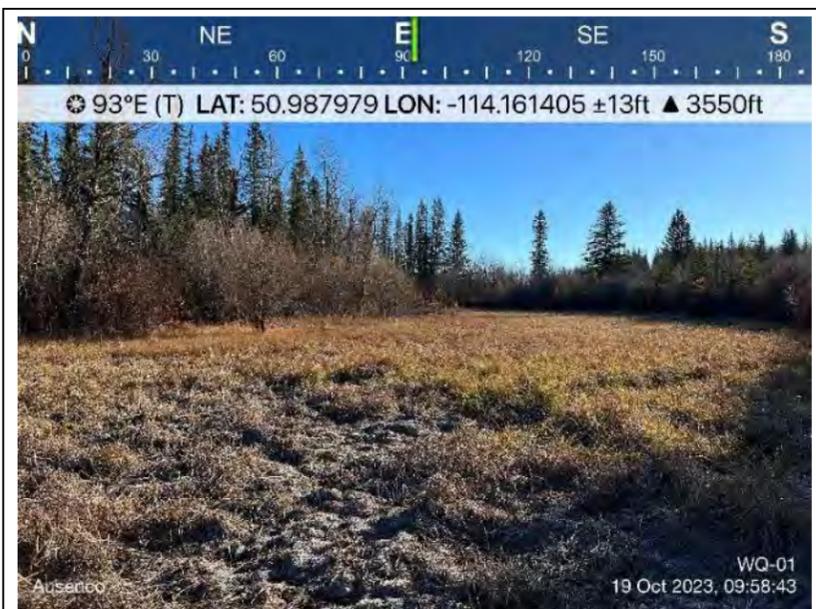


Photo 5 View east from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 19, 2023.



Photo 6 View west from WQ-01 sample site, located within the Reference Wetland. Photo taken during fall sampling on October 19, 2023.



Photo 7 View north from WQ-01 sample site, located within the Reference Wetland. Photo taken on October 19, 2023.



Photo 8 View of ground at WQ-01 sample site, located within the Reference Wetland. Photo taken on October 19, 2023.



Photo 9 View west from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 10 View south from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 11 View north from WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.

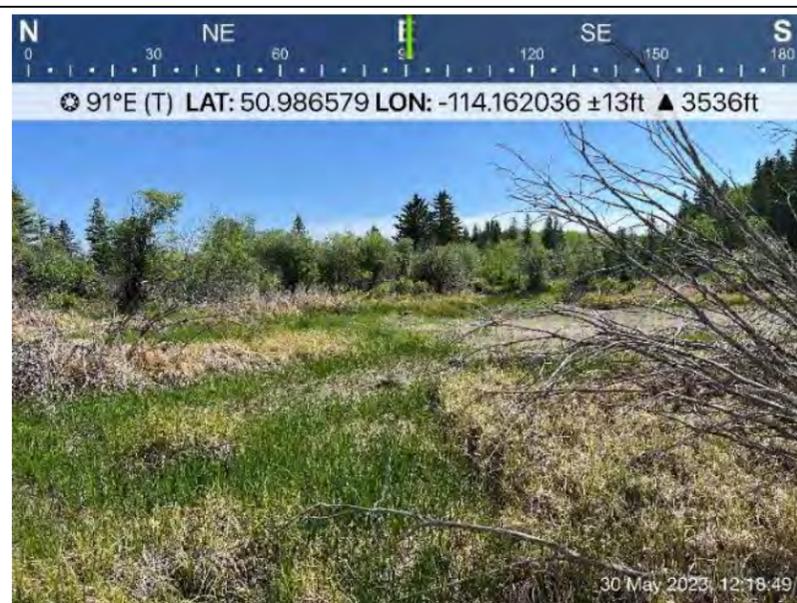


Photo 12 View of the ground conditions at WQ-02 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.

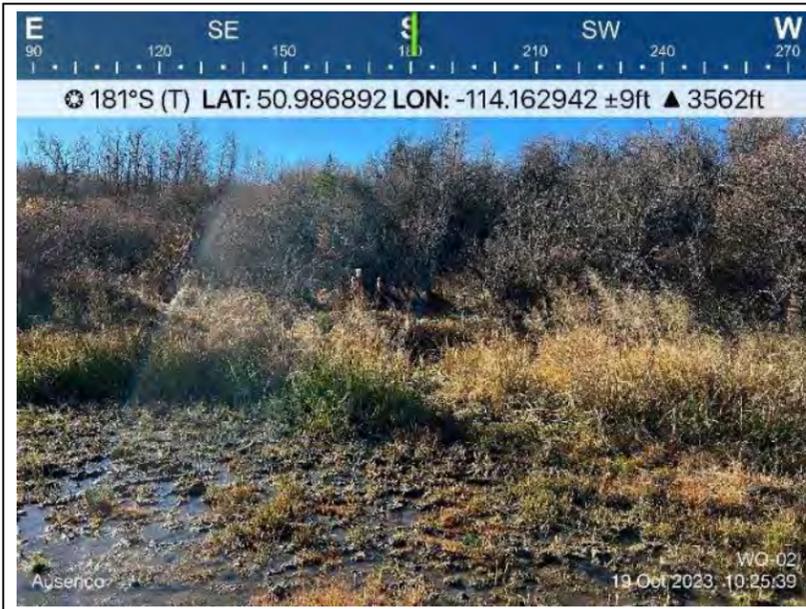


Photo 13 View south from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 14 View north from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.

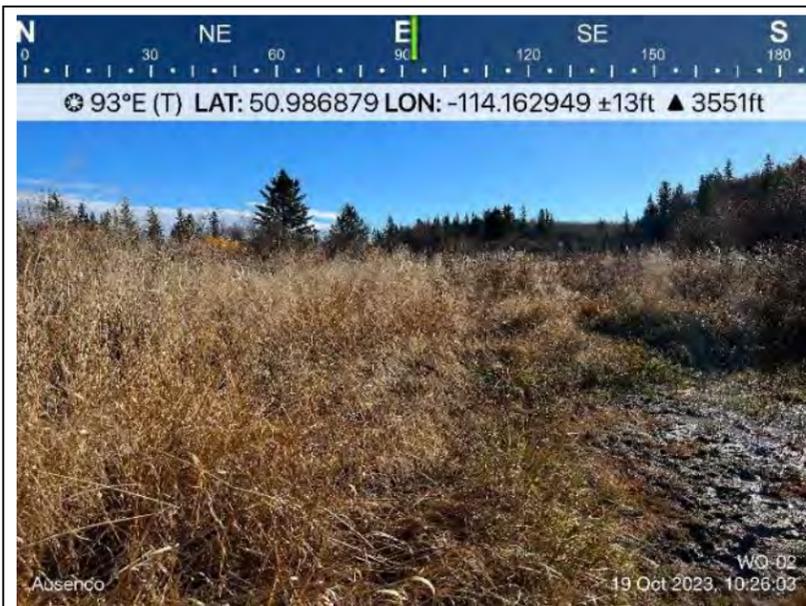


Photo 15 View east from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 16 View of ground conditions from WQ-02 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 17 View east from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 18 View north from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 19 View south from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 20 View west from WQ-03 sample site, located within Wetland 06. Photo taken during spring sampling on May 30, 2023.



Photo 21 View west from WQ-03 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 22 View north from WQ-03 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 23 View south from WQ-03 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 24 View of ground conditions from WQ-03 sample site, located within Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 25 View east from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 26 View north from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 27 View south from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 28 View north from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 29 View south from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 30 View east from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 31 Ground conditions at WQ-06, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 32 View west from WQ-06 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 33 View north from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 34 Ground conditions at WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on May 30, 2023.



Photo 35 View east from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 36 View west from WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 37 View south from the WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 38 View east from the WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 39 View south from the WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 40 View north from the WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 41 View west from the WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 42 Ground conditions at WQ-07 sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 19, 2023.



Photo 43 View east from WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 26, 2023.



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 26, 2023.



Photo 45 Ground view at WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 26, 2023.



Photo 46 View north from WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during spring sampling on May 26, 2023.



Photo 47 View south from WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 48 View north from WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 49 View west from WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 50 Ground conditions at WQ-04b sample site, located downslope of the SWCRR Project and Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 51 View north from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 26, 2023.



Photo 52 View east from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 26, 2023.



Photo 53 View west from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during spring sampling on May 26, 2023.



Photo 54 View south from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during Spring sampling on May 26, 2023.



Photo 55 View south from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 56 View east from WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 57 Ground conditions at the WQ-05b sample site, located downslope of the SWCRR Project and Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 58 View north of WQ-4a sample site located upslope of the SWCRR Project within Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 59 View west of WQ-4a sample site located upslope of the SWCRR Project within Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 60 View south of WQ-4a sample site located upslope of the SWCRR Project within Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 61 View east from WQ-4a sample site, located upslope of the SWCRR Project within Wetland 08. Photo taken during spring sampling on May 30, 2023.



Photo 62 View west from WQ-4a sample site, located upslope of the SWCRR Project within Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 63 View east from WQ-4a sample site, located upslope of the SWCRR Project within Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 64 View south from WQ-4a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on October 18, 2023.



Photo 65 View of substrate at WQ-4a sample site, located upslope of the SWCRR Project within Wetland 08. Photo taken during fall sampling on October 18, 2023.



Photo 66 Ground conditions at WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 26, 2023.



Photo 67 View north of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 68 View south of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 69 View north of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 19, 2023.



Photo 70 View south of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 19, 2023.



Photo 71 View east of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 19, 2023.



Photo 72 View west of the WQ-4c sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 19, 2023.



Photo 73 View north of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 74 View south of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 75 View east of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 76 View west of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.

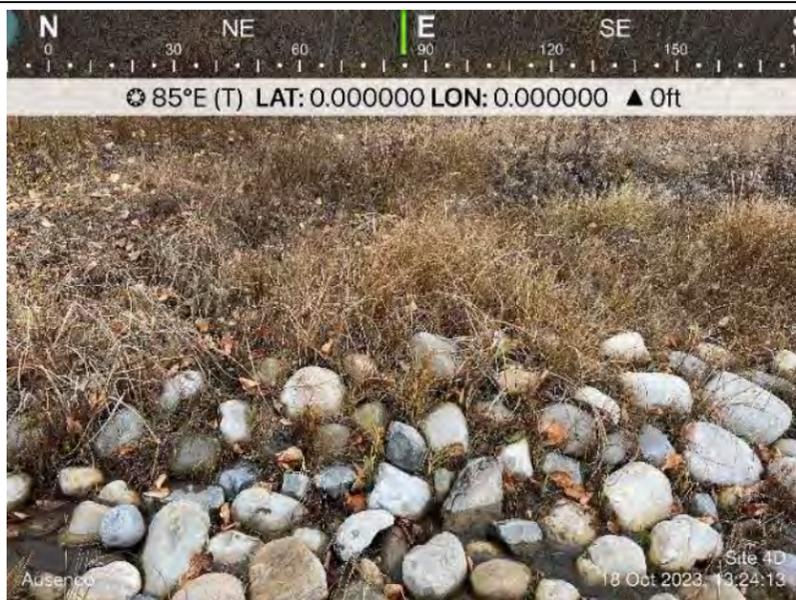


Photo 77 View east of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling October 18, 2023.



Photo 78 View south of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling October 18, 2023.



Photo 79 View west of the WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling October 18, 2023.



Photo 80 View ground view at WQ-4d sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling October 18, 2023.



Photo 81 View north of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 82 View east of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30 2023



Photo 83 View west of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30, 2023.



Photo 84 View south of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during spring sampling on May 30 2023



Photo 85 View west of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 86 View east of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 87 View north of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 88 View south of the WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 89 Ground condition at WQ-5a sample site, located upslope of the SWCRR Project within Wetland 09. Photo taken during fall sampling on October 18, 2023.



Photo 90 View upstream (west) of the FL-01 inflow site. Photo taken during spring sampling on June 2, 2023.



Photo 91 View upstream (east) of the FL-01 inflow site. Photo taken during spring sampling on May 26, 2023.



Photo 92 View of the west bank at the FL-01 inflow site. Photo taken during spring sampling on May 26, 2023.



Photo 93 View of east bank at the FL-01 inflow site. Photo taken during spring sampling on May 26, 2023.



Photo 94 View south of the FL-01 inflow site. Photo taken during fall sampling on October 19, 2023.

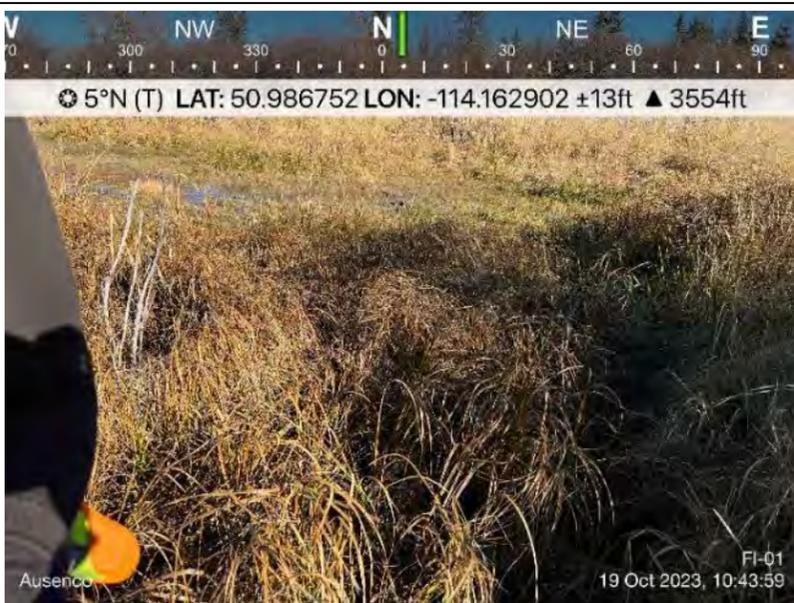


Photo 95 View north of the FL-01 inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 96 View of ground conditions at the FL-01 inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 97 View west at the FL-01 inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 98 View of the eastern bank of the FL-02 Inflow site. Photo taken during spring sampling on May 26, 2023.



Photo 99 View downstream of FL-02 Inflow site. Photo taken during spring sampling on May 26, 2023.



Photo 100 View upstream of the FL-02 Inflow site. Photo taken during spring sampling on May 26, 2023.

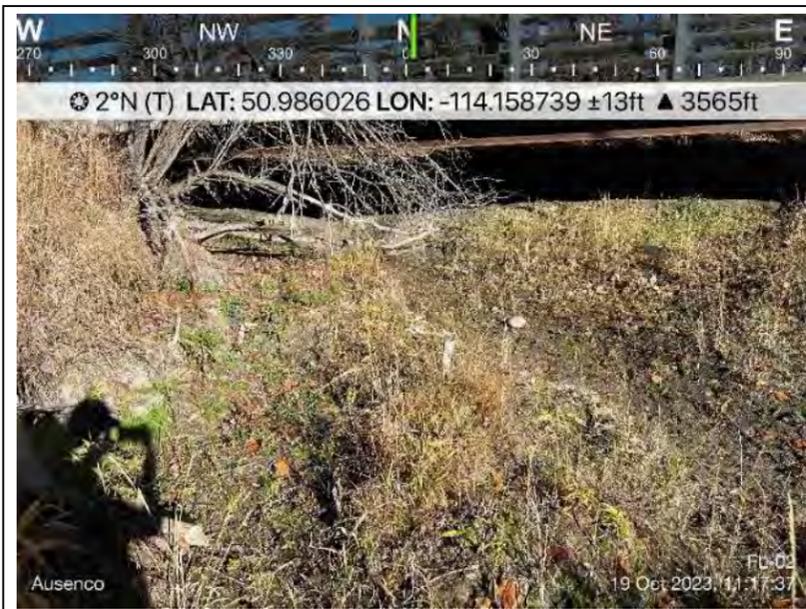


Photo 101 View downstream (north) of the FL-02 Inflow site. A beaver dam located at the downstream extent of the inflow channel prevents surface connectivity between the Channel and Wetland 06. Photo taken during fall sampling on October 19, 2023.



Photo 102 View east from the FL-02 Inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 103 View of the western shore of the FL-02 Inflow site. Photo taken during fall sampling on October 27, 2023.



Photo 104 Ground conditions at the FL-02 Inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 105 .View north of the FL-03 Inflow site. Photo taken during spring sampling on May 30, 2023.



Photo 106 View south of the FL-03 Inflow site. Photo taken during spring sampling on May 30, 2023.



Photo 107 .View north of the FL-03 Inflow site. Photo taken during spring sampling on May 30, 2023.

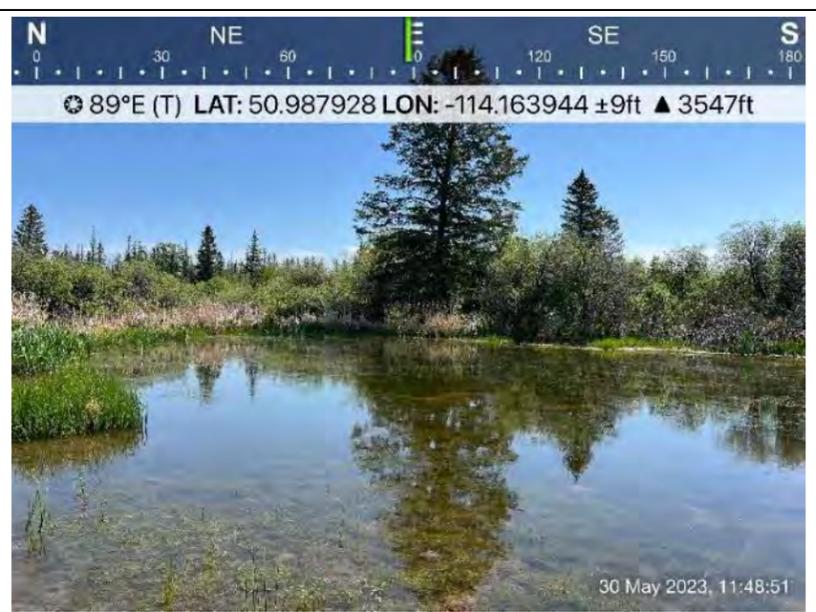


Photo 108 .View east of the FL-03 Inflow site. Photo taken during spring sampling on May 30, 2023.

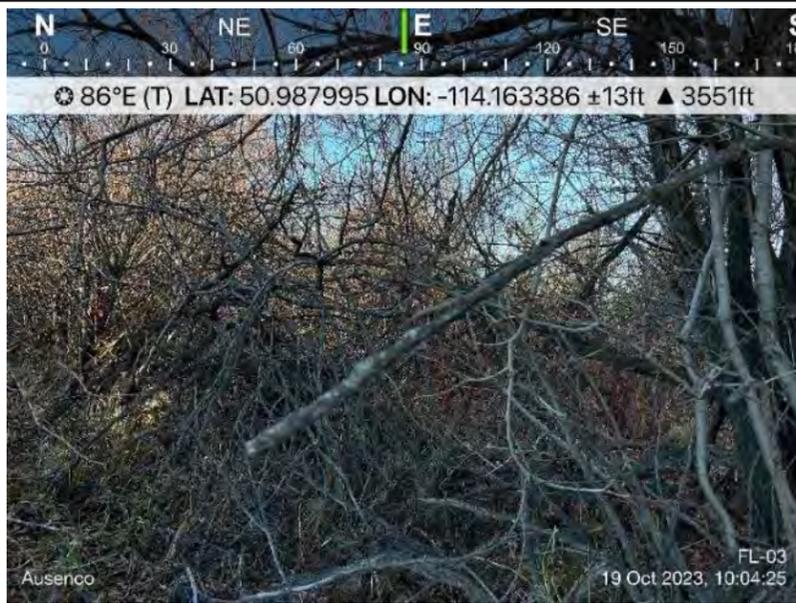


Photo 109 View east of the FL-03 Inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 110 View west of the FL-03 Inflow site. Photo taken during fall sampling on October 19, 2023.

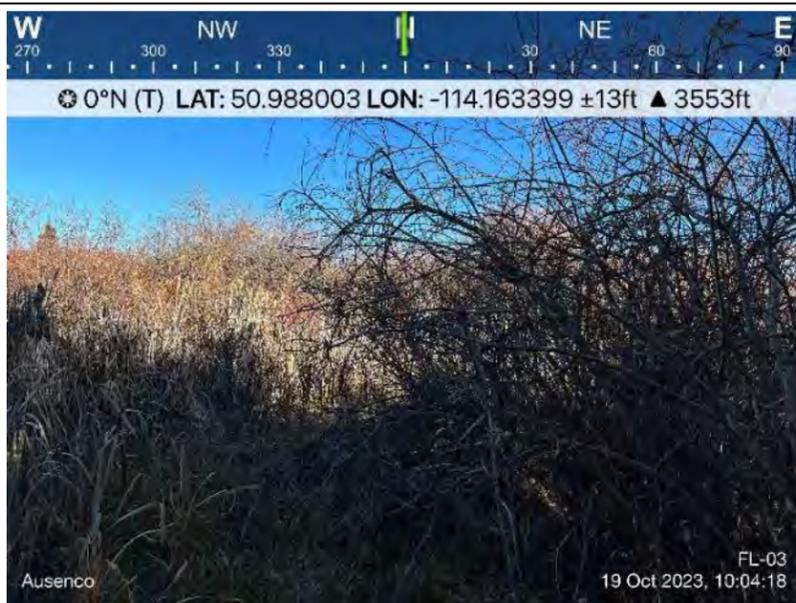


Photo 111 View north at the FL-03 Inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 112 View of ground conditions at the dry FL-03 Inflow site. Photo taken during fall sampling on October 19, 2023.



Photo 113 View east of the FL-04 outflow site. Photo taken during spring sampling on June 2, 2023.

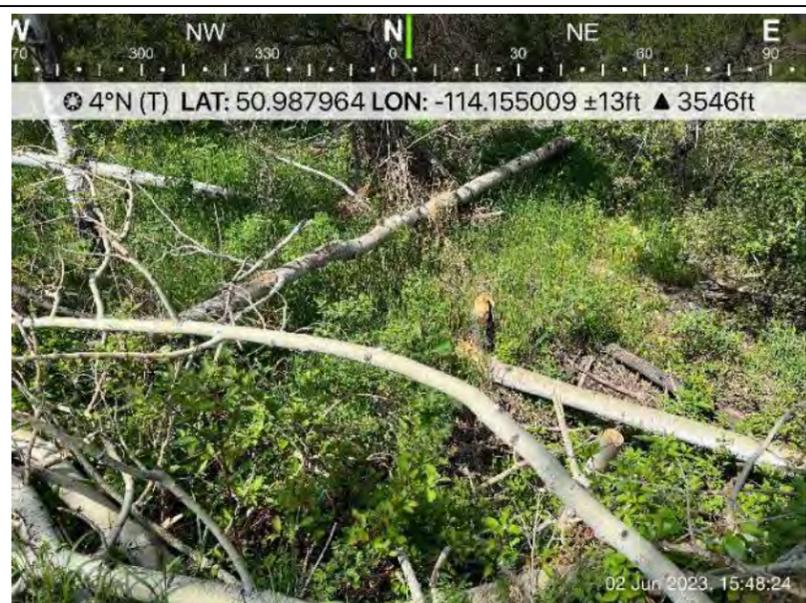


Photo 114 View northeast of the FL-04 outflow site. Photo taken during spring sampling on June 2, 2023.

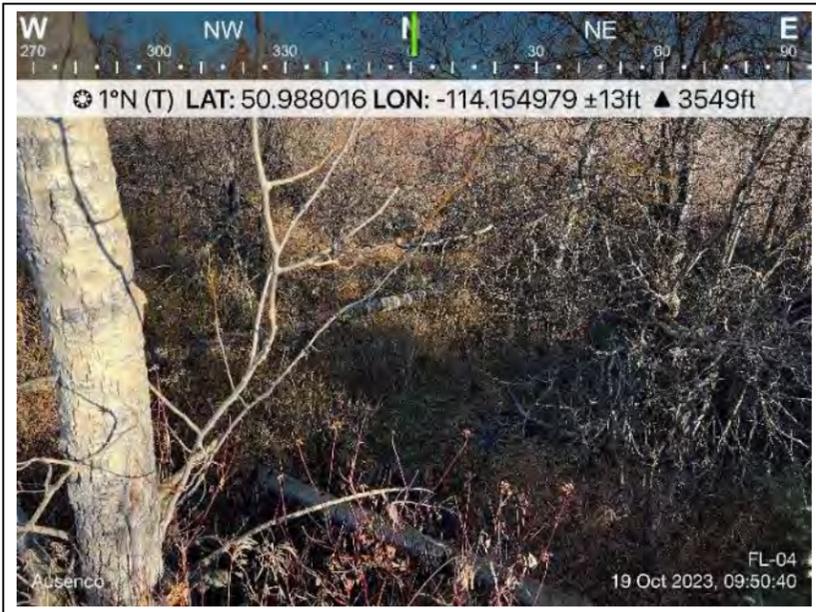


Photo 115 View north of the FL-04 outflow site. Photo taken during fall sampling on October 19, 2023.



Photo 116 View south of the FL-04 outflow site. Photo taken during fall sampling on October 19, 2023.



Photo 117 View west at the FL-04 outflow site. Photo taken during fall sampling on October 19, 2023.



Photo 118 View of ground conditions at the FL-04 outflow site. Photo taken during fall sampling on October 19, 2023.



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